

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. Patent No. 8,121,904

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Assignee: Clear With Computers, LLC

Title: ELECTRONIC PROPOSAL PREPARATION SYSTEM

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DECLARATION OF EDWARD A. FOX, PH.D.

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I, Edward A. Fox, Ph.D., hereby declare as follows:

I. INTRODUCTION AND QUALIFICATIONS

1. My name is Edward Alan Fox. I live with my wife in Blacksburg, Virginia. We have four sons and four grandchildren.

2. I have worked with computers since the fall of 1965 when, at age 15, I took Saturday courses at Columbia University in New York City. In 1972, I earned my B.S. degree in Electrical Engineering, Computer Science Option, at the Massachusetts Institute of Technology (MIT).

3. After teaching data processing 1971-1972 at Florence Darlington Technical College in Florence, SC, where I guided students on how to use computers to prepare business reports and a variety of electronic services, I was Data Processing Manager at Vulcraft, a division of Nucor Corporation. There I supported all parts of the company, including implementing systems to prepare product proposals for customers based on answers to their questions, along with engineering designs, inventory, payroll, and manufacturing instructions. After moving in 1978 to Ithaca, NY for graduate work at Cornell University, I earned M.S. (1981) and Ph.D. (1983) degrees in Computer Science. My specialty area was information retrieval (*i.e.*, the field underlying modern search engines), including how to prepare customized answers to user queries.

4. I worked 1982-1983 as the Manager of Information Systems at the International Institute of Tropical Agriculture, Ibadan, Nigeria, where I ran the computer operations in support of the mission to advance tropical agriculture. From August 1983 to the present I have worked in the Department of Computer Science at Virginia Tech, Blacksburg, VA. In 1988 I was tenured, and in 1995 I became a full Professor. I also serve as Faculty Advisor to Information Technology, reporting to Virginia Tech's Vice President for Information Technology, helping broadly with campus use of computers at Virginia's largest public university.

5. Since the early 1990s I have taught a course called Computer Science 4624: Multimedia, Hypertext, and Information Access. This is an undergraduate capstone course for seniors. It was one of the first courses offered in the United States at this level that covers these important technologies.

6. Over the years I have taught thousands of students, and have graded many thousands of reports and assignments. I served as adviser for more than 37 M.S. or Ph.D. theses. In addition to courses at Virginia Tech, I have taught over 77 tutorials in more than 28 countries. My research, supported by 114 grants/contracts, led to publications and presentations including: 16 books/proceedings, 105 journal/magazine articles, 49 book chapters, 180 refereed (and 40 other) conference/workshop papers, 66 keynote/banquet/international

invited/distinguished speaker presentations, 38 demonstrations, 116 technical reports, and over 300 additional oral presentations.

7. For the Association for Computing Machinery (“ACM”) I served 1988-91 as editor-in-chief of ACM Press Database Products (responsible for the broad area of electronic publishing including online, CD-ROM, hypertext, interactive multimedia, and developing a digital library). This led in part to my guest editing a Special Section on Interactive Technologies for the July 1989 Communications of the ACM, covering the emergence of Interactive Digital Multimedia Systems (Ex. 1020), and to a video documentary “Interactive Digital Video.” Ex. 1018.

8. I served from 1987-95 as vice chair and then chair of the ACM Special Interest Group on Information Retrieval, and from 1992-94 as founder and chairman of the Steering Committee for the ACM Multimedia series of conferences. I was lead guest editor for Communications of the ACM special issues about digital multimedia and digital libraries: July 1989, April 1991, April 1995, April 1998, and May 2001. Additionally, I was editor for the Morgan Kaufmann Publishers book series on Multimedia Information and Systems.

9. At present among other responsibilities, I serve as:

- a. Executive Director and Founder, Networked Digital Library of Theses and Dissertations (“NDLTD,” incorporated May 2003)

- b. Member, Board of Directors, Computing Research Association
 - c. Chair, Steering Committee, ACM/IEEE-CS Joint Conference on Digital Libraries
 - d. Member of 9 editorial boards, including for: ACM Transactions on Information Systems, Information Processing and Management, and Multimedia Tools and Applications
10. I am a founding member of the Virginia Tech Center for Human-Computer Interaction, and am experienced in designing, building, and managing work on many information systems that provide customized services based on user input.
11. My research, teaching, and service have related to areas including digital libraries, information storage and retrieval, hypertext, hypermedia, multimedia, superimposed information, computing education, computational linguistics, CD-ROM and optical disc technology, electronic publishing, artificial intelligence, and expert systems. Some of my publications related to CD-ROM, hypertext, hypermedia, multimedia, and/or composite documents include:
- a. REPRESENTATIVE PUBLICATIONS:
 - i. E. Fox. Advances in Interactive Digital Multimedia Systems. IEEE Computer, Oct. 1991, 24(10): 9-21. Reprinted in Readings in Groupware and Computer Supported Cooperative Work, ed.

Ron Baecker, Morgan Kaufmann, San Mateo, CA, 1993, 342-354 and as Chapter 1 of Multimedia Computing: Preparing for the 21st Century, ed. Sorel Reisman, Idea Group Publishing, Harrisburg, PA, 1994, 3-33. Ex. 1019.

- ii. A. Siochi, E.A. Fox, D. Hix, E.E. Schwartz, A. Narasimhan, and W. Wake. The Integrator: A prototype for flexible development of interactive digital multimedia applications. Interactive Multimedia, July-Sept. 1991, 2(3): 5-26. Ex. 1017.
- iii. E. Fox. Standards and the Emergence of Digital Multimedia Systems. Commun. of the ACM, Apr. 1991, 34(4): 26-29. Guest ed. intro., Special Section on Digital Multimedia. Ex. 1021.
- iv. E. Fox. How to Proceed Toward Electronic Archives and Publishing. Psychological Science, Nov. 1990, 1(6): 355-8. Ex. 1024.
- v. E. Fox. The Coming Revolution in Interactive Digital Multimedia Systems. Commun. of the ACM, 1989, 32(7): 794-801. Guest ed. intro. Special Section on Interactive Technologies. Ex. 1020.
- vi. E. Fox, Q.F. Chen, and R.K. France. Integrating Search and Retrieval with Hypertext. In Hypertext/Hypermedia Handbook,

- ed. E. Berk and J. Devlin, McGraw-Hill, New York, 1991, 329-355. Ex. 1033.
- vii. E. Fox, B. Rous, and G. Marchionini. ACM's Hypertext and Hypermedia Publishing Projects. In Hypertext/Hypermedia Handbook, ed. E. Berk and J. Devlin, McGraw-Hill, New York, 1991, 465-467. Ex. 1034.
- viii. E. Fox. Optical Disks and CD-ROM: Publishing and Access. In Annual Review of Information Science and Technology, Martha E. Williams (ed.), ASIS / Elsevier Science Publishers B.V., Amsterdam, 1988, Vol. 23, 85-124. Ex. 1029.
- ix. E. Fox. Information Retrieval: Research into New Capabilities. In CD-ROM: The New Papyrus, Steve Lambert and Suzanne Ropiequet (eds.), Microsoft Press, Redmond, WA, 1986, 143-174. Ex. 1027.
- x. E. Fox. Multimedia Update. Invited presentation appearing in ONLINE/CD-ROM'91 Conference Proceedings, Nov. 11-13, 1991, San Francisco, CA, 65-69.
- xi. E. Fox, Qi Fan Chen. Why and How We Should Have Hypertext/Hypermedia Standards: ACM's Need and the CODER/LEND Approach. Refereed poster selected for workshop

discussion at Hypertext Standardization Workshop, National Institute of Standards and Technology, Jan. 16-18, 1990, Gaithersburg, MD, 10 pages.

- xii. E. Fox. Advances in Text and Image Publishing for CD-ROM. Invited presentation for National Online Meeting, May 10, 1989, New York, 165-170.
- xiii. E. Fox. Analysis and Retrieval of Composite Documents. ASIS '85, Proceedings of the 48th American Society for Information Science Annual Meeting, October 20-24, 1985, Las Vegas, Nevada, 22: 54-58.
- xiv. E. Fox. Composite Document Extended Retrieval: An Overview. Proc. Research and Devel. in Information Retrieval, Eighth Annual International ACM SIGIR Conf., June 5-7, 1985, Montreal, 42-53.

b. CD-ROMs:

- i. E. Fox, editor and project manager. Virginia Disc One. Produced by Nimbus Records, 1990. Blacksburg VA: VPI&SU Press. Contains about 600 megabytes in about 6000 files of data and DOS executable programs. ISBN 0-929900-00-6. Ex. 1036 is the explanatory booklet stored on and accompanying this CD-ROM.

- ii. E. Fox, editor and project manager. Virginia Disc Two. Produced by Nimbus Records, 1990. Blacksburg VA: VPI&SU Press. Contains 2 searchable library catalog collections accessible with MicroVTLS and Personal Librarian. ISBN 0-929900-02-2.
- iii. E. Fox, editor and project manager. Virginia Disc Three. Produced by Nimbus Records, 1990. Blacksburg VA: VPI&SU Press. Contains about 300 megabytes of data and software of interest for Macintosh systems running the A/UX version of UNIX. ISBN 0-929900-01-4.

c. VIDEOTAPE DOCUMENTARY:

- i. E. Fox, executive producer, script writer. Interactive Digital Video. Five minute preview (Aug. 1989), hour final program (Jan. 1990), supplementing July 1989 Communications of the ACM, produced for ACM Press Database and Electronic Products with assistance from IBM T. J. Watson Research Center (with producer/director Guillermo Pulido). Ex. 1018.

12. My curriculum vitae is available online at <http://fox.cs.vt.edu/cv.htm>; a recent copy is attached hereto.

13. I have been retained by Hyundai Motor America, Inc. (“Hyundai”) as an expert in electronic systems for creating customized documents, electronic

publishing, hypertext, hypermedia, multimedia, CD-ROM, database, and similar information processing and management technologies, in connection with this matter.

14. I am being compensated at my usual and customary hourly rate of \$400 (or \$500 for testimony during trial or deposition). My compensation is not dependent upon the outcome of the Petition for *Inter Partes* Review that I understand Hyundai's attorneys are filing along with this Declaration. Nor is my compensation dependent upon the outcome of any related litigation proceedings, the opinions I express, or my testimony.

15. I have previously testified as an expert at trial or by deposition in several patent cases, including in the past four years, in *Personalized User Model, LLP vs. Google, Inc.* C.A. No. 09-525 (LPS) (D. Del. 2012) and *Bright Response, LLC vs. Google Inc., et al.*, C.A. No. 2:07-CV-371-CE (E.D. Tex. 2010).

16. Additional information may become available which would further support or modify the conclusions that I have reached to date. Accordingly, I reserve the right to modify and/or enlarge this opinion or the bases thereof upon consideration of any further discovery, testimony, or other evidence, including any issues raised by any expert or witness of the patentee, Clear With Computers LLC, or based upon interpretations of or conclusions about any claim term by the Patent Office different than those proposed in this declaration.

II. SCOPE OF ASSIGNMENT

17. I have been retained to opine on the unpatentability of U.S. Patent No. 8,121,904 (the “’904 Patent”). I have studied the ‘904 Patent (Ex. 1013) in detail; my observations follow:

18. The ‘904 Patent was filed Oct. 11, 2009. It claims priority to an earlier patent application filed May 5, 1992, which issued as U.S. Patent No. 5,493,490. It was issued to Jerome D. Johnson on Feb. 21, 2012, with assignee Clear With Computers, LLC (“CWC”). It has 40 claims and 43 drawing sheets.

19. The ‘904 Patent’s title is “Electronic Proposal Preparation System.” The field of invention is described (1:20-26) as: “The present invention relates to a system for creating a customized proposal by linking together product pictures, environment pictures showing environments in which the product may be used, and text related to the product. The system includes means for linking together predetermined product pictures, environment pictures, and text based upon a potential customer’s answers to predetermined queries.”

20. Put succinctly, the ‘904 Patent discloses a system for creating customized “proposals” for the sale of a tangible product generated using electronic templates “filled in” with stored images and text. *E.g.*, ‘904 Patent, Abstract. One such template is shown below, reproduced from Figure 1B.

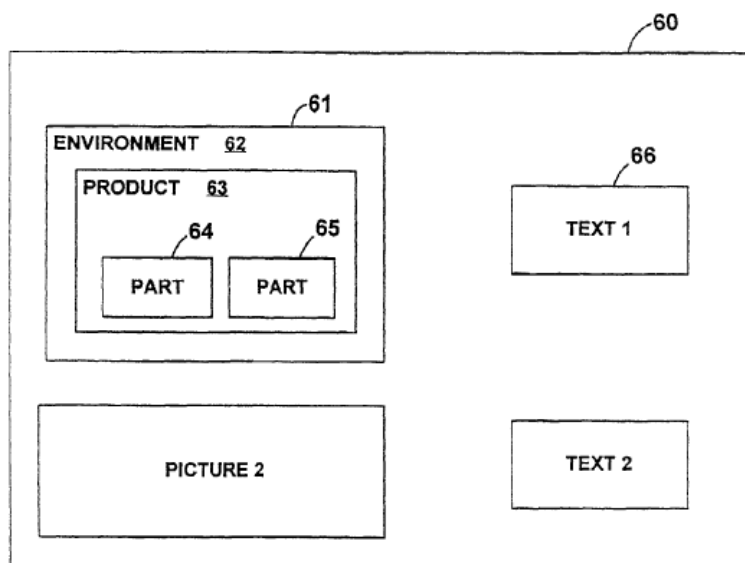


FIG. 1B

21. Figure 2 below illustrates the preferred embodiment of the ‘904 Patent, including several elements that embody claims 22-40: (1) a user interface through which users input predetermined answers to predetermined queries (element 102) using, for example, menus, ‘904 Patent, 8:42-60; (2) a “selection device” (that according to the challenged claims) loads page templates and causes them to be “filled in,” in response to the user input (element 101), *e.g.*, ‘904 Patent, 17:13-18:45; (3) an active database that electronically stores user input (element 103), ‘904 Patent, 6:1-2; and (4) a static database that electronically stores pictures, including of environments, products, and parts, as well as a textual descriptions database with text segments corresponding to pictures, for use in filling in the templates (element 105), ‘904 Patent, 7:60-8:12.

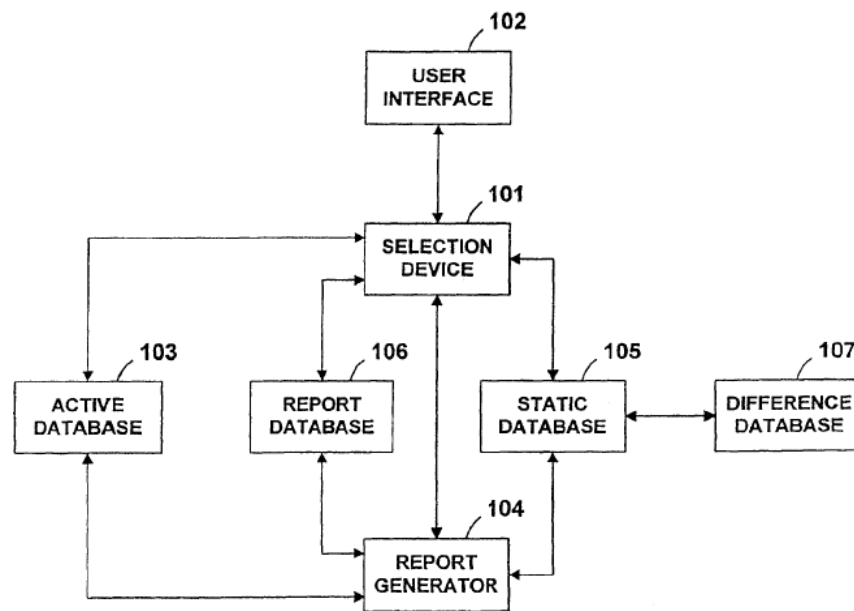


FIG. 2

22. Further details are provided of how the system produces the various specific parts (pages) of proposals, though those details are not of particular relevance to the elements of claims 22-40. '904 Patent, 11:43-38:37. I note that claims 22-40 do not recite any of the report generator 104, report database 106, or difference database 107 that are a part of Figure 2.

23. I have been asked to consider whether the inventions recited in claims 22-40 of the '904 Patent are unpatentable over certain published prior art references.

24. This declaration sets forth my opinion on this topic.

III. SUMMARY OF OPINIONS

25. Based upon my investigation and analysis, and for the reasons set forth below, it is my opinion that all of the elements recited in claims 22-40 of the ‘904 Patent were disclosed in published prior art references and that those claims are anticipated by and/or rendered obvious in view of these references. In particular there are two key references that have never been considered by the Patent Office before:

(1) One such reference is Nohmi, et al., *Multimedia Presentation Systems – Prototyping for Electronic Catalogs*, in Proceedings of the 38th National Convention of the Information Processing Society of Japan (1989 First Half) 668-69 (1989) (“Nohmi”), Ex. 1001. This reference describes a sales presentation system designed to dynamically present proposal materials to facilitate the sale of tangible products (cars, in this instance) using interactive interfaces to convey information of interest to customers based upon their interests.

(2) Another such reference is U.S. Patent No. 5,357,439 to Matsuzaki, et al. (“Matsuzaki”), Ex. 1004, filed in 1991. This reference discloses a custom design and ordering system that provided interactive interfaces through which a user could answer questions about a desired product and have a composite of images and text describing that product presented in real-time.

Several additional references I discuss herein strengthen and supplement various teachings in Nohmi and Matsuzaki. Those references include:

- Miyaoka, et al., Image Processing in Presentations Systems, The Journal of the Institute of Electronics, Information and Communication Engineers, vol. 74, no. 4, 392-97 (April 25, 1991) (“Miyaoka”), Ex. 1002. This reference teaches the “function of creating an image of a scene showing a product placed in the environment in which it is actually used with the product colors or patterns being changed. This is the part where the advantages of digital image processing can be maximized.” Miyaoka, § 2.1.
- JP H3-74769 to Kobayashi, et al. (“Kobayashi”), Ex. 1003. This reference describes how to address efficiency problems in presentation systems by expressing the information to be displayed using templates (called “pages”) that can be processed in real-time to recall images and text from a centralized location.
- JP 02-270069 to Takashi, et al. (“Takashi”), Ex. 1005. This reference teaches a “picture compositing device ... [to] composite [a] commodity image and the usage environment ... and create a commodity usage image for the customer. The customer experiences a scene where the made-to-order form of the commodity is utilized in an environment he knows well or in an

environment where he wishes to use it, and thereby is able to assess the specification of the commodity.” Takashi, pp. 5-6.

- CabNetWare The Detailer™ (1990) (“Detailer”), Exs. 1006-1007. These references describe sales presentation and design software that combines images and text to produce customized proposals for kitchen cabinet layouts formatted for printing.
- The 1987 Chevrolet Cars and Trucks Mailer (“The 1987 Mailer”), Ex. 1008. This is an example of a prior art product catalog that contains exemplary images and textual information of the type system designers would have included in computerized sales presentations.
- Buick Dimension 1988 (“Dimension”), Exs. 1009-1012. These references describe an interactive sales presentation system for cars, displaying images of car models for sale along with related environment images and text segments, which included printing capabilities and functionality to present financing options to a potential customer.

26. I have further read and understood the Petition for *Inter Partes* Review filed herewith and agree with all of the technical comments and analysis set forth therein.

IV. LEGAL PRINCIPLES USED IN ANALYSIS

27. I am not a patent attorney nor have I independently researched the law on patent validity. Hyundai's attorneys have explained certain legal principles to me that I have relied on in forming my opinions set forth in this report.

A. Person of Ordinary Skill in the Art

28. I understand that my assessment and determination of the unpatentability of claims 22-40 of the '904 Patent must be undertaken from the perspective of what would have been known or understood by someone of ordinary skill in the art as of the earliest claimed priority date of the '904 Patent—May 5, 1992. From analyzing the '904 Patent and the relevant prior art, it is my opinion that a person of ordinary skill in the relevant art for the '904 Patent would have at least a Bachelor's degree in Computer Science (or an overlapping field), and 2-3 years of experience, emphasizing the development of electronic systems that produce customized documents (especially involving electronic publishing, hypertext, hypermedia, multimedia, CD-ROM, database, and similar information processing and management technologies). An individual with additional education or commercial experience could also be one of ordinary skill in the art for the '904 Patent if that additional experience compensated for a deficit in one of the other aspects of the requirements stated above. Unless otherwise specified, when I state that something would be known to or understood by one skilled in the

art or possessing ordinary skill in the art, I am referring to someone with this level of knowledge and understanding.

29. A person of ordinary skill in the art in the use of electronic systems that produce customized documents (involving electronic publishing, hypertext, hypermedia, multimedia, CD-ROM, database, and similar information processing and management technologies) would have looked to various sources of available information in order to address the same problem that the '904 Patent purports to address—the undesirability of “generic” preprinted marketing material and related matters. This problem, along with solutions to that problem, can be found in numerous examples including literature describing presentation and proposal systems (for example, Nohmi, which is discussed in this declaration and the accompanying petition), textbooks, patents, trade journals, proceedings of seminars and conferences, and literature from trade shows.

30. With roughly 45 years of experience in the field of electronic systems that produce customized documents (involving electronic publishing, hypertext, hypermedia, multimedia, CD-ROM, database, and similar information processing and management technologies), and roughly 30 years teaching students who could work and indeed have worked in this field, I am well acquainted with the level of ordinary skill required to implement the subject matter of the '904 Patent. I have direct experience with and am capable of rendering an informed opinion on what

the level of ordinary skill in the art was for the relevant field as of May 5, 1992. Therefore, my analysis and opinions regarding the unpatentability of the claims 22-40 will be offered from this perspective.

B. Patent Claims in General

31. I understand that patent claims are the numbered sentences at the end of each patent. The claims are important because it is the words of the claims that define what a patent covers. The figures and text in the rest of the patent provide a description and/or examples and context for and help explain the scope of the claims, but it is the claims that define the breadth of the patent's coverage.

32. I understand that an "independent claim" expressly sets forth all of the requirements that must be met in order for something to be covered by that claim. I understand that a "dependent claim" does not itself recite all of the requirements of the claim but refers to another claim for some of its requirements. In this way, the claim "depends" on another claim. A dependent claim incorporates all of the requirements of the claim(s) to which it refers. The dependent claim then adds its own additional requirements. To determine what a dependent claim requires, it is necessary to look at the recitations of the dependent claim and any other claim(s) on which it depends.

33. I understand that patent claims may be expressed as "methods" or "apparatuses/devices/systems." That is, I understand that a patent may claim the

steps of a “method,” such as a particular way to perform a process in a series of ordered steps, or may claim a combination of various elements in an “apparatus,” “device,” or “system.”

C. Prior Art

34. I understand that the law provides categories of information that constitute prior art that may be used to anticipate or render obvious patent claims. To be prior art to a particular patent, a reference must have been made, known, used, published, or patented, or be the subject of a patent application by another, before the priority date of the patent. I also understand that the person of ordinary skill is presumed to have knowledge of all prior art.

D. Unpatentability

1. Anticipation

35. I understand that a claim is not patentable when a single prior art reference that existed prior to the claim’s priority date describes every element of the claim, either explicitly or inherently to a person of ordinary skill in the art. I understand that this is referred to as “anticipation.” I further understand that to anticipate a patent claim, the prior art does not have to use the same words as the claim, but it must describe the requirements of the claim with sufficient clarity to establish that the subject matter existed and that its existence was recognized by a person of ordinary skill in the art in the technology of the invention, so that looking

at that one reference, that person could make and use the claimed invention. In addition, I am informed and understand that, in order to establish that an element of a claim is “inherent” in the disclosure of a prior art, it must be clear to one skilled in the art that the missing element is the inevitable outcome of the process and/or thing that is explicitly described in the prior art, and that it would be recognized as necessarily present by a person of ordinary skill in the art. I also understand that if a reference relied on expressly anticipates all of the elements of the claimed invention, the reference is presumed to be operable. Even if a reference discloses an inoperative device, it is still prior art for all that it discloses (and teaches).

2. Obviousness

36. I understand that, even if every element of a claim is not found explicitly or implicitly in a single prior art reference, the claim may still be unpatentable if the differences between the claimed elements and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person of ordinary skill in the art. That is, the invention may be obvious to a person having ordinary skill in the art when seen in light of one or more prior art references. I understand that this is often referred to as “obviousness.” In other words, a patent is obvious when it is only a combination of old and known elements, with no change in their respective functions, and that

these familiar elements are combined according to known methods to obtain predictable results. I understand that the following four factors are considered when determining whether a patent claim is obvious: (1) the scope and content of the prior art; (2) the differences between the prior art and the claim; (3) the level of ordinary skill in the art; and (4) secondary considerations tending to prove obviousness or nonobviousness. I understand that the courts have established a collection of secondary factors of nonobviousness, which include unexpected, surprising, or unusual results; nonanalogous art; teachings away from the invention; substantially superior results; synergistic results; long-standing need; commercial success; and copying by others. I further understand that there must be a connection between these secondary factors and the scope of the claim language.

37. I understand that some examples of rationales that may support a conclusion of obviousness include:

- (A) Combining prior art elements according to known methods to yield predictable results;
- (B) Simply substituting one known element for another to obtain predictable results;
- (C) Using known techniques to improve similar devices (methods, or products) in the same way;

(D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

(E) Choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success—in other words, whether something is “obvious to try”;

(F) Using work in one field of endeavor to prompt variations of that work for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art; and

(G) Arriving at a claimed invention as a result of some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings.

38. I understand that other rationales to support a conclusion of obviousness may be relied upon. For instance, I understand that common sense (where substantiated) may be a reason to combine or modify prior art to achieve the claimed invention.

3. Anticipation/Obviousness Determination

39. I understand that a determination of whether the claims of a patent are anticipated or rendered obvious by prior art is a two-step analysis: (1) determining

the meaning and scope of the claims, and (2) comparing the properly construed claims to the prior art. I have endeavored to undertake this process herein.

V. CLAIM CONSTRUCTION

40. I am told that the ‘904 Patent has expired, and therefore, for the purposes of any *inter partes* review granted on the petition this declaration accompanies, each of its claim terms should be “generally given [its] ordinary and customary meaning” as would be understood by a person of ordinary skill in the art in question at the time of the invention. I am further told that a same or similar term used in a related patent in a same or similar manner should be given the same definition unless there is a specific reason not to.

41. I understand that the ‘904 Patent is a continuation of U.S. Patent Nos. 5,615,342 and 7,606,739, which were the subject of litigation in the Eastern District of Texas between Hyundai and Clear With Computers LLC (“CWC”) and its predecessor. I also understand there was a prior litigation between CWC’s predecessor, Orion IP LLC, and Hyundai, over U.S. Patent No. 5,615,342.

42. In both cases the parties fully briefed and argued claim constructions for several terms in the parent patents that are found in the same or substantially the same form in claims 22-40 of the ‘904 Patent.

43. Reviewing the District Judge’s underlying reasoning in both claim construction opinions (*see* Exs. 1014, 1015), it is my opinion that the claim

constructions ultimately adopted in those cases represent the “ordinary and customary meaning” for the below terms as they would be understood by a person of ordinary skill in the art in question at the time of the invention. Those constructions are:

Claim Term (in the ‘904 Patent)	Claim Construction
“proposal” (Claims 22-24, 26, 31, 35-36, 39-40)	“information intended for conveyance to a customer.” Ex. 1014 at 7-8, Ex. 1015 at 17.
“single composite customized output,” “composite customized output,” “single composite output” (Claims 22-25, 27-33, 39-40)	“a single image that includes the selected text and an image of a product in a product environment.” Ex. 1014, at 9-10.
“static database” (Claims 22, 31, 39-40)	“a database that is not alterable during generation of a composite visual output.” Ex. 1014, at 12.
“active database” (Claims 22, 31, 39-40)	“a database that is alterable based on user input.” Ex. 1014, at 12-13.
“database” (Claims 22, 31, 39-40)	“a collection of logically related data stored together in one or more computerized files.”

	Ex. 1014, at 11-12.
“dynamically building a template,” “template dynamically constructed” (Claims 22, 31, 39-40)	“constructing a template that may be modified to fit selected images and text.” Ex. 1014, at 13-14.
“selection device” ¹ (Claims 22, 31, 39-40)	“computer code data structure.” Ex. 1014, at 14-18.

44. I have reviewed claims 22-40 and it is my opinion that the other terms used in the claims would have been understood to have their plain meaning by a person of ordinary skill in the art in question at the time of the invention. I understand that neither Hyundai nor CWC disagrees with this, and reserve the right to readdress this conclusion if CWC argues otherwise. I also have studied the opinions in Exhibits 1014 and 1015 and have taken those opinions into account in

¹ I understand that in connection with the pending litigation between Hyundai and CWC over U.S. Patent No. 7,606,739, Hyundai’s position is that “selection device” as recited in the claims of that patent is invalid for failing to meet the written description and definiteness requirements of 35 U.S.C. § 112. I understand that Hyundai’s position on “selection device” as recited in the challenged claims is the same, but that it is not possible to present that position in *inter partes* review.

my analysis to the extent that they comment on certain terms and party positions but do not provide constructions.

45. For instance, I note that the District Judge found: 1) the term “questions” as used in terms such as “answers to a plurality of questions” (*e.g.*, claim 22) includes “menus or menu-like interfaces as questions” *see* Ex. 1015 at 19-20; 2), that “feature and ... use” as used in various forms needed only to relate to desired features *or* uses, and not necessarily both, *see* Ex. 1015 at 18-19; and 3) that “[a] superimposed image is one way to create a ‘composite’ visual output, but ‘composite’ is ... broader,” *see* Ex. 1014 at 10. I have taken these comments into account in my consideration of whether claims 22-40 are unpatentable.

VI. STATE OF THE ART AT THE TIME OF THE ‘904 PATENT’S PRIORITY DATE

46. By May 5, 1992, the ‘904 Patent’s earliest priority date, there were many achievements that I am quite familiar with, in a variety of areas of information processing and management, that together characterize the state of the art related to the ‘904 Patent. Computerized systems for handling documents were well established by the 1970s. By 1972 I had worked with IBM 7094, 360, and 1620 computers, and with DEC PDP-1 and PDP-8 computers, which had a diversity of processing units, memory, storage (including magnetic disks), display, and printing systems. I programmed the graphic display unit on the PDP-8, working to output a variety of graphic images. I used text editors, on both

independent minicomputers and on large time-sharing systems, managing text segments. I also worked with a New Hampshire company on plans for automating the newspaper industry to manage news stories with text and images and their printing.

47. By 1982 I had worked with IBM's System R, the first active relational database system, and with Ingres, another relational database system running on DEC VAX 11-780 systems. Database systems and software engineering techniques rapidly became common tools for software developers, so those graduating from an undergraduate program in computer science often took courses related to each, *e.g.*, the Database and Software Engineering classes I taught in my early years at Virginia Tech. Some of the textbooks I used included one on databases by Date (whose 2nd edition of "An Introduction to Database Systems" was available in 1977) and "Software Engineering" by Sommerville (now in its 10th edition; his first book appeared in 1982). Object oriented programming and system development were important topics studied in undergraduate software engineering courses.

48. Closely related to software engineering is the study of human-computer interaction. I worked closely in the late 1980s and early 1990s with colleagues H. Rex Hartson and Deborah Hix, experts in human-computer interaction, and editors of a series of books on "Advances in Human-Computer

Interaction,” with Volume 2 published in 1988. Human-computer interaction covers all types of interaction between humans and computers, especially through interactive systems, and including menus, data structures used with selection devices, handling of questions and answers, connections with database queries, hypermedia, and presentation of text and multimedia content (including images). By 1991, Dr. Hix and I had worked with IBM PCs to support high quality images as well as interactive digital video.

49. Examples of such systems are captured in Exs. 1017 (Figure 1 shown below) and 1018. Figure 1 shows an interface to a presentation system we built called the “Multimedia Integrator,” that could be configured to create composite outputs of multimedia objects including video, still images, audio, and text.

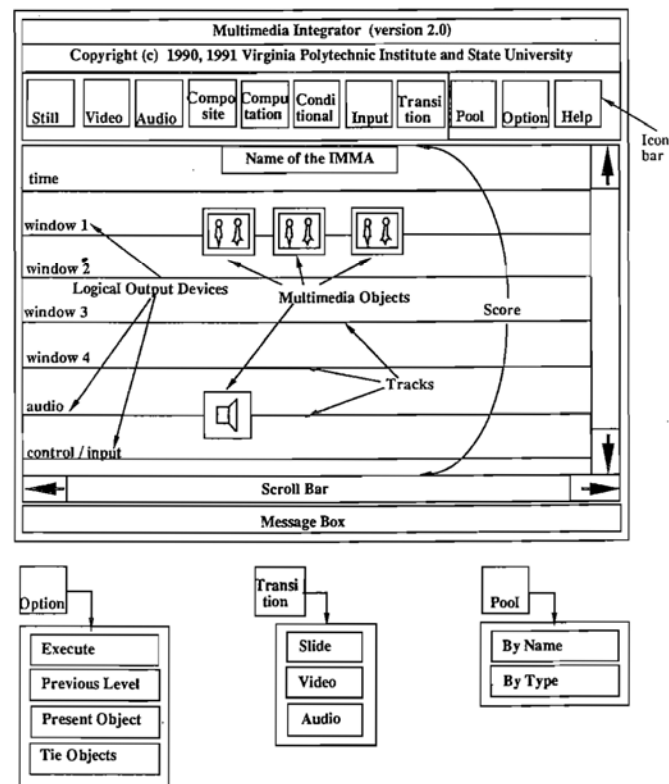


Figure 1. Specification of a simple slide show

50. Thus, there was significant work by 1991 on multimedia information and systems, which I summarized in various publications. Those included Exs. 1019 and 1020, the cover image of which is shown below, illustrating navigation functions in such systems:



Ex. 1019, Cover image.

51. Some of my other publications in this area include Exhibit 1021, and a documentary, Ex. 1018. In that documentary, aired on PBS, I included illustrations of composite customized outputs, like customized room environments where products for sale (*e.g.*, furniture) could be shown in various layouts.

52. Also shown in my documentary was a PC-based interactive digital video application from the Software Engineering Institute, Ex. 1023. That application created various conference room environments in which different people could be assigned different roles and seats, with the system creating composite images customized according to answers (provided by the person in charge of training) to questions, using advanced image processing techniques. That system is illustrated in Figure 3 of Ex. 1023, given below. Figure 3 shows individuals being composited into an environment with a virtual conference table.



53. Another broad area relating to the '904 Patent's proposal generation system is general electronic publishing, which I had written about by 1990. Ex. 1024. The UNIX system, first developed at Bell Labs, included text editors and programs like nroff, troff, tbl, and eqn that I worked with to prepare my dissertation in 1983 (so it could be viewed on a computer display as well as printed on laser printers). The idea of dual publishing, for display and printing, led in 1986 to an international electronic publishing standard to facilitate this process, the Standard Generalized Markup Language, SGML. Ex. 1025. Later examples of SGML-like languages include HTML and XML, widely used on the World Wide Web.

54. Another broad area relating to the '904 Patent is static storage (including static databases) on compact-disc read only memory (CD-ROM) systems. Microsoft became quite interested in this new technology, preparing two

edited books to summarize development, in 1986, Ex. 1026 (including my article connecting with information retrieval, Ex. 1027, from which Figure 6 is reproduced below, showing search and retrieval functions) and in 1987, Ex. 1028. Figure 6 shows an exemplary system that was capable of translating user's questions into relevant search results.

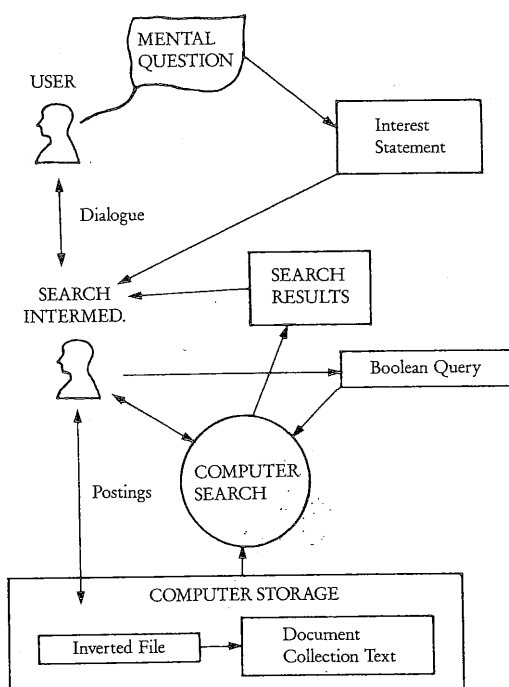


Figure 6. Boolean query formation and inverted file search

55. I published a long summary and review article covering this area in 1988. Ex. 1029. It was clear at that time that CD-ROMs could provide static optical storage that worked well with personal computer systems. These systems included static databases, and made it easy to publish electronic versions of catalogs, including of tangible products for sale to customers, with text segments

(including specifications and performance information on those products) and images (of all types, including images of environments).

56. I also led development of the first three CD-ROMs manufactured in Virginia (Virginia Discs One, Two, and Three) by 1990, to demonstrate the range of possible content and use of CD-ROMs connected with powerful personal computers, as can be seen from the overview booklet found on Virginia Disc One. Ex. 1036. The Internet had advanced sufficiently by 1991, as had telecommunications connections between PCs and larger corporate computers, so that static databases on CD-ROMs often worked in concert with more up-to-date active databases on those company computers. Likewise, PCs ran active database software to collect information, such as about users who were interested in information in large catalogs accessed through static databases on CD-ROMs managed by the PCs.

57. Yet another area related to the '904 Patent is hypertext. This is a collection of text rendered on a computer display or other electronic device with references to other text that the reader can immediately access. A hypertext connection is commonly referred to today in the context of internet technology as a "link" or "hyper link." Hypertext was ultimately generalized to handle multimedia content; that was given the name "hypermedia," which includes text and other

media and is accessible in the same manner. The World Wide Web is generally accepted to have evolved from such systems.

58. By 1987, when Apple provided the HyperCard software freely with new computers, hypertext and hypermedia were commonly deployed. HyperCard made use of templates looking like cards, in which different text and image content could be rendered onto displays, and easily printed. Apple holds the copyright on a 1988 book that arose from a Conference on Multimedia in Education, Ex. 1030; that book highlights how HyperCard and other hypermedia document systems work with text, images, documents, CD-ROMs, databases, displays, and templates, *see, e.g.*, Ex. 1030, p. 9.

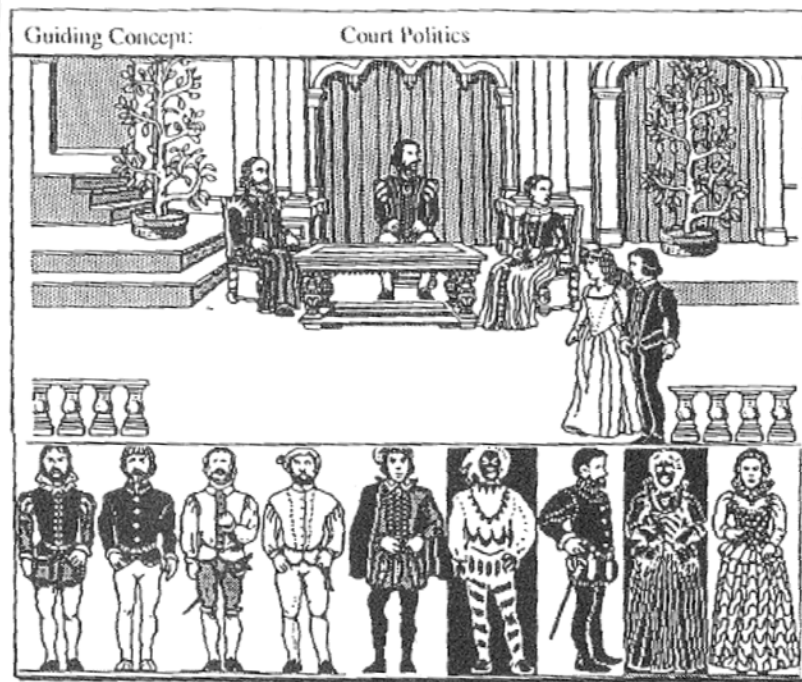


Figure 4. The Director's Kit. The student has chosen the desired costume and will transfer it to the stage area. When all the design elements are selected, the student can animate the scene.

59. An example of the kind of “compositing”—*i.e.*, creation of composite images—that was available using these systems is provided in the figure above taken from Exhibit 1030. It shows how composite images could be created composed of theater sets, costumes, and props.

60. This figure illustrates how images of tangible objects (such as costumes) could be easily composited with images of environments (shown on the stage) to convey information of interest.

61. A good overview of all this technology, Ex. 1031, appeared in 1990, covering the history of hypertext (with works from 1945, and others from the

1960s through 1980s), as well as current computers and hypertext systems. These systems included connections with databases, customized human-computer interfaces, CD-ROMs, displays, and pointing devices. This overview also discusses business applications, including hypertext sales catalogs used for advertising products to customers, and their benefits (“provid[ing] access to large amounts of information but to show the user only those parts that are relevant for the individual customer”). Ex. 1031, p. 5.

62. In 1991, as part of a useful handbook about hypertext and hypermedia, Ex. 1032, I wrote about how the technologies could be integrated with search and retrieval, Ex. 1033, and about the hypertext and hypermedia publishing work I coordinated for ACM, Ex. 1034. These technologies made it easy to implement interactive information delivery systems that tied together databases, text, images (including of products and environments), selection devices, and interfaces responsive to user queries.

63. By early 1992 there was clear integration of multimedia, hypermedia, hypertext, human-computer interaction, interfaces, information exploration, handling queries and questions, and varied applications. Exs. 1017-1034. Indeed, because the Department of Computer Science at Virginia Tech began requiring freshmen who entered in 1985 to purchase Apple computers that ran UNIX as well as regular Apple software like HyperCard, by 1992 those students who had

graduated with a Bachelor's degree and had worked for several years in these areas would have been familiar with these technologies—which are part of the state of the art that relates to the '904 Patent, as explained above.

64. The final area related to the '904 Patent was that of using computers for the sale of tangible products, customized for use in particular environments. Graduates from computer science programs like that at Virginia Tech often had engaged in service learning and other projects related to real products, to develop software applications like these. Even more graduates were hired to develop such systems, as they gained experience in business or industry.

65. Such graduates were often hired by product-manufacturing or marketing companies, much as I had been when working during 1972-1978 at Vulcraft, a building materials (*e.g.*, steel joists) manufacturer. There I wrote programs for the sales department so that its employees could work with customers; get answers to predetermined questions (*e.g.*, about requirements); share information about product specifications (like length and height), performance features (like weight bearing capacity), and desired environments (*e.g.*, to support a roof inside a home or warehouse, or to carry loads as part of an outdoor bridge); and provide customized quotations (proposals).

66. Such uses of computers were well known by 1992, through, for instance, the CompuServe Information Service that aided the online sale of

products, or through sales support software offered by automobile companies like General Motors or Ford. For example, the Apple Macintosh was used by 1987 to advertise Buick products, as discussed in Ex. 1035, with those skilled in the art immediately recognizing the value of integrating text, graphics, animation, and data processing into a single presentation medium that could be customized to a customer's needs and preferences. *Id.* Figure 3, which is reproduced from the output of the software discussed in Ex. 1035, shows a composite display of a car with both text regarding specifications and images of the car (and its parts, in the car environment), and shows its dimensions, with additional options to display performance specifications on demand.

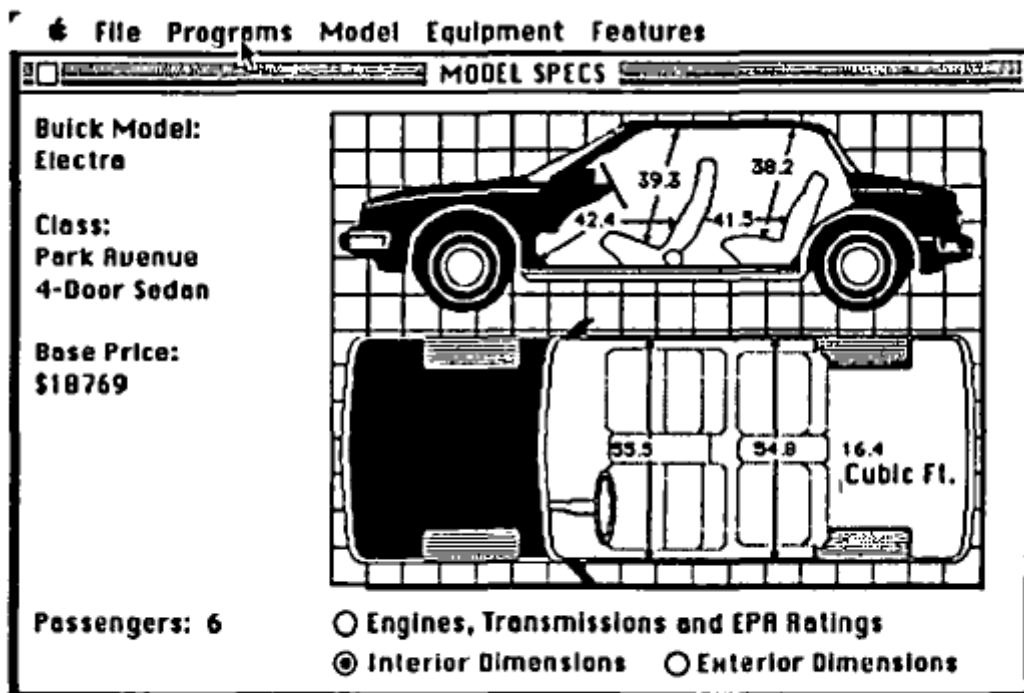


FIGURE 3

67. In view of the above, I believe (and have shown) that the state of the art was quite advanced at the time of the 1992 filing of the ‘904 Patent’s earliest predecessor. Indeed, each of the elements claimed in claims 22-40 of the ‘904 Patent was well known at that time as part of a large number of useful systems. This sets the stage for my further analysis of some of those systems that contained each of those elements in exactly the same combinations given in claims 22-40.

VII. PRIOR ART REFERENCES

68. I understand that *inter partes* review of the ‘904 Patent has been requested in view of the following references: (1) Nohmi, et al., *Multimedia Presentation Systems – Prototyping for Electronic Catalogs*, Proceedings of the 38th National Convention of the Information Processing Society of Japan (1989 First Half) 668-69 (1989) (“Nohmi”) (Ex. 1001); (2) Miyaoka, et al., Image Processing in Presentations Systems, The Journal of the Institute of Electronics, Information and Communication Engineers, vol. 74, no. 4, 392-97 (April 25, 1991) (“Miyaoka”) (Ex. 1002); (3) JP H3-74769 to Kobayashi, et al. (“Kobayashi”) (March 29, 1991) (Ex. 1003); (4) U.S. Patent No. 5,357,439 to Matsuzaki, et al. (“Matsuzaki”) (March 11, 1991) (Ex. 1004); (5) JP 02-270069 to Takashi, et al. (“Takashi”) (November 5, 1990) (Ex. 1005); (6) CabNetWare The Detailer™ (1990) (“Detailer”) (Exs. 1006-1007); (7) the 1987 Chevrolet Cars and Trucks

Mailer (“The 1987 Mailer”) (Ex. 1008); and (8) Buick Dimension 1988 (“Dimension”) (Exs. 1009-1012).

A. Nohmi

69. Exhibit 1001, by Nohmi et al. (M. Nohmi, S. Miyaoka, M. Funabashi – working at Hitachi, Ltd., in Japan) (“Nohmi”), has the title *Multimedia Presentation Systems – Prototyping for Electronic Catalogs*. Nohmi describes a sales presentation system that could dynamically present proposals relating to tangible products (cars are illustrated) based on information provided by users. Published in 1989, it is one of an integrated set of publications by these authors and their colleagues, presenting various aspects of their prototyping of an evolving system.

70. Nohmi provides this presentation functionality in the context of car sales to consumers, discussing search using an electronic car catalog. Its figures, which demonstrate the linking commonly practiced by hypermedia systems, give illustrations of screens that could be produced by the prototype system described, and that show cars and car parts in use environments, along with specification and performance text segments. *See* Fig. 2, below.

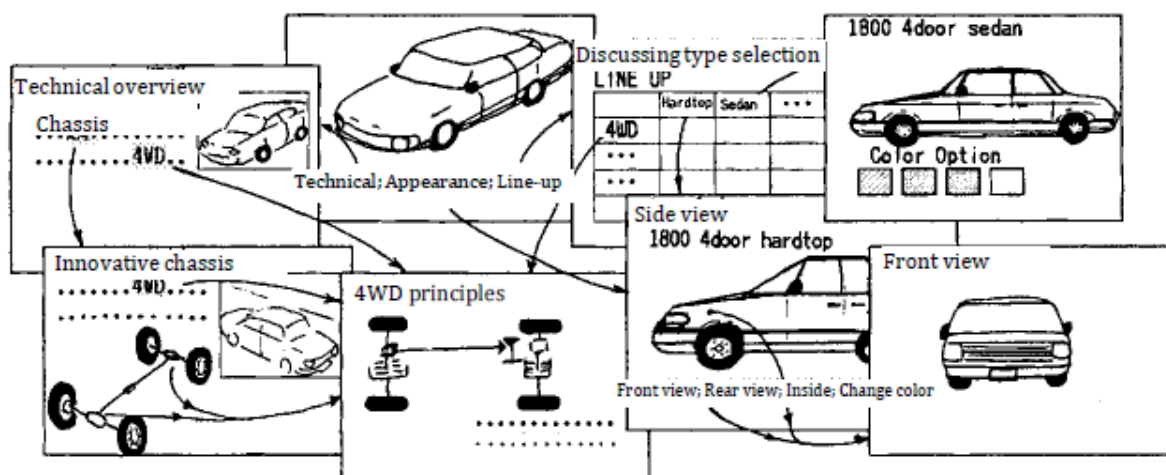


Figure 2: Outline of functions and image representation of a search

71. For example, a user of the Nohmi system would be presented with a screen page that listed a “LINE UP” of various cars, such as “Hardtops” or “Sedans”, and showing some performance features or options associated with the cars, like “4WD” (referring to four wheel drive). From that screen, if the user wanted more information about one of the vehicles with four wheel drive, the user could simply click on a selectable keyword, image element, or menu element on the screen. In response, the system would determine which page would next be displayed, and separately select the elements of that next page to be displayed to the user, including pictures and text relevant to the user’s prior selection (as on the page entitled “4WD Principles,” which is shown as being displayed in response to selection of the “4WD” keyword on the “Technical overview” page). The system accomplished this by storing the user’s response in memory, and then, based on certain software rules developed in anticipation of the range of possible user input,

retrieving responsive text and pictures from other file structures that separately stored preexisting text segments and pictures. The system then presented the new page to the user by dynamically filling the screen with the selected elements, resulting in a customized, composite display of information of particular interest to the user.

72. More broadly, Nohmi discusses and demonstrates the integration of CD-ROM, multimedia, hypermedia, hypertext, human-computer interaction, image processing, and workstation technologies. It talks about media structures as well as other data structures for pages, making clear templates are filled in with text segments and images, and explains interactive interface operations using both menus and hypertext “links.” As can be seen in Figure 3 below, each page is composed of columns of paragraphs (text) and images, which can be imbued with keywords or selectable elements linking functionality to allow navigation from page to page.

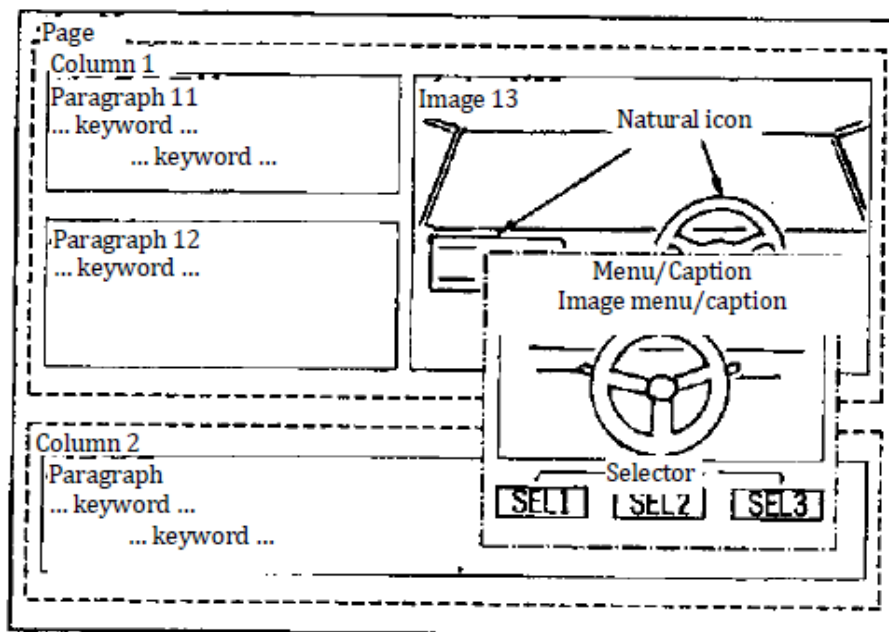


Figure 3: Page structure

73. Another feature demonstrated by Nohmi is that image processing can be used to change car color according to indications of preferences supplied by users, as well as to provide varying views in different background road settings. For instance, as can be seen in the right upper most page example in Figure 2 above, the user can be provided with options to select car color, which would propagate through to images of the car on other pages. In addition, as can be seen in the lower left most page example of Figure 2, the car (product image) is shown in a road setting (environment image), demonstrating that the car could be placed on different backgrounds as dictated by the subject matter.

B. Miyaoka

74. Exhibit 1002, by Miyaoka et al. (S. Miyaoka, M. Kato, M. Nohmi – working at Hitachi, Ltd., in Japan) (“Miyaoka”), is entitled *Image Processing in Presentation Systems*. This journal article, published in 1991, is another of an integrated set of publications by these authors and their colleagues, presenting various aspects of their prototyping of an evolving system. The first and third authors of this work correspond to the first and second authors of Nohmi.

75. Like the Nohmi reference, this reference discusses sales support presentation systems (*i.e.*, the title of Section 2), where there is interaction with the customer to aid in product sales. A user using the system described in Miyaoka would encounter a very similar interface allowing the retrieval of customized information of interest to that user. Miyaoka adds further details, focusing on (natural) image processing, especially image simulation, which involves extracting an object from an image, changing the color of an object, and synthesizing an image (*e.g.*, embedding the extracted object in another image, such as a natural background environment). The authors suggest implementing these capabilities because more effective marketing of products involves showing products in environments in which they are used. *See* §2.1, Photo 1, below.

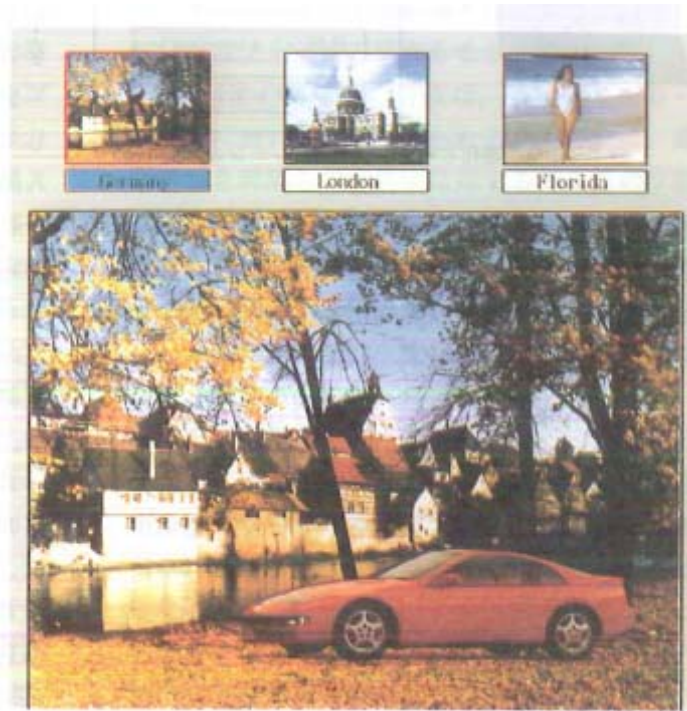


Photo 1: Example of image synthesis: the automobile is superimposed on the upper left background photo and combined.

76. As in Nohmi, and as in Photo 1 above, the example application is car sales. Automobiles are identified in a natural image (that is, a real image, taken by a camera), and an automobile object is extracted from that image. Several extraction algorithms are discussed, including semi-automatic interactive methods. Image synthesis then is discussed, to place the extracted automobile onto a natural background image such as that which might be desired by a user. To ensure realistic images, special methods are employed to simulate color change while retaining highlights and shadows. Miyaoka shows that all this was feasible at least by 1991, within the confines of the described sales presentation system, to help with car sales, making use of the interactive processing emphasized in this article.

C. Kobayashi

77. Exhibit 1003, by Kobayashi, Nohmi (Nohmi), and Miyaoka, JP H3-74769, has the title *Multimedia Presentation Systems* (“Kobayashi”). It was filed Aug. 16, 1989 and was laid open on March 29, 1991. It was assigned to Hitachi, Ltd., of Japan, which also funded the work in Exs. 1001, 1002, 1004, and 1005. Co-authors Nohmi (Nohmi) and Miyaoka are co-authors of Exs. 1001 (Nohmi) and 1002 (Miyaoka) too.

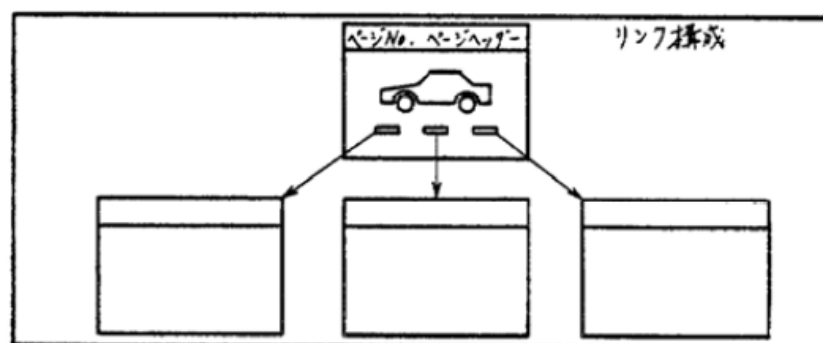
78. Kobayashi addresses the same need, for multimedia systems that include images and text, and discusses the same endeavor on multimedia presentation systems that was described in Nohmi and Miyaoka and undertaken by Hitachi. This patent has a specification and claims that describe the efficiency aspects of what has been invented by Nohmi, Miyaoka, and Kobayashi, which, according to the patent, makes “it possible to efficiently access information necessitating a large amount of data as with images ...” (in Problem to be solved by the Invention). Kobayashi further describes the Problem to be solved by the Invention, referring to HyperCard (a hypermedia system like that discussed in Nohmi and Miyaoka), and the need with such systems for speedy methods when generating pages that have both images and text, *i.e.*, generating a single composite customized output. A user using the system described in Kobayashi would

encounter a very similar interface to the Nohmi system allowing the retrieval of customized information of interest to that user.

79. Kobayashi elaborates over Nohmi on how to address efficiency problems by: expressing the information to be displayed using a template structure (a page) that can be processed in real-time to recall images and text from a centralized location, thus avoiding the need as in the prior art to store all the images and text along with the page structure in a single flat file. This allows images and text to be reused as needed in the system, which facilitates speedier creation of customized outputs that are responsive to consumer interests.

80. Kobayashi teaches three key concepts. The first is connecting user actions, such as selection with a pointing device like a mouse, with the hypermedia system operation, to cause composite output pages to be generated and displayed.

FIG. 14

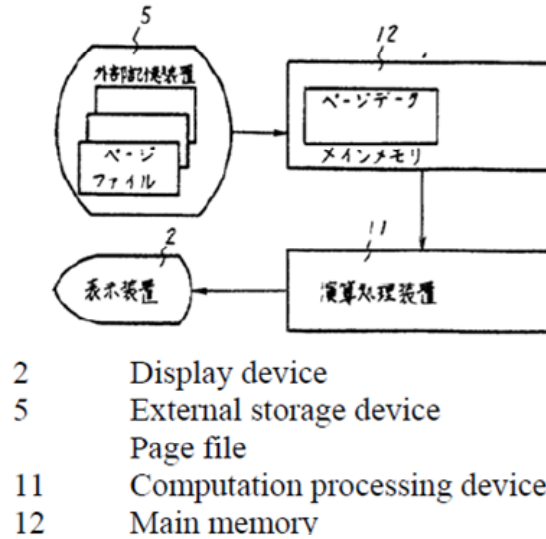


Page No. Page header
Link configuration

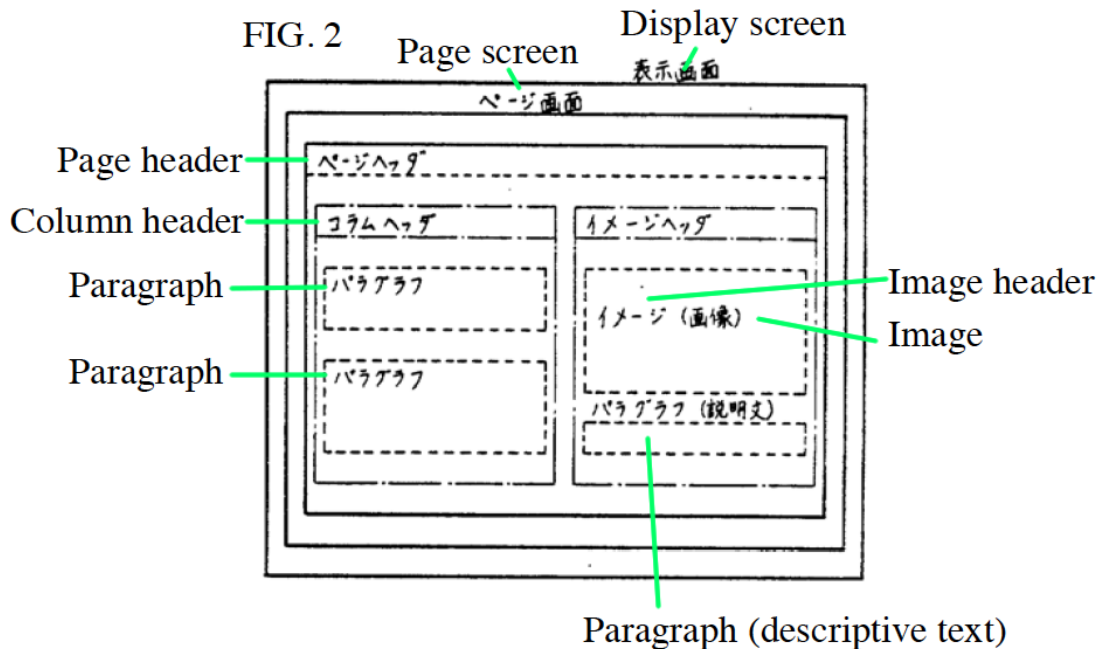
This is illustrated in, *e.g.*, Figure 14, above, which shows a page as it would be rendered by the Kobayashi system (depicting a car) having 3 links that are configured to load other pages in the presentation when selected to do so by a user. Such pages could include, as depicted in Nohmi, other information about a vehicle such as a “Technical overview” or “4WD principles.” *See* Ex. 1001 (Nohmi), Fig. 2. I understand that the labels that appear in the Kobayashi figures correspond to the Japanese text as it appears going left to right in the figure. Thus, it is my understanding that the Japanese text in the picture of the top “page” translates to “Page No. Page Header” and the Japanese text in the upper right corner informs me that this is an example of “Link configuration.”

81. The second key concept taught by Kobayashi is storing the images and text in centralized files, *i.e.*, static databases. Figure 3 shows an image or piece of text as it is called out of a “Page file” on an “External storage device,” (item 5), *i.e.*, a repository of text and images that can be displayed as needed, to the system’s memory (item 12), where it can then be processed by the CPU (item 11) and appropriately displayed on a display device (item 2). *See* Kobayashi, p. 5.

FIG. 3



82. Kobayashi's third key concept is using dynamic page templates to generate integrated composites of images and text, as in Figure 2, below.



83. The figure shows an example of such a page structure as it is being rendered, with hashed lines showing how the various "Paragraphs" and "Images"

will be shown on the display device. The English labels added to this figure are shown by green arrows to point to the corresponding elements from Kobayashi that were originally labeled in Japanese. Thus, the top text establishes that this is a depiction of a “Display screen” which contains a “Page screen.” Within the “Page screen” there is a “Page header” (produced by the computer code that defines the start of a “Page”) and two columns, each with a “Column header” (produced by the computer code that defines the start of a “Column”). In the left column two “Paragraph” elements are shown and in the right column, an “Image” is shown (with its “Image header,” which defines the start of an “Image”). A “Paragraph” of descriptive text for the “Image” also is shown under the “Image” in the right column. Thus, depending on the various “Paragraph” and “Image” elements contained within a page template, Kobayashi will dynamically organize and render them, as is shown in Figure 2. The hashed lines indicate that the ultimate display will be changed as necessary to “fit” the elements defined for that “page.”

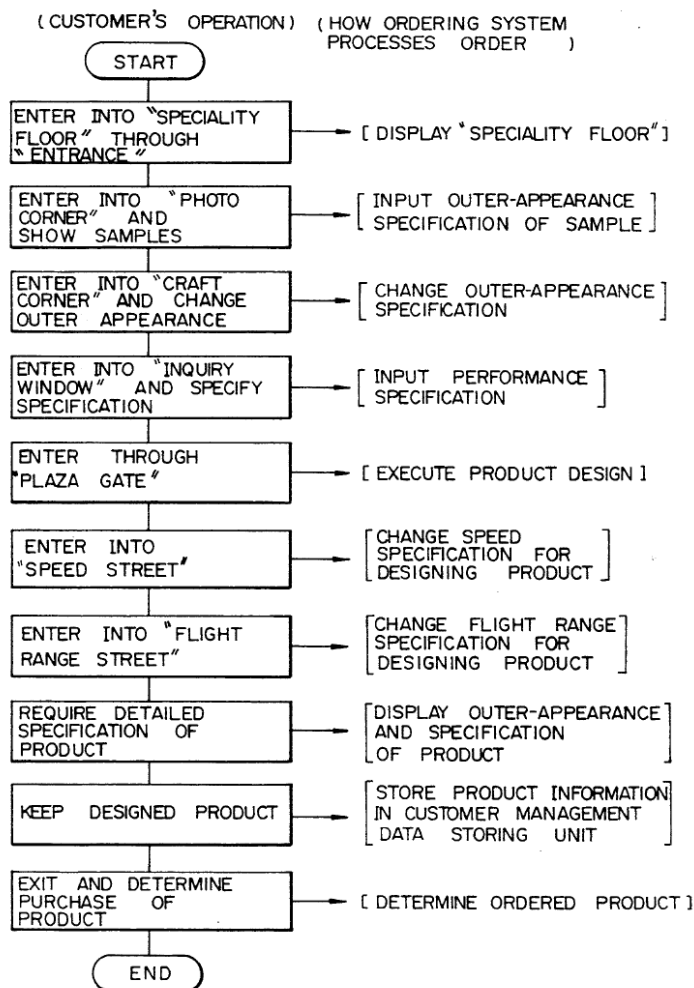
D. Matsuzaki

84. Exhibit 1004, by Matsuzaki, et al., U.S. Patent No. 5,357,439, has the title *Custom-made Manufacturing System and Custom-made Manufacturing Method*. It was filed March 11, 1991 and issued Oct. 18, 1994. It was assigned to Hitachi, Ltd., of Japan, which also funded the work in Exs. 1001-1003 (Nohmi, Miyaoka, and Kobayashi). It has 16 claims and 52 drawing sheets.

85. Matsuzaki describes a “system which accepts a custom order of product from a customer.” Its steps include “inputting the required specification of a product, creating the product design based on ... the input required specification, showing the created product design to the customer, selectively indicating a product to be purchased, ... and producing a product based on the selected product specifications.” Matsuzaki, Abstract.

86. As described in the flow chart shown in Figure 8 (below), a user of the Matsuzaki system steps through a series of interface displays designed to collect “answers” to “questions” posed to the user about what kind of product she might like to purchase and the specifications for that product. First a user might define the general outer appearance of the product—such as a model airplane—that she wishes to purchase in the “Photo Corner” interface by selecting from samples presented to her there. Next the user might customize elements—such as form and color—of that outer appearance in the “Craft Corner” interface. Once this is completed, the user can specify certain performance specifications—such as a desired ascending speed, or flight speed—in the “Inquiry Window.” At this point, the Matsuzaki system is ready to generate possible product designs, as represented by the action of entering “through the ‘plaza gate’.”

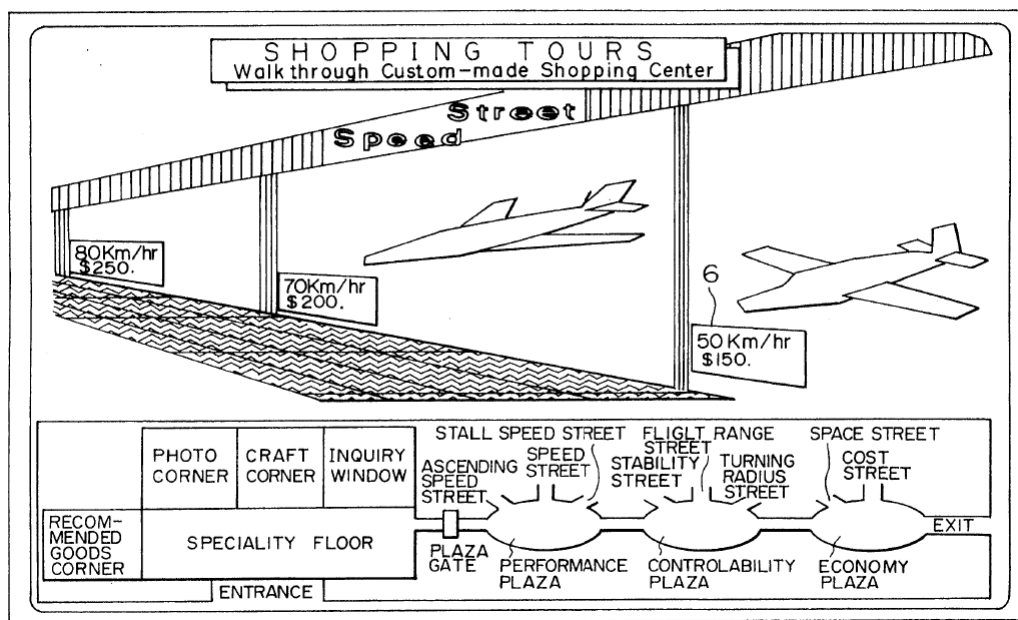
FIG. 8



87. Figure 9 (below) illustrates the interface that presents possible customized designs to the user. From this point, the user may enter one of a number of "streets," each corresponding to further changes in a specification of the possible product designs. Figure 9 shows "speed street," which presents the user with a visualization of the product designs using images of the product (high-end toy planes) inherently in an environment in which they can be used (a virtual

airplane hanger),² along with various text segments describing specific performance specifications of those products (e.g., 70Km/hr \$200.) See Matsuzaki, 10:48-11:49.

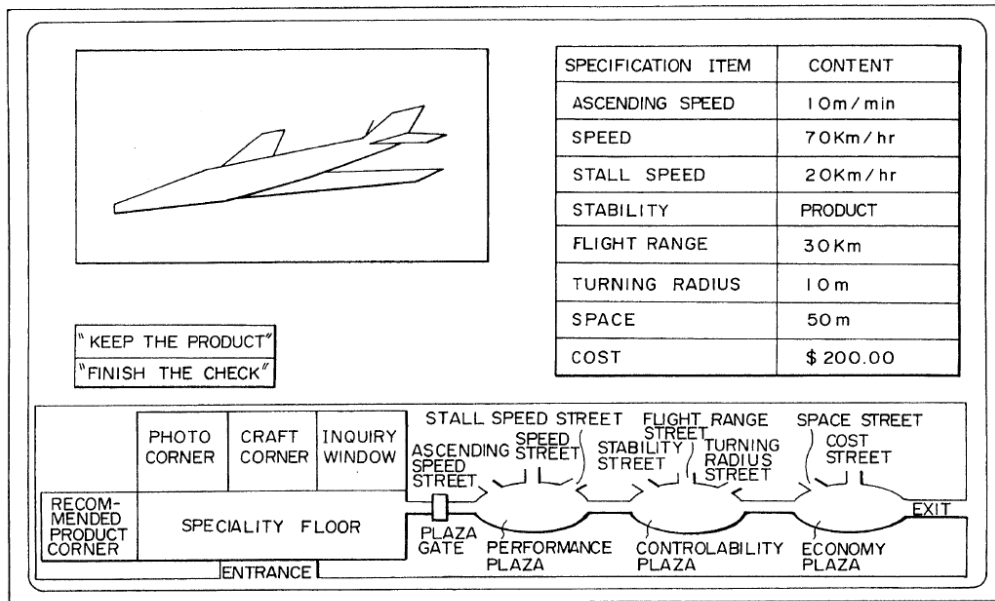
FIG. 9



88. If a user selects one of the products presented, Matsuzaki's system presents a detailed view of that product, as shown in Figure 10 (below) with an image of that product and even more text segments describing product specifications and performances of that product. See Matsuzaki, 11:49-65.

² Matsuzaki's system has the inherent ability to composite product/part images in a variety of environments, including showing a component part in the environment of its completed product. See, e.g., Matsuzaki, Figs. 19, 20, 31, and 32.

FIG. 10



89. If the user wants to save the product description she has created, she can select "Keep the Product" which stores the detailed specification in an active database (the customer management data storing unit 1-14). She also can proceed to "EXIT" which causes the configured product to be ordered and manufactured. *See Matsuzaki, 12:1-21.*

90. Thus, as is suggested by these figures and described above, Matsuzaki provides a system with much user interaction: questions are posed, answers are given, specifications are identified, and integrated product information is generated and displayed in a composite customized output that represents a proposal to sell a product (including text, product images, and images of environments in which those products may be used). *See Matsuzaki, 5:49-12:39, 16:25-17:64.*

91. Matsuzaki also includes a series of block diagrams of the claimed system (Fig. 1) and more details about its various parts, including the product specification defining system (Fig. 2), which is what facilitates user interaction as described above. Matsuzaki also describes the order generalizing system (Fig. 3, described at 3:35-37) and production planning system (Fig. 4, described at 3:38-40) which causes the products configured by the user to be manufactured. Fig. 6 shows the computer that the Matsuzaki system runs on. Figures 7, 9 (above), and 10 (above) illustrate output displayed in connection with the sales support phases of defining specifications and ordering. Figures 18-20 show additional detail regarding the various stored data structures covering the specifications, product model, and parts data displayed within Matsuzaki's interface displays. 4:10-17.

E. Takashi

92. Exhibit 1005, by Takashi, et al., JP 02-270069, has the title *CAD System*. It was filed March 3, 1989 and was laid open November 5, 1990. It was assigned to Hitachi, Ltd., of Japan, which also funded the work in Exs. 1001-1004 (Nohmi, Miyaoka, Kobayashi, and Matsuzaki).

93. Very similar to Matsuzaki, Takashi's invention "relates to a computer-aided design (CAD) system for formulating the production and sale of a made-to-order commodity ... having a function for enabling a salesperson to ascertain a request from a customer ... and determine a product specification." See Takashi p.

1 (“<Industrial Applicability>”). As explained in the “Problems to be Solved” section, this invention addresses a need, *i.e.*, that “Customers have wanted a commodity suited to their own taste.”

94. Takashi thus describes a very similar user interface to Matsuzaki in which a user enters desired product information and is presented with an interactive interface display showing “image data of the commodity [in] the environment to make the customer feel as though he is using the product, to thus provide support such that the customer can design a satisfactory form and function.” *See* Takashi p. 4-5. Thus, “[t]he customer experiences a scene where the made-to-order form of the commodity is utilized in an environment he knows well or in an environment where he wishes to use it, and thereby is able to assess the specification of the commodity.” *See* Takashi p. 5-6.

95. Examples and illustrative figures are given that provide further detail about the specific structures that support user interaction: specifically: a customer preference inputting means, which is what collects user “answers” to “questions” posed about the product being designed; a “commodity structure” database, which contains product specifications and other textual elements; a “commodity image” database, which contains images of the products; a “picture compositing” device, which composites the images of the products with images of usage environments;

and finally, a “composite picture” display device which presents the composite output to the user. *See* Takashi p. 4-6.

F. Detailer

96. Exhibits 1006 and 1007 show “The Detailer” by CabNetWare—sales presentation and design software that rendered custom kitchen cabinet layouts and produces printed proposals in response to user input.

97. Exhibit 1006 is dated April 6, 1990 based upon the page numbers printed at the top of pages 1-8. Page 1 shows that the CabNetWare Product Pricing was effective March 1990, so I can conclude that Exhibit 1006 was available from CabNetWare at that time and that the The Detailer was available for sale at the given retail price, and required an IBM compatible computer with a dot matrix printer (and pen plotter as optional hardware). At pages 3-5 and 7-12, the CabNetWare reference (Exhibit 1006) provides exemplary printed proposals that can be output from The Detailer, showing composites of text, images, and backgrounds. For instance, the left page below shows a list of selected components and their pricing, while the right page below shows those components in various views, including within a kitchen environment. Based on the fact that Exhibit 1006 was itself an offer for sale of the commercial Detailer software, I can conclude that a person of ordinary skill could have at least obtained Exhibit 1006 in 1990, and thus, that Exhibit 1006 is a prior art printed publication.

Jamison Kitchen Design
Rt. 2 Box 2490
Davis, CA 95616
Lic No 234267

CRIC Construction
6276 F St.
Davis, CA 95616

John Smith
1237 N 10th St.
Davis, CA 95616

We propose to perform the following work in accordance with the drawings and specifications submitted and completed in a workmanlike manner according to standard for the sum listed below as "GRAND TOTAL", with payments to be made listed below as "TERMS".

Quantity	Item	Price
MANUFACTURER: PACIFIC CABINET CORP.		
LINE: CUSTOM		
DOOR: RAISED PANEL		
3	B15	225.00
5	B33	750.00
2	B24	200.00
2	BR42	240.00
2	W3021	90.00
4	W3033	220.00
3	W3036	195.00
2	WR42	140.00
1	W1806	68.00
1	W1830	45.00
1	SINK TRAY	24.50
5	8 FT LENGTHS CROWN MOULDING	45.00
TOTAL		2,229.50
CONTRACTOR DISCOUNT		(222.95)
SUBTOTAL		2,006.55
SALES TAX		120.59
GRAND TOTAL		\$2,126.94
TERMS: 50% DEPOSIT - REMAINDER UPON COMPLETION		

Any alteration or deviation from the above specifications involving extra costs will be made only upon written agreement, and will become an extra charge over and above the estimate. This proposal may be withdrawn by us at any time before acceptance.

ACCEPTANCE OF PROPOSAL
The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payments will be made as outlined above. It is understood and agreed that this is work not provided for in any other agreement and no contractual rights arise until this proposal is accepted in writing.

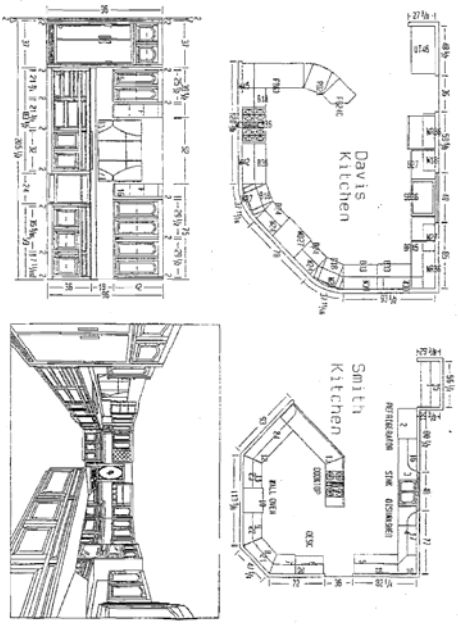
Date: _____ Signature: _____

Authorized Signature: _____

Page 1

HYUN407459 DTX 678 0003

HYUN407467 DTX 678 0011



98. Exhibit 1007 is an additional brochure describing The Detailer, explaining that it used a computer to aid in the sale of cabinets (tangible products) customized for a particular room environment, and provided floor plans, elevation diagrams, change and modification capabilities, views including 3D perspectives and cross sections, multiple drawings on a page, counter top drawings, lumber cutting lists, panel optimization options, and financial information (including estimating, change orders, job costing, proposals, and bid reports).

G. The 1987 Mailer

99. Exhibit 1008 shows the "1987 Chevrolet Cars and Trucks" Mailer, just one example of a pre-printed sales brochure of the type identified as prior art in the '904 Patent. The 1987 Mailer is dated 1987 and I have no reason to doubt it

was available from Chevrolet at least as early as that date, if not earlier based on the common practice of forward dating car model years (*e.g.*, 1987 models would likely have been released in late 1986). I can therefore conclude that Exhibit 1008 would have been accessible to a person of ordinary skill in 1987, and thus, that Exhibit 1008 is a prior art printed publication.

100. The 1987 Mailer is evidence of the types of images and textual information that were included in product catalogs before the filing of the '904 Patent and thus would have been considered by a system designer in sales presentation systems seeking to output similar brochures in an individualized manner. *See, e.g.*, Ex. 1008, p. 4 (reproduced below).



101. In particular, The 1987 Mailer contains:

- product images (*see, e.g.*, Ex. 1008, pgs. 2-3);

- images of products in environments in which they can be used (*see, e.g.,* Ex. 1008, p. 4, showing S-10 Blazer 2WD in business environment, S-10 Pickup 2WD at flower supply shop, p. 6, Astro van in mountains, Astro van hauling boat, p. 8, S-10 Blazer 4x4 in off-roading environs, p. 11, showing engine in car environment);
- product specifications (*see, e.g.,* Ex. 1008, p. 11, description of different engine technologies, transmissions, drivetrain technologies);
- performance specifications (*see, e.g.,* Ex. 1008, p. 10, stating towing capacity, 11, providing performance-oriented characterizations of engine power: “The popular 4.3 Vortec V6 with EFI gives Astro more power than any front drive van”); and
- environment text (*see, e.g.,* Ex. 1008, p. 8, “Adventure calls you and your Chevy. Off-road, hubs locked, 4x4 engaged. Whether your destination is a remote trout stream or a mountain pinnacle.”)

102. The 1987 Mailer is illustrative of the “product catalogs” that systems such as Nohmi, Miyaoka, Kobayashi, Matsuzaki and Takashi were attempting to computerize. *See, e.g.,* Nohmi, § 2.

H. Dimension

103. Exhibit 1009 is a copy of the printed user guide for the “1988 Buick Dimension” software “for the IBM PC,” released in 1988 by Buick. I understand

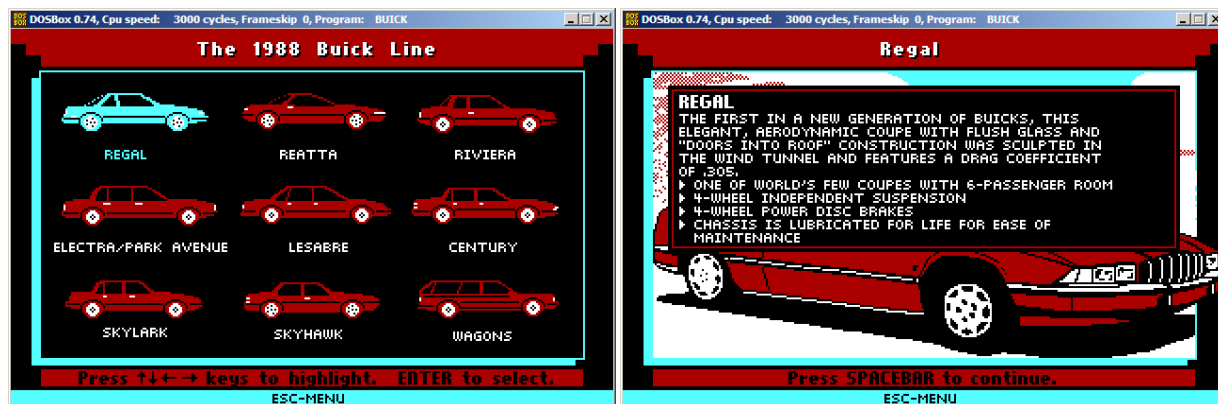
the printed user guide to have been distributed with the 1988 Buick Dimension software, which could be obtained freely by requesting it from Buick in Detroit, Michigan. *See* Ex. 1011 (advertisement offering free copy of Buick Dimension 1988 by mail). Exhibit 1012 is an actual copy of the 1988 Buick Dimension software.³ Running that software (without entering any user data) and printing the screen of the computer produces screenshots such as those provided in Exhibit 1010, and which are discussed below. Based on the materials I reviewed and the demonstration I witnessed, I can conclude that at least Exhibits 1009 and 1011-1012 would have been accessible to a person of ordinary skill in 1988 and that person, on running the Exhibit 1012 software, would have seen output akin to Exhibit 1010. Thus, I can conclude that at least Exhibits 1009-11 are prior art printed publications.

104. Exhibit 1009 states (on page 2, under Getting Started) that the minimum equipment is an “IBM PC/XT, AT, or fully compatible computer ... and color monitor,” and disk storage. Optional equipment calls for an “IBM, Epson,

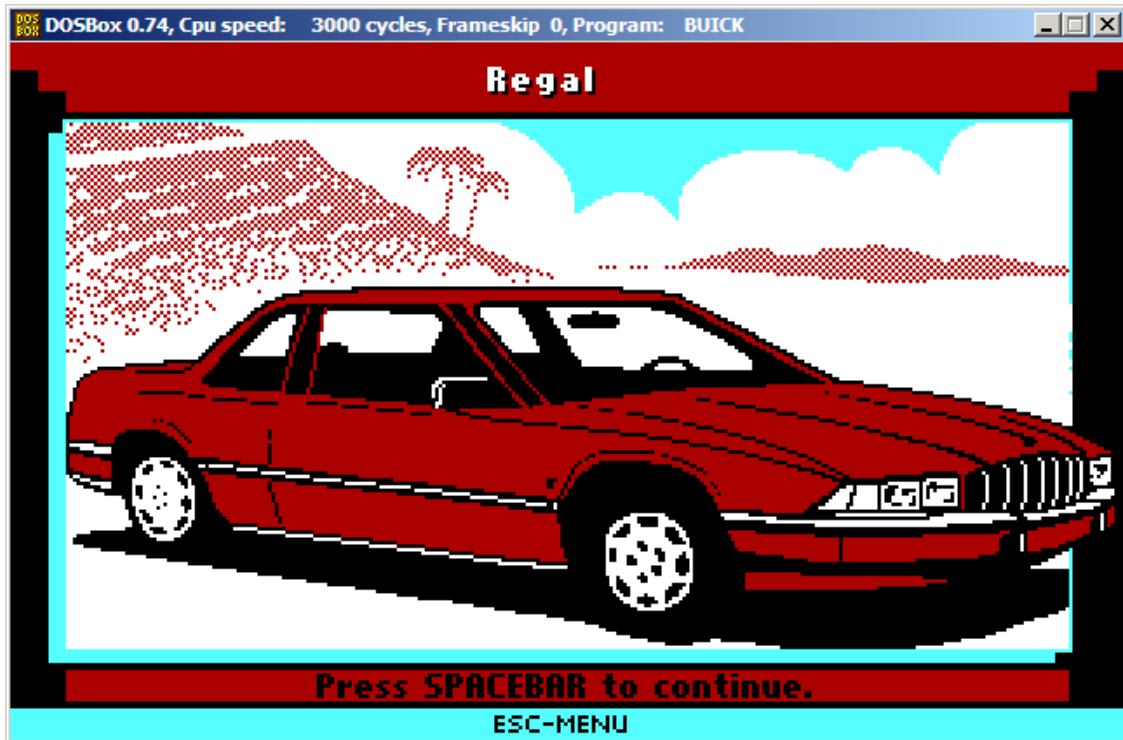
³ My review of the files that comprise Exhibit 1012, including BUICK.EXE, shows they have a Date Modified for all files from no later than 1988. I also note a copyright date of 1988 is displayed when the software was run. *See* Ex. 1010, p. 9.

Okidata, or fully compatible dot matrix printer,” and the guide also includes (at page 5) a section describing printing the various outputs generated by the program.

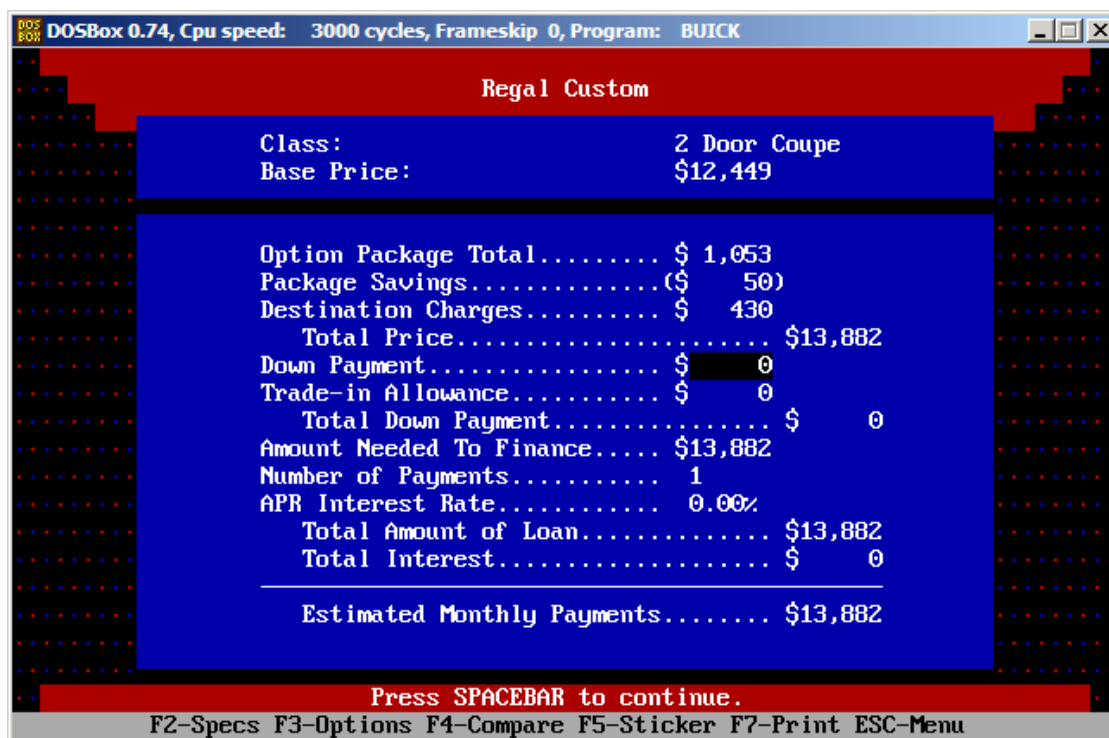
105. Dimension was an interactive sales presentation system for cars, displaying images of cars for sale along with related text segments and environment images. *See* Ex. 1009, p. 4, section on Menus and Interaction (“Primary interaction throughout The 1988 Buick Dimension program is through selection from menus,” “The menus and user instructions guide you sequentially through the program.”). As explained in Ex. 1009 on page 3, within the software there were images of 9 different base models of Buick automobiles (“nine car icons”); *see* Ex. 1010, p. 3 (below). There also was display of “model specifications and features.” *See* Ex. 1009, p. 3, *see also* Ex. 1010, pp. 3-4 (below).



106. Dimension also allowed a potential customer to view Buick vehicles in different environments, such as a seaside environment. *See* Ex. 1010, p. 4 (below).



107. As explained in Ex. 1009 on pages 3 and 4, Dimension further allowed a customer to respond to questions, with answers that led to a customized sales proposal (represented by the pages displayed to the user) for a Buick automobile meeting the user's specifications. That proposal included a "Purchase Plan spreadsheet" with financial information that could be displayed on the computer as well as printed, showing price breakdowns and estimated monthly payments. *See* Ex. 1009, p. 4, *see also* Ex. 1010, p. 8 (below).



VIII. UNPATENTABILITY OF CLAIMS 22-40 OF THE '904 PATENT

A. General Comments

108. This section includes a discussion of the unpatentability of claims 22-40 of U.S. Patent No. 8,121,904 (the “’904 Patent”) to Johnson. Claims 22 and 39 are independent method claims. Claims 23 through 30 depend on claim 22. Further, Claims 24 and 25 depend upon claim 23, and claim 26 depends upon claim 25. Claim 31 is an independent system claim. Claims 32-38 depend on claim 31. Claim 40 is another independent system claim.

109. Using the limitations of claim 22 as an example, each of the challenged independent claims (22, 31, 39 and 40) describe “generating a customized output with a computer system to facilitate a sale of a tangible product”

(the preamble) in a series of seven process steps or structural components capable of performing those steps:

- 1) the **“receiving” limitation:** “receiving ... answers to a plurality of questions related to at least one of a desired feature and a desired use by a customer of a tangible product for sale”;
- 2) the **“automatically selecting” limitation:** “automatically selecting ... in response to at least one of the answers, an image of the tangible product for sale, an image of an environment in which the tangible product for sale is to be used, and a text segment comprised of a description of product specifications and performances that are of particular interest to the customer”;
- 3) the **“integrating” limitation:** “integrating the selected images and selected text segment into a proposal for the sale of the tangible product for the customer such that a single composite customized output representing the tangible product in the environment in which the tangible product is to be used along with said text segment can be generated”;
- 4) the **“selection device” limitation:** “the single composite customized output is generated by a selection device”;
- 5) the **“active database” limitation:** the selection device is operatively interconnected to an active database ... configured to electronically store

customer information obtained via the answers”;

6) the **“static database” limitation**: the selection device is also “operatively connected to a static database, the static database electronically storing at least one of (a) text, (b) pictures or (c) text and pictures relating to at least one product”; (the “selection device” limitation); (the “static database” limitation); and

7) the **“dynamically building” limitation** that the “composite customized output” is produced by “dynamically building a template utilizing the selection device to fill in the template.”

110. These same seven elements can be seen in the elements of claim 39, which include:

- “receiving, at a computer system, answers to inquiries intended to determine a customer's desired features for and desired use of a tangible product for sale” (the **“receiving” limitation**);
- “automatically selecting, by the computer system and in response to at least one of the answers, an image of the tangible product for sale, an image of an environment in which the tangible product for sale is to be used, and a text segment comprising a description of product specifications and performances that are of interest to the customer” (the **“automatically selecting” limitation**);

- “generating and displaying, by the computer system, a single composite customized output representing the tangible product in the environment in which the tangible product is to be used along with said text segment” (the **“integrating” limitation**);
- “wherein a single composite customized output is: generated by a selection device” (the **“selection device” limitation**);
- “the selection device is operatively connected to (i) an active database configured to electronically store customer information” (the **“active database” limitation**);
- “the selection device is operatively connected to (ii) a static database electronically storing at least one of (a) text, (b) pictures, or (c) text and pictures relating to the tangible product” (the **“static database” limitation**);
- “arranged as a proposal for the sale of the tangible product customized in accordance with the customer's desires” (the other part of **the “integrating” limitation**); and
- “presented within a template dynamically constructed by the computer system utilizing the selection device” (the **“dynamically building” limitation**).

111. From this I can conclude that showing that claim 22 is unpatentable also suffices to show that claim 39 is unpatentable. In my opinion the same can be said for system claims 31 and 40, since claims 22 and 39 begin with “A method of generating a customized output with a computer system,” making clear that the claims depend upon and include a computer system of the kind recited in claims 31 and 40. The only differences are that claim 31 introduces a “memory system” and “processing system,” and claim 40 introduces “storage system.” But each of these structural elements, which are inherent in any computer system, simply perform one or more of the process steps described above. Consequently, like with claim 31, when considering unpatentability of claims 39 and 40, it is my opinion that it is sufficient to show how each of the seven above elements is disclosed, taught or suggested by the prior art, since those elements in similar combinations with only minor differences make up claims 31, 39, and 40. I have reviewed the various minor differences contained in the claims (*e.g.*, claim 39 uses “inquiries” instead of “questions”, and claim 40 receives “information concerning desired features and use”) and in my opinion they have no impact on unpatentability.

112. My further analysis makes clear that what is discussed in the dependent claims 32-38 is covered by claims 23-30. Dependent claim 23 specifies that the “customized output” of the method is a “customized proposal.” Dependent claim 24 requires output to a “computer display” and claim 32 similarly calls for

“provid[ing] a user interface to present the ... output ... as a visual output.” Dependent claims 25, 26 and 33 all require including a printer or printing the output as a printed document. Dependent claims 27-29, 34-36 and 38 all require storage and linking for inclusion in the customized output specific kinds of text segments—“environment text segments,” “product specifications,” and/or “performance specifications.” Finally, dependent claims 30 and 37 require presenting “queries related to financing the tangible product” and including “financing information” in the customized output. Thus, like with the independent claims, it is my opinion that an analysis of the elements of dependent claims 23-30 suffices to show unpatentability of dependent claims 32-38.

113. To further confirm my analysis I constructed a concept map to show the key words and phrases in those claims, as well as their relationships. *See* Figure 1 below. In such concept maps, nodes in box-like shapes contain the words or phrases that represent the key concepts, while lines (arcs) between boxes describe relationships among those concepts. Some arcs have arrows to show direction; for others the direction is assumed, since the normal reading is from top to bottom and from left to right. In some nodes an extra line of text has been added to show in which claim the concept was first introduced; for most other nodes each concept is introduced somewhere in claim 22.



114. The concept map verifies that what is introduced in claims 22-30 covers what is described in claims 31-40 as well. As I mentioned above, there are three structural elements (“memory system,” “processing system,” and “storage system”) introduced in later claims, all of which relate to inherent structural aspects of the claimed “computer system.” Thus, the following nine subsections give details regarding the unpatentability of claims 22-40, based on analysis of the prior art references given above in Section VII.

115. All of those references are prior art under 35 U.S.C. §§ 102(b) or 102(e). Subsections B and C below discuss the prior art works labeled as Nohmi and Matsuzaki, respectively, explaining how each anticipates claims 22-24, 27-29, 31-32, 34-36, and 38-40. Subsections D-H discuss the obviousness of claims 22-24, 27-29, 31-32, 34-36, and 38-40. In particular, Subsections D-F discuss Nohmi in view of, respectively, Miyaoka, Kobayashi, and Matsuzaki. Subsections G and H discuss Matsuzaki in view of Takashi and Miyaoka, respectively. Further, obviousness discussions of several dependent claims are provided in Subsections I (for claims 25-26 and 33), J (for claims 27, 34, and 38), and K (for claims 25-26,

30, 33, and 37), over the prior art covered in Subsections B-H, in further view of Detailer, The 1987 Mailer, and Dimension, respectively.⁴

116. The legal principles discussed above in Section IV.D are considered in the discussions below of anticipation and obviousness. In the interest of brevity, the discussions below are presented in a prose style. I reserve the right to explain further if such is warranted or desired.

117. Also to save space, I provide here some general comments, so they will not have to be repeated in each of the subsections below. First, a person of ordinary skill in the art, familiar with the use of computerized systems with documents, involving electronic publishing, hypertext, hypermedia, multimedia, CD-ROM, database, and similar information processing and management technologies (as explained in Subsection IV.A above), would have been knowledgeable about the state of the art at the time, as explained in Section VI, in view of the claim constructions discussed above. Second, such a person, if faced

⁴ Claims 25-26 and 33 relate to printing. The '904 Patent admits there is prior art regarding printing when it describes "[p]rinters such as the Canon CLC-300 produce color computer print-outs." '904 Patent, 2:51-53. Thus it was well known that computer displays could be printed, as could other computer documents, including customized output.

with the need to address each of claims 22-40, would have been motivated to consider the combinations discussed below in Subsections D-J. That is because it would have been obvious that these references are from the same field (as stated above -- the use of computerized systems with documents, involving the then rapidly converging areas of electronic publishing, interactive user interfaces, hypertext, hypermedia, multimedia, CD-ROM, database, and similar information processing and management technologies) and are targeted at the same problem, namely the integrated use of text and images for interactive support of customized sales of products.

B. Nohmi Discloses All Elements of Claims 22-24, 27-29, 31-32, 34-36, and 38-40 and Thus Anticipates Those Claims

118. In my opinion, claims 22-24, 27-29, 31-32, 34-36, and 38-40 of the '904 Patent are unpatentable since all of the elements of these claims are disclosed by Nohmi (Ex. 1001), as explained below.

119. Nohmi discloses, as is explained below, what is described in **the preamble**: “generating a customized output with a computer system to facilitate a sale of a tangible product.” Specifically Nohmi discloses a “sales presentation system being put to practical use; it enables real presentations for products.”

Nohmi, Introduction⁵. Further, Nohmi describes that the disclosed “sales presentation system” is a “multimedia presentation system that applies the concept of hypermedia for the purpose of sales presentations.” *Id.* This allows users to interact with Nohmi’s system to obtain the information they desire regarding various models, features, and uses of cars. *See* Nohmi, §§ 3.1 (a “car”); 3.3 (an electronic “car catalog”); Figs. 2, 3 (showing images of cars). Thus, Nohmi’s “multimedia presentation system” generates “customized output” that facilitates a sale of a tangible product, cars. Further, the “multimedia presentation system ... [is] integrated onto a work station (HITAC-2050, 2050G),” *i.e.*, a computer system. Nohmi, § 3.1.

120. Nohmi also discloses, as is explained below, what is described in the **“receiving” limitation**: “receiving via a computer system, answers to a plurality of questions related to at least one of a desired feature and a desired use by a customer of a tangible product for sale.” Nohmi discloses an interface (a “car catalog”) that uses selectable keywords or elements within images (called “KEYS”) as well as menus composed of text and images (called “MENUS” with

⁵ When referring to Nohmi, for consistency I refer to the section numbers of the English translation, as the page numbers on the translation do not correspond to the Japanese original.

“SELECTORS”) to collect “answers to a plurality of questions” regarding “desired features and ... uses” for a product, *e.g.*, a car, as is illustrated below in Nohmi, Figure 2. *See* Nohmi, §§ 2, 3.1, 3.3, and 3.4 (discussing “KEY,” “MENU”, and “SELECTOR” objects).

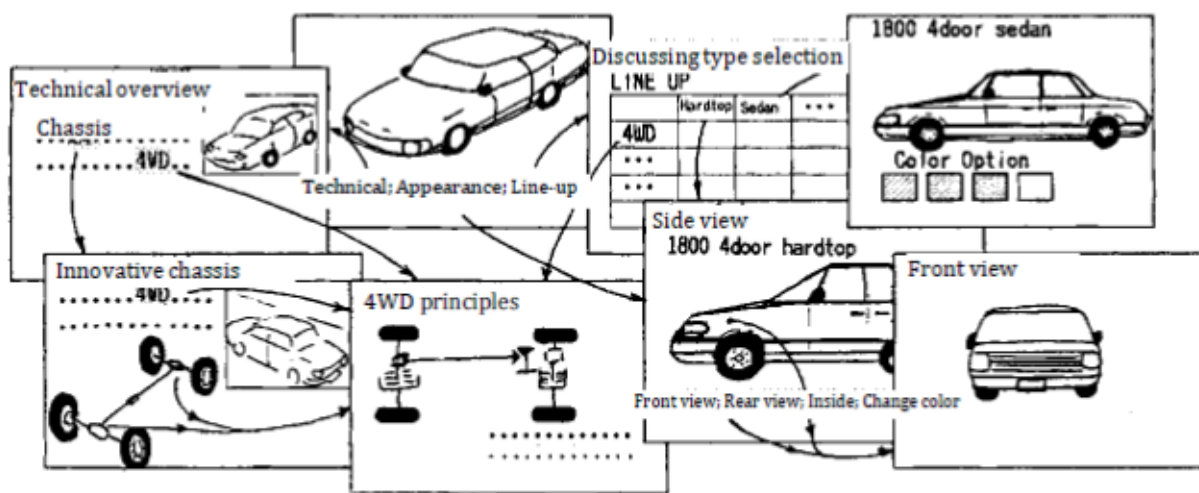


Figure 2: Outline of functions and image representation of a search

As this figure shows, such “features and... uses” could include such things as the model type (*e.g.*, “Hardtop” or “Sedan”), colors, type of chassis, and type of drivetrain (*e.g.*, “4WD”). The specific use of hypermedia as a mechanism for receiving answers to questions is discussed in Nohmi’s Introduction and Sections 3.1, 3.2, and 4 of the text. The selectable keywords or image elements (“KEYS”, which are like the clickable textual or graphical “links” of modern webpages), and text and image menus (“MENUS,” with “SELECTORS”) in the hypermedia car catalog serve as questions, with answers given by way of clicks on those objects. Some of the examples shown in Nohmi’s Figure 2 include “questions” to a

customer regarding whether they would like to learn more about 1) the “Innovative chassis” of the car, 2) the “Hardtop” or “Sedan” models, or 3) how and where they can use the car with “4WD.” *See* Nohmi, Figure 2, above.

121. Nohmi also discloses, as is explained below, what is described in the **“automatically selecting” limitation**: “automatically selecting by the computer system, in response to at least one of the answers, an image of the tangible product for sale, an image of an environment in which the tangible product for sale is to be used, and a text segment comprised of a description of product specifications and performances that are of particular interest to the customer.”

122. Depending on what “question” the customer answers in the affirmative by choosing a menu selection or clicking on a selectable keyword or image element on one of Nohmi’s catalog “pages,” Nohmi’s computer system “automatically selects” the information that next will be shown to the customer. *See* Nohmi, § 3.1(2) (“Hyper retrieval (text, natural images)”); 3.3 (“when that key is selected, the new page specified thereby is displayed”). The specific page elements that are separately selected for display depend on the user’s answers, and can include, as shown in Figure 2 of Nohmi:

- “image[s] of the tangible product for sale”, such as the various pictures of a car in Figure 2 and particularly the depiction of the car on the “Innovative chassis” page;

- “images of an environment in which the tangible product for sale is to be used,” such as the depiction of the car on the “Innovative chassis” page in which an image of the car is shown on an image of a normal road, and;
- “text segment[s] comprised of a description of product specifications and performances,” such as the dotted lines on the “Innovative chassis”, which represent text about the product, including its “4WD” specifications and performances.

123. Separate selection of these elements is confirmed by the data structure for “pages,” which include separate elements for Paragraph (“PARA”) and Image (“IMAGE”). *See* Nohmi, § 3.4. This means that each paragraph and image element is individually referenced within the “page,” and therefore “separately” selected by the software when that paragraph or image element is processed. That product images and environment images are separately selected is further confirmed by the “Image processing functions” discussed in Section 3.1(3), specifically “Segmentation (cutting out the body of car)” and “Processing (Simulations for changing the color of the body).” That is, the Nohmi system can store natural images (scenes) separately from segmented images of products (cars) so that the two may be composited.

124. Nohmi also discloses, as is explained below, what is described in the **“integrating” limitation**: “integrating the selected images and selected text

segment into a proposal for the sale of the tangible product for the customer such that a single composite customized output representing the tangible product in the environment in which the tangible product is to be used along with said text segment can be generated.”

125. As can be seen in Figure 2 (reproduced above), Nohmi integrates the selected images and text segment into a “proposal,” that is, “information intended for conveyance to the customer.” It does this by compositing the selected images and text segment into “a single composite customized output:” namely, a “page,” the structure of which is described in Figure 3 (reproduced above). *See* Nohmi, § 3.4 (“the page structure for implementing the various link structures shown above [in Figure 2], as illustrated in Figure 3, has the following stratified configuration, where each stratum is managed as an object”). Such pages, moreover, are the “output” of the system, and they show not only text segments, but also show the “tangible product” in the “environment” in which it is to be used. This can be seen in at least the “Innovative chassis” page shown in Figure 2, which shows both text segments, images of the product (the car and its chassis), with the image of the car (the tangible product) being shown on the road (an image of the environment in which it is to be used.)

126. Finally, that the “proposal” presented on the page is “for the sale of the tangible product for the customer” is confirmed in Section 2, where Nohmi

states that “[a] presentation system refers to the digital conversion of a product catalog ... or the like ... intended for providing information with a specific object,” specifically, customized information based on the user’s specific interactions with the system. The purpose of product catalogs is of course to sell products. Thus, under the applicable claim construction, the composite images created by Nohmi based upon its “digital” product catalog are a “proposal” for “sale” of a product.

127. Nohmi also discloses, as is explained below, what is described in the **“selection device” limitation**: “wherein a single composite customized output is generated by a selection device.” Nohmi’s selection device is simply the computer code (or “computer code data structure,” as the District Judge put it) that processes the page structures and builds the composite outputs for display to customers. *See, e.g.,* Nohmi, § 3.4, Fig. 2 (showing exemplary outputs of this code). Moreover, one of ordinary skill reading Nohmi would recognize the algorithm shown in Figure 4 as illustrating how the “single composite customized output” is generated from a page’s list structure by sequentially processing and rendering all the various elements of the page, including the specific Paragraph (“PARA”) or Image (“IMAGE”) elements that require selection and layout of individual text and images.

128. Nohmi also discloses, as is explained below, what is described in the **“active database” limitation**: that “the selection device is operatively connected

to (i) an active database configured to electronically store customer information.” Nohmi’s active database is the record of the collection of selectable keywords, selectable image elements, and menu items selected as shown in Figure 2, that at least records the customer’s car color option preference (“customer information”), so that a preferred color car can be included on “pages” of Nohmi’s electronic catalog. *See also* Nohmi, § 3.3 (“key elements are recorded”); § 3.1(3) (“Processing (Simulations for changing the color of the body)”); § 3.4 (discussing pointer in the page structure to “start up the color-changing simulation”). As required by the District Judge’s construction, this is a “[collection of logically related data stored together in one or more computerized files] that is alterable based on user input.” The “logically related data” are the key elements that are recorded by the system, and this collection is alterable, as explained above, depending on what selections a user (customer) makes.

129. Nohmi also discloses, as is explained below, what is described in the **“static database” limitation**: that “the selection device is operatively connected to (ii) a static database electronically storing at least one of (a) text, (b) pictures, or (c) text and pictures relating to the tangible product” – with “static database” meaning (as the District Judge held) a “[collection of logically related data stored together in one or more computerized files] that [are] not alterable during generation of a composite visual output.”

130. Nohmi describes in Section 2 that its software is designed to be run from “dedicated media that uses a CD-ROM or similar packaged media”—media that obviously foreclose “alteration” of the database that is contained on them, particularly during generation of a composite visual output. And of course a product seller’s database of products in such a system could not really be altered during the short time involved in creating a composite visual image or proposal for conveyance to a customer; hence the database of product information, at a minimum, is not “alterable” during the generation of the composite visual image or proposal.

131. In Nohmi, moreover, the separately stored particular images and text are obtained by hypermedia retrieval from centralized storage on that media. *See* Nohmi, §3.1(2) (“Hyper retrieval”); 3.2 (“the following link structure allows for network-based retrieval, which is the basic architecture for hypermedia.”). The contents of the centralized storage thus constitute a “collection” of data. And the data are “logically related” because (1) they all concern the products being marketed through use of the Nohmi system, and (2) they are the organized text and image elements that the Nohmi system is capable of displaying.

132. Finally, Nohmi discloses, as is explained below, what is described in the **“dynamically building” limitation**: that the proposal is “presented within a template dynamically constructed by the computer system utilizing the selection

device” – that is (according to the District Judge’s construction), constructed so that the template “may be modified to fit selected images and text.” As shown in Figures 2 and 3 of Nohmi and described in §3.4, Nohmi’s “pages” are rendered (*i.e.* “dynamically constructed”) with images and text retrieved on-the-fly via “Hyper retrieval.” Thus, the page (a “template”) displayed on a computer screen must be capable of being “modified” as necessary to “fit” the selected images and text.

133. As can be seen in Figure 3 (below), the format of the display is altered as necessary to fit the elements prescribed by that list structure. Indeed, the hashed lines surrounding the “Columns,” “Paragraphs,” and “Images” shown in Figure 3 indicate that the sizes (both absolute and relative) of these elements of the output will vary depending on the needs of each presentation, including the space required to properly render the data selected for inclusion in each of those elements.

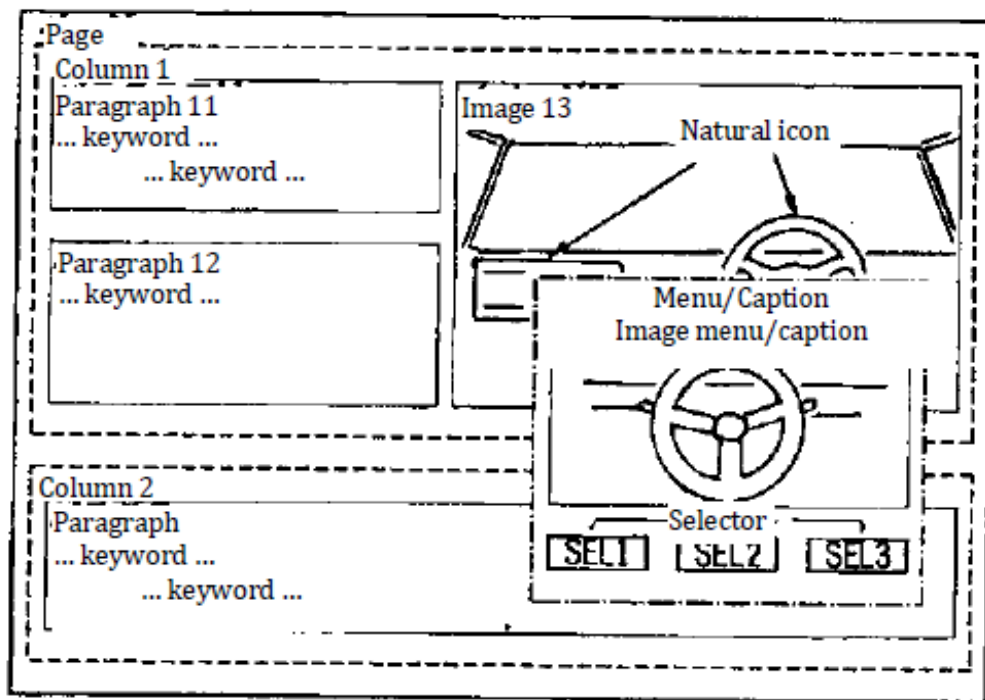


Figure 3: Page structure

134. Since Nohmi discloses all elements I have identified above as necessary to anticipate independent claims 22, 31, 39 and 40, it is my opinion that Nohmi anticipates those claims

135. In addition to disclosing all of the elements necessary to anticipate independent claims 22, 31, 39 and 40, Nohmi also discloses, as is explained below, what is described by dependent claims 23 and 24: “outputting the composite customized output to a user as a customized proposal” and “displaying the composite customized output on a computer display for viewing by the user.” This can be seen in Figure 3 of Nohmi and (the last part of) Figure 2, which all show examples of customized pages that have been “outputted” to a computer display,

and that contain information designed to be conveyed to a customer. Thus, Nohmi anticipates these claims too.

136. Nohmi also discloses, as is explained below, what is described in claim 27, which has two limitations, the first of which is “the computer system stores a plurality of predetermined environment text segments related to environments in which the tangible product may be used.” Nohmi discloses this limitation through, for example, the text stored in the Nohmi system and shown as dotted lines that are displayed on the page “4WD principles” shown in Figure 2. The text on the “4WD principles” page, and the stored information represented by that text, includes “predetermined environment text segments” relating to the environments in which the “4WD” would be active, *e.g.*, off-roading. The inclusion of such “predetermined environment text segments” on these pages and in the system’s memory also necessarily flows from the fact that Nohmi was designed to computerize the kinds of “product catalogs” contained in the prior art that included text describing, for instance, environments in which products could be used such as traveling to “a remote trout stream or a mountain pinnacle.” *See, e.g.*, Ex. 1008 (The 1987 Mailer), p. 8.

137. Nohmi also discloses the second limitation of this claim: “linking at least one of the answers with one of the plurality of predetermined environment text segments for inclusion in the composite customized output.” The

“predetermined environment text segments” displayed on the “4WD principles” page in Nohmi are necessarily “linked” to an “answer” provided by a customer selecting that page for display. *See* Nohmi, Fig. 2. That is because the “4WD principles” page includes paragraph (PARA) elements that link those “predetermined environment text segments” for inclusion in the composite customized output displayed to the customer. *See* Nohmi, § 3.4. Thus, Nohmi anticipates claim 27 too.

138. Nohmi also discloses, as is explained below, what is described in claim 28, which has two limitations, the first of which is that “the computer system stores a plurality of product specifications related to producing the tangible product in a variety of configurations.” Nohmi discloses this limitation through, for example, the text related to product specifications that is stored in the Nohmi system and shown as dotted lines that are displayed in the exemplary “pages” shown in Figure 2, for example, the table “LINE UP” which appears to be a list of various product “configurations” with unique specifications (*i.e.*, the company’s product “line-up”). The “product specifications” for the seller’s entire lineup of products clearly relates to producing the product in a variety of configurations. The inclusion of such “product specifications” on these pages and in the system’s memory also necessarily flows from the fact that Nohmi was designed to computerize the kinds of “product catalogs” contained in the prior art that included

text describing, for instance, the different kinds of chassis available for a given model. *See, e.g.*, Ex. 1008 (the “1987 Mailer”), p. 4.

139. Nohmi also discloses the second limitation of this claim: “linking at least one of the answers with one of the plurality of product specifications for inclusion in the composite customized output.” The “product specifications” displayed as part of the “LINE UP” in Nohmi are necessarily “linked” to an “answer” provided by a customer selecting the “LINE UP” for display. *See* Nohmi, Fig. 2. That is because the “LINE UP” page includes paragraph (PARA) elements that link those “product specifications” for inclusion in the composite customized output displayed to the customer. Thus, Nohmi anticipates claim 28 too.

140. Finally, Nohmi also discloses, as is explained below, what is described in claim 29, which has two limitations, the first of which is “the computer system stores a plurality of performance specifications related to performance of the tangible product in a variety of configurations.” Nohmi discloses this through, for example, the text that is stored in the Nohmi system and shown as dotted lines that are displayed on the pages “4WD principles” and “Technical overview” shown in Figure 2. The text on these pages, and the stored information represented by that text, includes “performance specifications” relating to such capabilities as “4WD” or other technologies embodied in the vehicle. And

these specifications necessarily relate to the performance of the product in a variety of configurations. The inclusion of such “performance specifications” on these pages and in the system’s memory also necessarily flows from the fact that Nohmi was designed to computerize the kinds of “product catalogs” contained in the prior art that included text describing, for instance, towing capacities of various models, or relative engine power. *See, e.g.*, Ex. 1008 (the “1987 Mailer”), pp. 10, 11.

141. Nohmi also discloses the second limitation of this claim: “linking at least one of the answers with one of the plurality of performance specifications for inclusion in the composite customized output.” The “performance specifications” displayed on the “4WD principles” or “Technical overview” pages in Nohmi are necessarily “linked” to an “answer” provided by a customer selecting one of those pages for display. *See* Nohmi, Fig. 2. That is because the selected page includes paragraph (PARA) elements that link those “performance specifications” for inclusion in the composite customized output displayed to the customer. *See* Nohmi, § 3.4. Thus, Nohmi anticipates claim 29 too.

142. As is explained above, dependent claims 32, 34-36 and 38 describe the same features as dependent claims 23-24 and 27-29, so it is my opinion those claims also are anticipated by Nohmi.

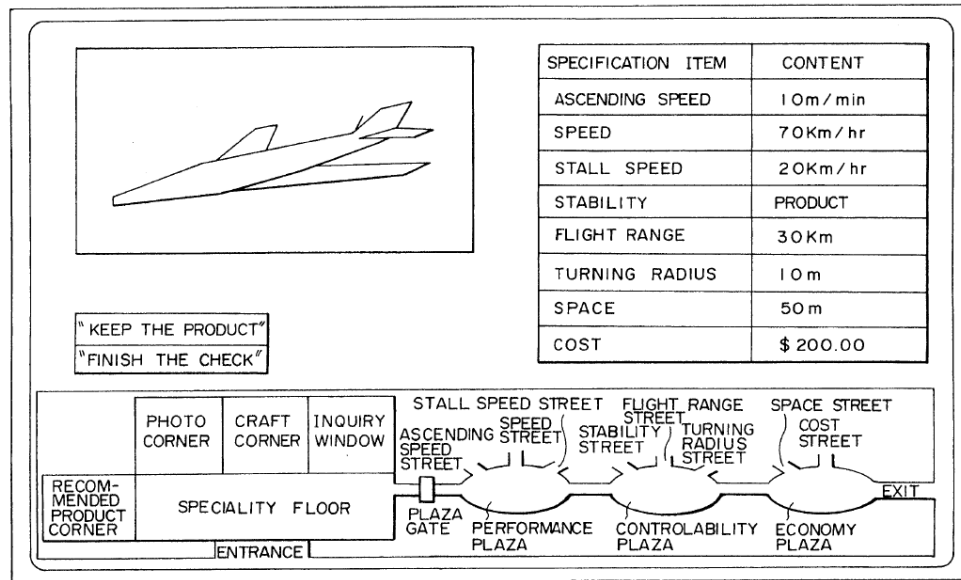
C. Matsuzaki Discloses All Elements of Claims 22-24, 27-29, 31-32, 34-36, and 38-40 and Thus Anticipates Those Claims

143. In my opinion, claims 22-24, 27-29, 31-32, 34-36, and 38-40 of the ‘904 Patent are unpatentable since all of the elements of these claims are disclosed by Matsuzaki (Ex. 1004), as explained below.

144. Matsuzaki discloses the preamble: “generating a customized output with a computer system to facilitate a sale of a tangible product.” Matsuzaki describes a “system which accepts a custom order of product from a customer.” Its steps include “inputting the required specification of a product, creating the product design based on ... the input required specification, showing the created product design to the customer, selectively indicating a product to be purchased, ... and producing a product based on the selected product specifications.” Matsuzaki, Abstract. This is by definition “generating a customized output with a computer system to facilitate a sale of a tangible product,” within the meaning of the ‘904 patent’s preamble.

145. Claim 16 of Matsuzaki confirms this by its requirements of “determining the product design... [and] designing the product.” Matsuzaki, 34:38-43. Figure 10 of Matsuzaki shows one such tangible product, a high-end toy plane.

FIG. 10



146. Matsuzaki also specifically discusses product sales (through its discussion of product pricing), at 1:43, 1:51, 2:47, and 31:47. It further discusses “ordering” a product, in the Abstract, in the SELLING STRATEGY box in Figure 27, at the top of Figure 51, and at 1:8-15, 1:55, 1:63, 3:28; as well as at the bottom of Figures 8 and 21, 2:36, and 2:59—all of which clearly indicate that the product at issue is being sold.

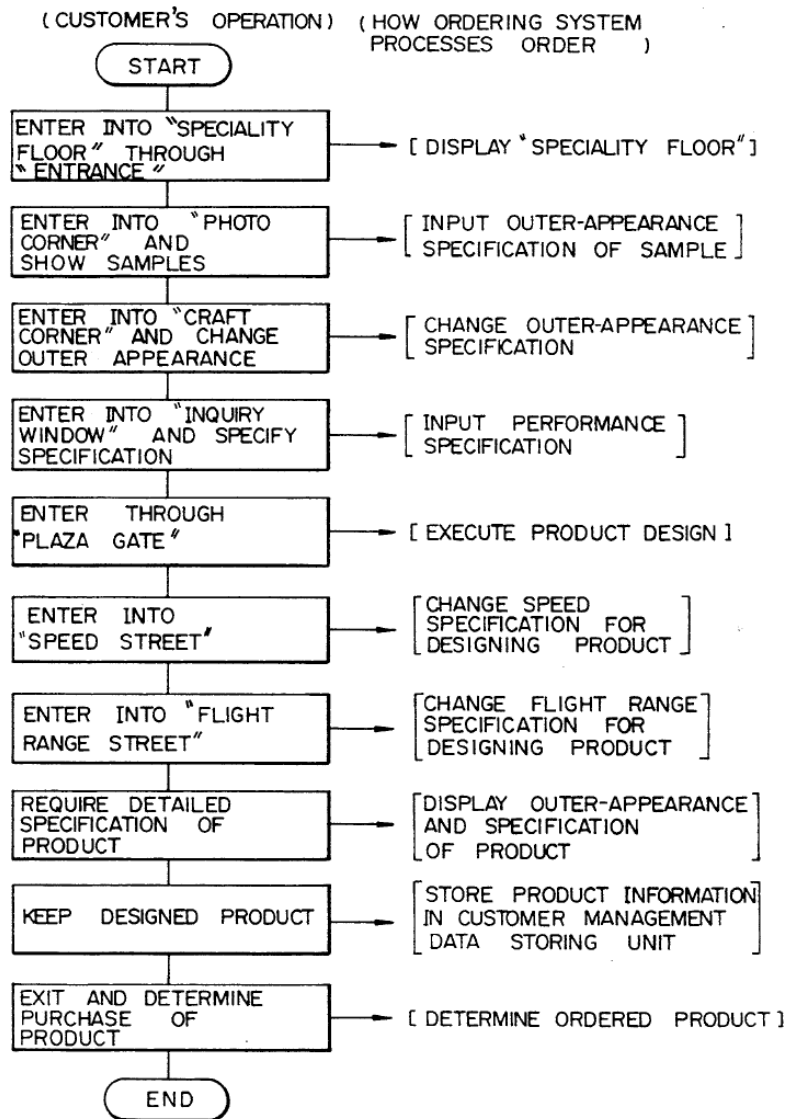
147. Matsuzaki also discloses the use of a “computer system” for these purposes, with that system being described at 9:31, 16:24, and shown in Figure 6 as item 1-22 (a “PROCESSOR” with a “GRAPHIC COMPUTER”). Specifically, in Matsuzaki the graphic computer 1-22 “is a computer having a graphic processing function and includes ... [a] combination design unit 1-10, and storage units such as the required specification storing unit 1-11, the product model storing

unit 1-12, the part data storing unit 1-13, and the customer management data storing unit 1-14.” Matsuzaki, 9:30-40.

148. Matsuzaki also discloses, as is explained below, what is described in the **“receiving” limitation**: “receiving via a computer system, answers to a plurality of questions related to at least one of a desired feature and a desired use by a customer of a tangible product for sale.”

149. As shown in the flow chart shown in Figure 8 (below), a user of the Matsuzaki system steps through a series of interfaces (shown in Figures 7, 9, and 10 and discussed at 9:51-12:36) designed to collect “answers” to “questions” posed to the user about what kind of product she might like to purchase and the specifications for that product.

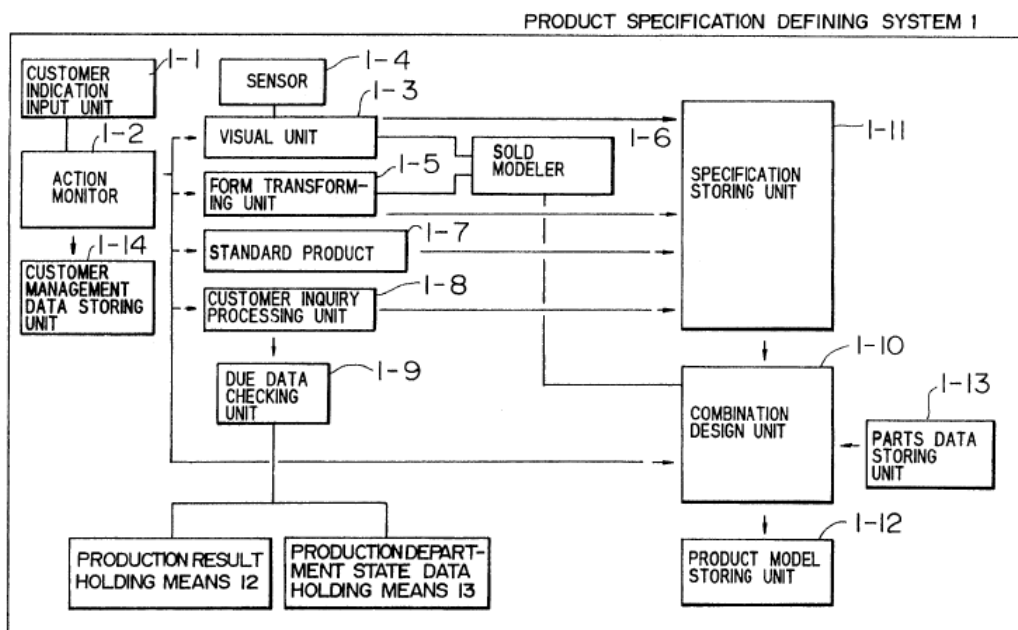
FIG. 8



150. First a user might define the general outer appearance of the product—such as a model airplane—that she wishes to purchase in the “Photo Corner” interface by selecting from samples presented to her there. Next the user might customize elements—such as form and color—of that outer appearance in the “Craft Corner” interface. Once this is completed, the user can specify certain

performance specifications—such as a desired ascending speed, or flight speed—in the “Inquiry Window.” At this point, the Matsuzaki system is ready to generate possible product designs, as represented by the action of entering “through the ‘plaza gate’.” These input steps are executed by item 1-8 in Figure 2 (shown below), a “CUSTOMER INQUIRY PROCESSING UNIT” which asks the “questions” about a customer’s desires. Item 1-1, called a “CUSTOMER INDICATION INPUT UNIT,” receives the “answers” to those questions.

FIG. 2



151. Matsuzaki also discloses, as is explained below, what is described in the **“automatically selecting” limitation**: “automatically selecting by the computer system, in response to at least one of the answers, an image of the tangible product for sale, an image of an environment in which the tangible

product for sale is to be used, and a text segment comprised of a description of product specifications and performances that are of particular interest to the customer.”

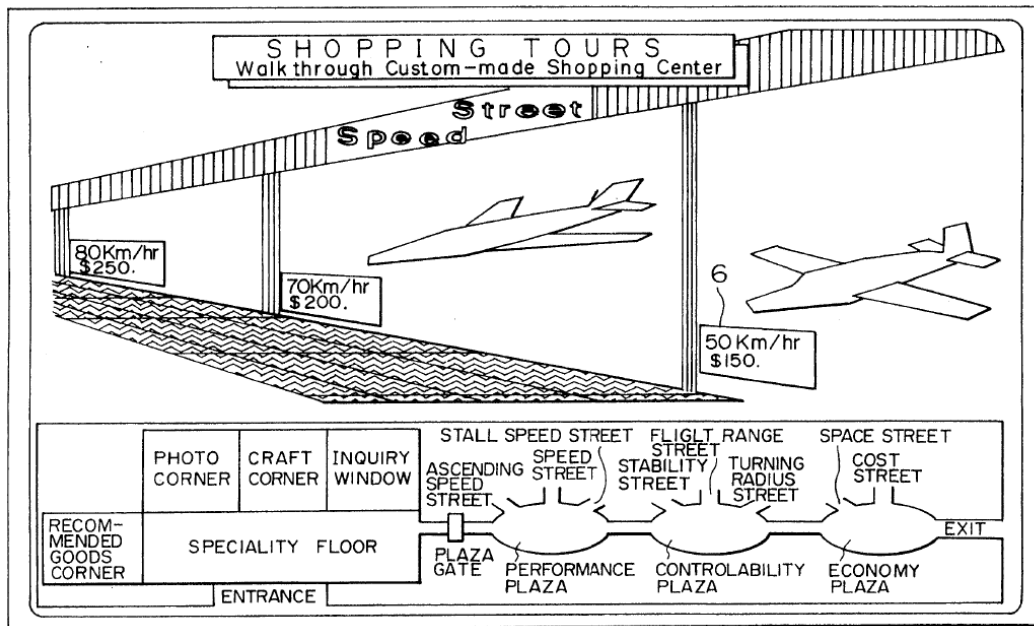
152. As shown in Figure 8 (above), depending on the “answers” to the “questions” input by the user, Matsuzaki’s system will “execute product design” and present those designs to the user on an interface (such as that shown in Figure 9, discussed below). In doing so—again referring to Fig 8—Matsuzaki’s “combination design unit 1-10” will “design the product as referring to the data stored in the parts data storing unit 1-13” and “store the resulting design in the product model storing unit 1-12.” Once the design process is complete, “product and performance specifications” such as prices and images of the product (both from product model storing unit 1-12), as well as an environment image (as shown, a virtual airplane hangar), are separately selected for display. *See, e.g.*, Matsuzaki, Figs. 8-10, 9:51-12:36. Separate selection is confirmed by the fact that Matsuzaki’s interfaces are dynamically generated, thus indicating that each element is separately selected for integration into that display.

153. Matsuzaki also discloses, as is explained below, what is described in the **“integrating” limitation**: “integrating the selected images and selected text segment into a proposal for the sale of the tangible product for the customer such that a single composite customized output representing the tangible product in the

environment in which the tangible product is to be used along with said text segment can be generated.”

154. Figure 9 (below) illustrates an interface that presents a single composite customized output to the user:

FIG. 9



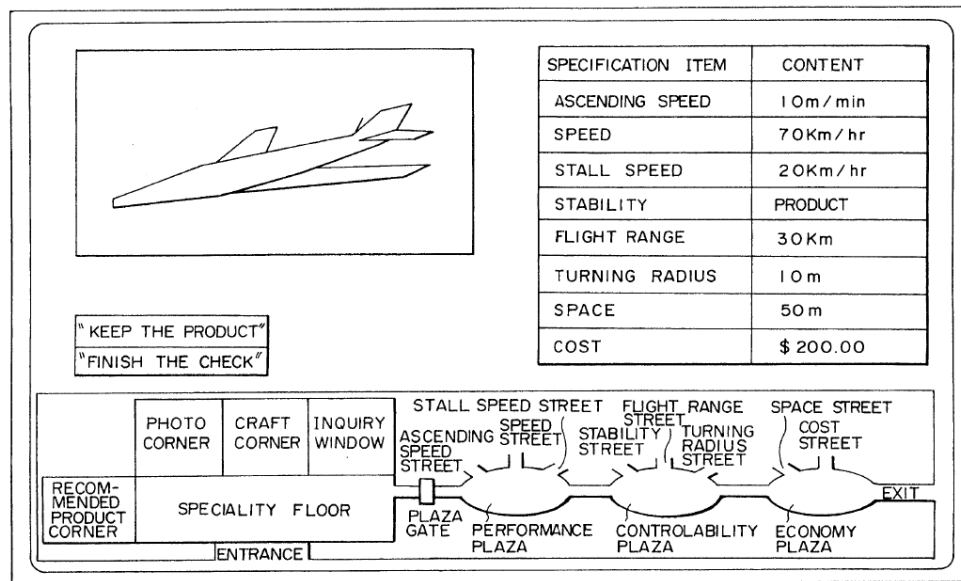
155. Figure 9 shows “speed street,” which presents the user with a visualization of the product designs using images of the product (high-end toy planes) in an environment in which they can be used (an airplane hangar),⁶ along

⁶ Although in this figure the environment is a “virtual” environment—a virtual airplane hangar—that does not matter: If the system can show a product in a virtual environment, it can show it in a “real” environment as well. Moreover,

with various text segments describing specific product and performance specifications of those products (*e.g.*, 70Km/hr \$200.) *See* Matsuzaki, 10:48-11:49, Fig. 11.

156. In Figure 10 (shown below), Matsuzaki shows the further composite customized output the system generates if a user selects one of the products presented. That figure shows an image of that product and even more text segments describing product specifications and performances. *See* Matsuzaki, 11:49-65.

FIG. 10

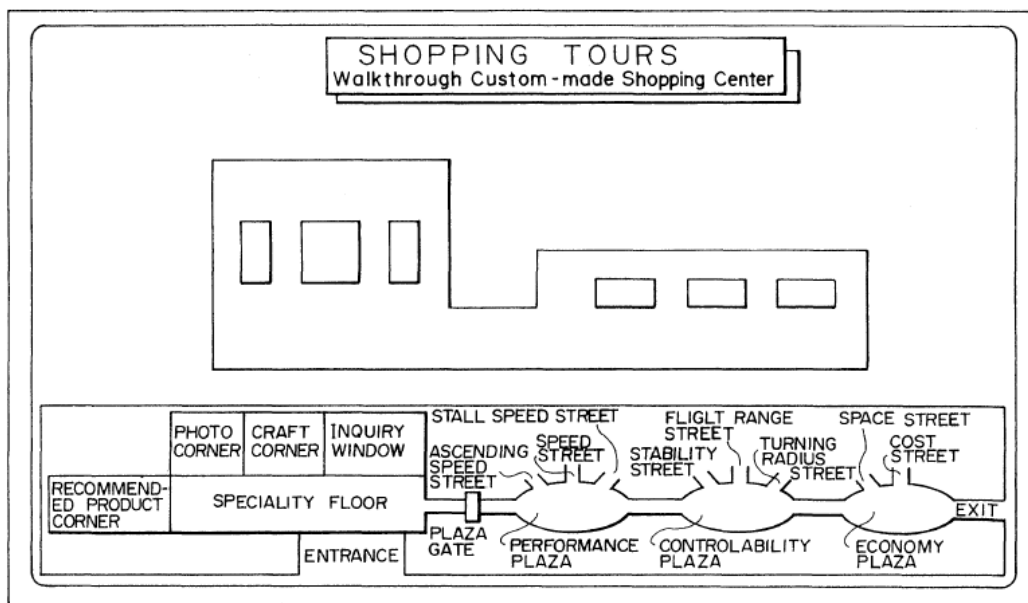


Matsuzaki's system has the inherent ability to composite product/part images in a variety of environments, including showing a component part in the environment of its completed product. *See, e.g.*, Matsuzaki, Figs. 19, 20, 31, and 32.

157. Matsuzaki discloses, as is explained below, what is described in the **“selection device” limitation**: “wherein a single composite customized output is generated by a selection device.” Matsuzaki’s selection device is simply the computer code (or “computer code data structure,” as the District Judge put it) that runs on the graphic computer 1-22 and builds the composite outputs for display to customers. *See, e.g.*, Matsuzaki, Figs. 9, 10 (showing exemplary outputs of this code).

158. As is explained at 9:42-43, “FIG. 7 is a view showing a screen appearing when the product specification defining system starts to work,” at the beginning of the product definition process.

FIG. 7



159. The single composite customized output given in Figures 9 and 10 (that follow on from the input entered on the screen shown in Figure 7) are generated by the graphic computer 1-22 (a “selection device”) as the user further interacts with the system. *See also* Figs. 1, 2, 4, 5, 7, 9, and 10, and 9:42-54, 10:36-47, and 11:49-12:21.

160. Matsuzaki also discloses, as is explained below, what is described in the **“active database” limitation**: that “the selection device is operatively connected to (i) an active database configured to electronically store customer information.” If a user wants to save the product she has created, she can select “Keep the Product,” which stores the detailed specification in a customer management data storing unit 1-14, which as noted above is connected to the “selection device” (software running on graphic computer 1-22). As required by the District Judge’s prior construction, this is a “[collection of logically related data stored together in one or more computerized files] that is alterable based on user input.” The “logically related data” are the product designs recorded by the system, and they are alterable, as explained above, depending on what selections a user (customer) makes.

161. Matsuzaki also discloses, as is explained below, what is described in the **“static database” limitation**: that “the selection device is operatively connected to (ii) a static database electronically storing at least one of (a) text, (b)

pictures, or (c) text and pictures relating to the tangible product” – with “static database” meaning (as the District Judge held) a “[collection of logically related data stored together in one or more computerized files] that [are] not alterable during generation of a composite visual output.”

162. Matsuzaki makes use of several such “static databases” that contain at least text relating to tangible products, including a “required specification storing unit 1-11” and a “part data storing unit 1-13,” to generate products in response to user input. These storing units are part of graphic computer 1-22 and thus “operatively connected” to the software running on that graphic computer 1-22 that is Matsuzaki’s “selection device.” They store (shown in Figure 18) specific data structures including product specifications, outer appearance, and parameters (“logically related data stored together in one or more computerized files”) that are used by the graphic computer 1-22 to generate the single composite customized output. Further, there is no indication that these data structures are alterable during generation of a composite visual output. And indeed it would be impossible for a product manufacturer to change such stored information as product specifications during the short time in which a proposal for a specific customer is being generated; hence I conclude that at least some of these data structures in fact are not “alterable,” as that term is used in the claim construction for “static database.

163. Matsuzaki also shows “static databases” that store pictures. Figure 12 shows a “TWO-DIMENSIONAL DATA STORING UNIT,” that takes input from an IMAGE INPUT UNIT 1-302, demonstrating a static database that electronically stores pictures (“logically related data stored together in one or more computerized files”) related to at least one product. *See also* Matsuzaki, 9:25-41, and 12:40-13:2.

164. Finally, Matsuzaki discloses, as is explained below, what is described in the **“dynamically building” limitation**: that the proposal is “presented within a template dynamically constructed by the computer system utilizing the selection device” – that is (according to the District Judge’s construction), constructed so that the template “may be modified to fit selected images and text.”

165. Figures 9 and 10 show templates that are dynamically built and filled in by the computer system, utilizing the selection device (graphic computer 1-22), to produce the composite customized output that includes text, product images, and environment images. *See, e.g.,* Matsuzaki, 3:47-62, 4:18-20, and 9:42-12:39. Since graphic computer 1-22 dynamically constructs the screens from the various image and text elements, the visual image created by graphic computer 1-22 will be “modified” as necessary to fit those elements.

166. Since Matsuzaki discloses all elements I have identified above as necessary to anticipate independent claims 22, 31, 39 and 40, it is my opinion that Matsuzaki anticipates those claims.

167. In addition to disclosing all of the elements necessary to anticipate independent claims 22, 31, 39, and 40, Matsuzaki also discloses, as is explained below, what is described by dependent claims 23 and 24: “outputting the composite customized output to a user as a customized proposal” and “displaying the composite customized output on a computer display for viewing by the user.” Figures 9 and 10 show customized proposals, the result of outputting the composite customized output to a user on a “screen” by Matsuzaki’s graphic computer 1-22. The methods associated with generating these outputs are taught in Figures 8, 11, and, 21 and additional details given at 3:50-62, 4:18-20, and 9:51-12:39. Thus, Matsuzaki anticipates these claims too.

168. Matsuzaki also discloses, as is explained below, what is described in claim 27, which has two limitations, the first of which is that “the computer system stores a plurality of predetermined environment text segments related to environments in which the tangible product may be used.” As discussed above, in the Matsuzaki system, designs are stored in a specification storing unit 1-11 and product model storing unit 1-12. The form of these specifications is shown by example in Figure 18 and prescribes “specification items includ[ing] function and

performance items and their contents ... The content of the specification representing the function and performance is a numerical value, a code representing a type, or a word.” Matsuzaki, 16: 29-35. These data include the text segments ultimately displayed on Figures 9 and 10, referring to a “SPACE” of “50m,” which conveys the amount of space needed to use the product—and thus constitutes a “predetermined environment text segment” relating to environments in which the product may be used. These text segments are predetermined and stored in specification storing unit 1-11. *See* Matsuzaki, 16:25-40. I also note that in Matsuzaki, the titles of these various text fields “are used so that the customer can easily understand the present ordering system” and that “[t]he titles may be changed depending on the subject product.” Matsuzaki, 12:30-33.

169. Matsuzaki also discloses the second limitation of this claim: “linking at least one of the answers with one of the plurality of predetermined environment text segments for inclusion in the composite customized output.” As shown in Figures 9-10, the user can select “SPACE STREET” from the list of available customizations and provide an “answer” to the question of “how much ‘SPACE’ is needed,” thus linking the “answer” with a predetermined environment text segment that is then included in the composite customized output (*e.g.*, “50m” in Figure 10). Thus, Nohmi anticipates claim 27 too.

170. Matsuzaki also discloses, as is explained below, what is described in claim 28, which has two limitations, the first of which is “the computer system stores a plurality of product specifications related to producing the tangible product in a variety of configurations.” As discussed above, in the Matsuzaki system, designs are stored in a specification storing unit 1-11 and product model storing unit 1-12. The form of these specifications is shown by example in Figure 18 and prescribes “specification items includ[ing] function and performance items and their contents ... The content of the specification representing the function and performance is a numerical value, a code representing a type, or a word.” Matsuzaki, 16:29-35. These data include the text segments ultimately displayed on Figures 9 and 10 related to the “STABILITY” of the product that appears to indicate that the product has a stabilizer mechanism, which is a “function ... item[s]” (“product specification”). Because the text segment associated with “STABILITY” conveys technical information that can vary depending upon the configuration of the product, “STABILITY” is a product specification related to producing the product in a variety of configurations. These text segments are predetermined and stored in specification storing unit 1-11. *See* Matsuzaki, 16:25-40. I also note that in Matsuzaki, the titles of these various text fields “are used so that the customer can easily understand the present ordering system” and that

“[t]he titles may be changed depending on the subject product.” Matsuzaki, 12:30-33.

171. Matsuzaki also discloses the second limitation of this claim: “linking at least one of the answers with one of the plurality of product specifications for inclusion in the composite customized output.” As shown in Figures 9-10, the user can select “STABILITY STREET” from the list of available “CONTROLLABILITY” customizations and provide an “answer” to the question “what the source of “STABILITY” is, and whether the design includes a stabilizer mechanism, thus linking the “answer” with a product specification that is then included in the composite customized output (*e.g.*, “PRODUCT” in Figure 10). Thus, Matsuzaki anticipates claim 28 too.

172. Matsuzaki also discloses, as is explained below, what is described in claim 29, which has two limitations, the first of which being that “the computer system stores a plurality of performance specifications related to performance of the tangible product in a variety of configurations.” As discussed above, in the Matsuzaki system, designs are stored in a specification storing unit 1-11 and product model storing unit 1-12. The form of these specifications is shown by example in Figure 18 and prescribes “specification items includ[ing] function and performance items and their contents ... The content of the specification representing the function and performance is a numerical value, a code

representing a type, or a word.” Matsuzaki, 16:29-35. These data include the text segments ultimately displayed on Figures 9 and 10, regarding “SPEED” of “70km/hr” and “TURNING RADIUS” of “10m,” which are “performance ... item[s]” (“performance specifications”) related to performance of the tangible product in a variety of configurations (*i.e.*, how much “SPEED” does this configuration of the product have, and what is its turning radius in that configuration). These text segments are predetermined and stored in specification storing unit 1-11. *See* Matsuzaki, 16:25-40. I also note that in Matsuzaki, the titles of these various text fields “are used so that the customer can easily understand the present ordering system” and that “[t]he titles may be changed depending on the subject product.” Matsuzaki, 12:30-33.

173. Matsuzaki also discloses the second limitation of this claim: “linking at least one of the answers with one of the plurality of performance specifications for inclusion in the composite customized output.” As shown in Figures 9-10, the user can select “SPEED STREET” from the list of available customizations and provide an “answer” to the question of “how much “SPEED” is needed,” thus linking the “answer” with a performance specification that is then included in the composite customized output (*e.g.*, “70km/hr” in Figure 10). Thus, Matsuzaki anticipates claim 29 too.

174. As is explained above, dependent claims 32, 34-36, and 38 describe the same features as dependent claims 23-24 and 27-29, so it is my opinion those claims also are anticipated by Matsuzaki.

D. Nohmi and Miyaoka Teach All Elements of Claims 22-24, 27-29, 31-32, 34-36, and 38-40 and Thus Render Those Claims Obvious

175. In my opinion, claims 22-24, 27-29, 31-32, 34-36, and 38-40 of the '904 Patent are unpatentable since each of these claims is rendered obvious by Nohmi in view of Miyaoka (Ex. 1002), which elaborates upon (additional) capabilities of systems such as that described in Nohmi. Although Subsection B above makes clear that Nohmi anticipates the challenged claims, with respect to certain features, including image processing, especially object extraction, color change simulation, and image synthesis, Miyaoka strengthens and supplements the teachings of Nohmi. It does that through explicit discussion of the use of natural background (environment) images, discussion of the compositing of product images with those environment images, and explanation of how color change and image simulations can be implemented.

176. I understand Nohmi and Miyaoka to be naturally combinable. First, Nohmi and Miyaoka were both co-authors of Exhibits 1001 and 1002. Second, they discuss the same prototyping endeavor, with the same application (customized sales) and application goals. Third, Miyaoka specifically states that it aims to use image processing methods to further enhance the quality of sales support, since

greater use of color images appeals to customer senses (Ex. 1002, Abstract and Section 1⁷), and since images with a product set in a use environment also yield more effective presentations (Ex. 1002, Abstract). These are simply additional features that could have been added to a system like Nohmi. Thus, one with ordinary skill would have found it obvious to combine Nohmi and Miyaoka.

177. Specifically, Miyaoka teaches, as is explained below, what is described in **the “automatically selecting” limitation**: “automatically selecting by the computer system, in response to at least one of the answers, an image of the tangible product for sale, an image of an environment in which the tangible product for sale is to be used, and a text segment comprised of a description of product specifications and performances that are of particular interest to the customer.”

178. Miyaoka specifically teaches this through discussion stating the benefit of “the function of creating an image of a scene showing a product placed in the environment in which it is actually used with the product colors or patterns being changed. This is the part where the advantages of digital image processing can be maximized.” Miyaoka also shows how that image is created in Photo 1

⁷ As with Nohmi above, I refer to section numbers and headings in Miyaoka for convenience.

from an image of a product (an automobile) and an environment (“Germany,” “London” “Florida”). Miyaoka also teaches the selection of text in discussing that, “in order to position the functions of an image-based presentation in a sales support system, the sales support system is modeled using three functions: information provision... [where] product information is interactively provided as multimedia information using images, sound, text, etc.” Miyaoka, Introduction.

179. Miyaoka also teaches, as is explained below, what is described in **the “integrating” limitation**: “integrating the selected images and selected text segment into a proposal for the sale of the tangible product for the customer such that a single composite customized output representing the tangible product in the environment in which the tangible product is to be used along with said text segment can be generated.”

180. Miyaoka teaches this through the discussion stating that “information provision ... [is where] product information is interactively provided as multimedia information using images, sound, text, etc.” Miyaoka, Introduction. Indeed, Miyaoka specifically shows a particular example of integrating images and text in a composite visual output as shown in Photo 1, showing “a product (component image) ... embedded in a background image.” Miyaoka, § 2.2 (also showing textual elements describing available environment images).

181. Miyaoka also teaches, as is explained below, what is described in the “active database” limitation, that “the selection device is operatively connected to (i) an active database configured to electronically store customer information,” in two ways. First, like Nohmi, Miyaoka teaches collecting user input (product customizations indicated by links selected and followed) and electronically storing that information so that it can be reflected in the presentation (*e.g.*, a preferred car color, as in Nohmi). *See* Miyaoka, § 2.1. Second, Miyaoka also teaches collecting user input and electronically storing that information to facilitate “the usual business processes [which] take place for a product customized by a consumer such as providing a quote, placing orders, etc.” *Id.* Both of these constructs are active databases as the District Judge defined them, that is, logically related data stored together in one or more computerized files that are alterable based on user input.

182. Thus, considering the above, if Nohmi’s teachings as to the “automatically selecting” “integrating,” or “active database” limitations were deemed insufficient, it would have been obvious to add Miyaoka’s teachings for those elements to the Nohmi system. Nothing in either of these references teaches away from their combination. Any few implementation differences between the references are mere design choices arising from the particular applications being

illustrated. There is no essential feature in Miyaoka in conflict with an essential feature of Nohmi.

E. Nohmi and Kobayashi Teach All Elements of Claims 22-24, 27-29, 31-32, 34-36, and 38-40 and Thus Render Those Claims Obvious

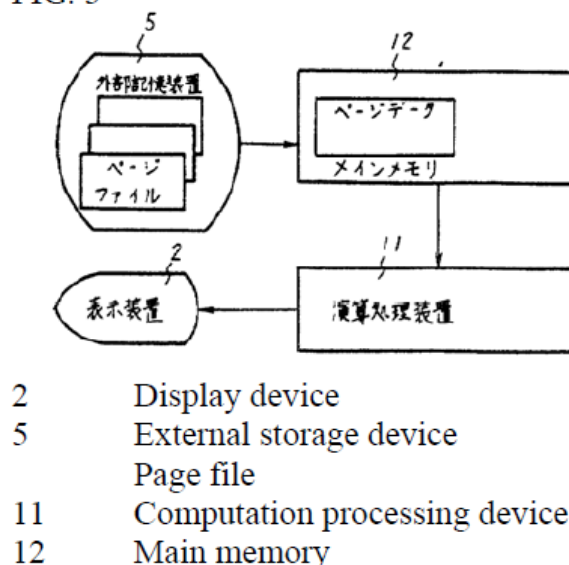
183. In my opinion, claims 22-24, 27-29, 31-32, 34-36, and 38-40 of the '904 Patent are unpatentable since each of these claims is rendered obvious by Nohmi in view of Kobayashi (Ex. 1003), which elaborates upon (additional) capabilities of systems such as that described in Nohmi. Although Subsection B above makes clear that Nohmi anticipates the challenged claims, Kobayashi strengthens and supplements the teachings of Nohmi with respect to certain features, including use of static databases for text and images, and use of dynamic templates in the generation of integrated composite documents.

184. I understand Nohmi and Kobayashi to be naturally combinable, since Nohmi and Miyaoka are co-authors of both works, since Hitachi Ltd. in Japan supported both efforts, and since both works are part of the same endeavor to develop multimedia presentation systems, and which resulted in a series of publications discussing the differing aspects of those systems. One with skill in the art would be particularly motivated to combine Nohmi and Kobayashi, since Kobayashi explained how to improve the efficiency of the system described by Nohmi.

185. Specifically, Kobayashi teaches, as is explained below, what is described in **the “static database” limitation**: that “the selection device is operatively connected to (ii) a static database electronically storing at least one of (a) text, (b) pictures, or (c) text and pictures relating to the tangible product” – with “static database” meaning (as the District Judge held) a “[collection of logically related data stored together in one or more computerized files] that [are] not alterable during generation of a composite visual output.”

186. Figure 5 (below) shows how text and images are called out of a “Page file” on an “External storage device,” (item 5), *i.e.*, a repository of text and images that can be displayed as needed, to the system’s memory (item 12), where it can then be processed by the CPU (item 11) and appropriately displayed on a display device (item 2). *See* Kobayashi, p. 5.

FIG. 3

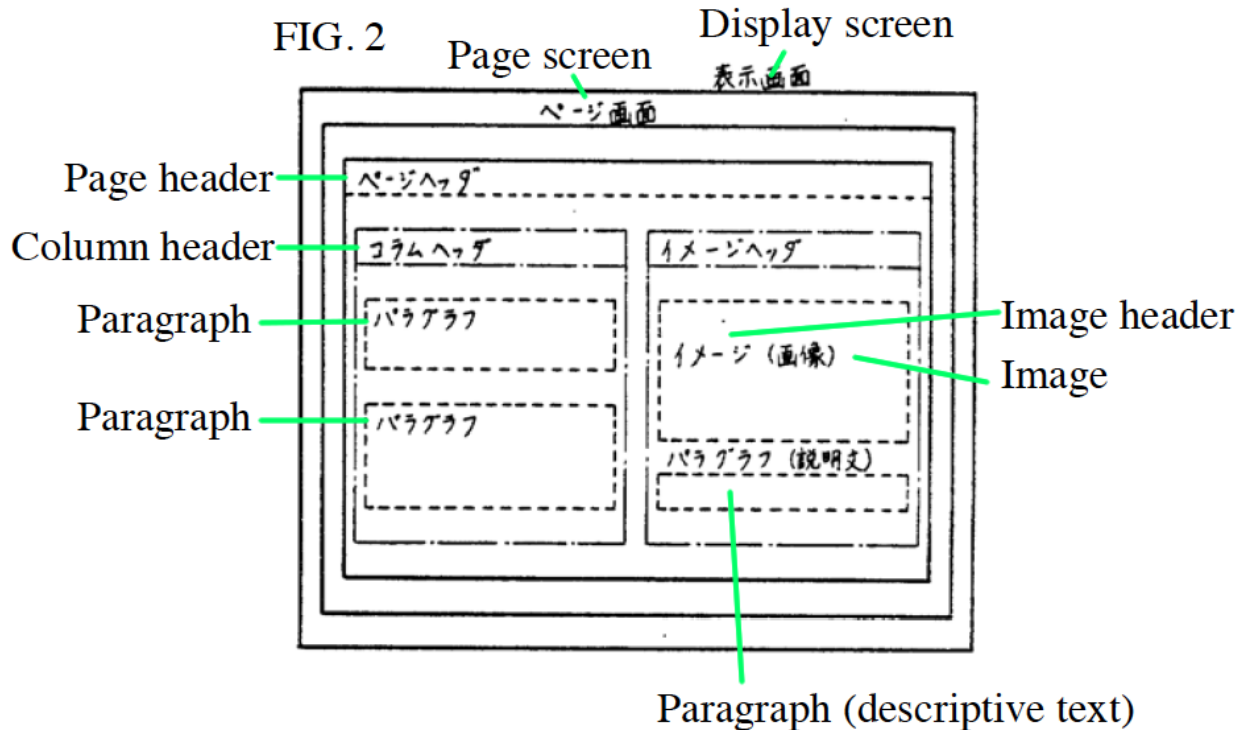


187. In Kobayashi, the external storage device 5 is the repository of a static database which contains separate text and image files that can be used by the system as needed. Kobayashi specifically teaches that “either all or some of the data serving as the origin for carrying out the display and output of information, including audio output, text, graphics, and images, is configured to be a component file of each element in a file different from the file corresponding to the page, and the data of the file division unit corresponding to the page is imparted with an index indicative of the site of the component file, such that when the page is operated, the data of the file division unit corresponding to the page and also the component file indicated by the index included therein are manipulated.” *See* Kobayashi, Claim 3. In other words, the data corresponding to text, audio, graphics, and images are all stored separately from the “pages” of which they will ultimately be the components.

188. This collection of information stored in this data structure, moreover, is not alterable during the creation of a customized proposal. Accordingly, Kobayashi teaches that the images and text employed by the Kobayashi system are stored in a static database under the District Judge’s construction, that is: a set of logically related data stored together in one or more computerized files that [are] not alterable during generation of the composite customized output.

189. Kobayashi also teaches, as is explained below, what is described in **the “dynamically building” limitation**: that the proposal is “presented within a template dynamically constructed by the computer system utilizing the selection device” – that is (according to the District Judge’s construction), constructed so that the template “may be modified to fit selected images and text.” Kobayashi does just that, teaching “expressing information that is to be displayed and outputted collectively with a list structure for text data, graphic data.” Kobayashi, pp. 4-5. This is shown further in Figures 2, 4, 7A, and 7B, and in the Embodiments section where those figures are explained.

190. An illustration of the rendering of such a list structure is shown in Figure 2, below. The English labels added to this figure are shown by green arrows to point to the corresponding elements from Kobayashi that were originally labeled in Japanese.



191. The figure shows an example of the use of such a list structure to render a “page,” with hashed lines showing generally how the various “Paragraphs” and “Images” will be shown on a display. Depending on the various elements contained within a page’s list structure, Kobayashi will dynamically render them, modifying the format of the display as necessary to fit the elements prescribed by that list structure. Indeed, the hashed lines surrounding the “columns,” “paragraphs,” and “images” shown in Figure 2 indicate that the sizes (both absolute and relative) of these elements of the output will vary depending on the needs of each presentation, including the space required to properly render the

data selected for inclusion in each of those elements. Thus, Kobayashi teaches allowing the template to be modified to fit selected images and text.

192. Thus, considering the above, if Nohmi's teachings as to the **“static database” or “dynamically building” limitations** were deemed insufficient, it would have been obvious to add Kobayashi's teachings for those elements to Nohmi. Nothing in either of these references teaches away from their combination. Any few implementation differences between the references are mere design choices arising from the particular applications being illustrated. There is no essential feature in Kobayashi in conflict with an essential feature of Nohmi.

F. Nohmi and Matsuzaki Teach All Elements of Claims 22-24, 27-29, 31-32, 34-36, and 38-40 and Thus Render Those Claims Obvious

193. In my opinion, claims 22-24, 27-29, 31-32, 34-36, and 38-40 of the '904 Patent are unpatentable since each of these claims is rendered obvious by Nohmi in view of Matsuzaki. Although Subsection B above makes clear that Nohmi anticipates the challenged claims, with respect to certain features, including collecting and storing user input in an active database, Matsuzaki strengthens and supplements the teachings of Nohmi.

194. I understand Nohmi and Matsuzaki to be naturally combinable, with both efforts funded by Hitachi, Ltd., in Japan. Both address the problem of promoting sales of products through customization. Matsuzaki includes the use of

integrated customized multimedia presentation, with images of products and environments, as well as specification and performance information, that is taught by Nohmi, and then adds steps for custom manufacture of the ordered product. Thus, one with skill in the art, reading Nohmi, and seeing the strong overlap in technologies employed, would be motivated to look to Matsuzaki for the additional description of custom manufacturing that builds on customized sales and adds value that would further strengthen sales. Hence, one with ordinary skill would have found it obvious to combine Nohmi and Matsuzaki.

195. For brevity, I will not repeat the detailed discussion of what Matsuzaki teaches (above in Section VIII.C), except to state affirmatively that Matsuzaki at least teaches **the “active database” limitation** as shown in Figures 1, 2, 4, 5, 7, 9, and 10, and as described at 9:42-54, 10:36-47, and 11:49-12:21. As explained above in Subsection C, Matsuzaki shows an “active database” that customer designs can be saved to.

196. Thus, considering the above, if Nohmi’s teachings as to the **“active database” limitation** were deemed insufficient, it would have been obvious to add Matsuzaki’s teachings for those elements to the Nohmi system. Moreover (as explained above in Subsection C) Matsuzaki also teaches every other element of the challenged claims. Nothing in either of these references teaches away from their combination. Any implementation differences between the references are

mere design choices arising from the particular applications being illustrated. There is no essential feature in Matsuzaki in conflict with an essential feature of Nohmi.

G. Matsuzaki and Takashi Teach All Elements of Claims 22-24, 27-29, 31-32, 34-36, and 38-40 and Thus Render Those Claims Obvious

197. In my opinion, claims 22-24, 27-29, 31-32, 34-36, and 38-40 of the '904 Patent are unpatentable since each of these claims is rendered obvious by Matsuzaki in view of Takashi (Ex. 1005), which elaborates upon (additional) capabilities of the Matsuzaki system. Although Subsection C above makes clear that Matsuzaki anticipates the challenged claims, with respect to certain features, including a database of product (commodity) images, images of customer usage environments, and the compositing and display of the combination of product and usage environment images, Takashi strengthens and supplements the teachings of Matsuzaki.

198. I understand Matsuzaki and Takashi to be naturally combinable, since both describe sales support systems for specifying (through interactive input of user preferences), designing, and custom-made production of tangible products. Both patents were assigned to Hitachi, Ltd. in Japan. Though Matsuzaki discusses custom-made manufacturing and Takashi describes a CAD system, these both aim to facilitate the sales of made-to-order products based on user-provided

specifications that arise during the sales activity. Both Matsuzaki and Takashi make use of database and image processing technologies, as well as interfaces that make it easy for customers to describe and verify what is being sold, by seeing integrated images and text about the proposed product and usage environment. One skilled in the art, who reads Matsuzaki, would be motivated to combine with Takashi, where additional details are given about the need for and functionality of compositing products and usage environment images. It was well known that sales are increased when a customer is given additional details on the desired product, and when a customer is given feedback about how a tangible product would appear in a desired usage environment – as suggested by Takashi.

199. Specifically, Takashi teaches, as is explained below, what is described in **the “receiving” limitation**: “receiving via a computer system, answers to a plurality of questions related to at least one of a desired feature and a desired use by a customer of a tangible product for sale.”

200. Takashi teaches a “customer preference input device 100” that is provided for the customer to input an “answer” to the “question” of what features he would like in a product, using expressions such as “sporty and small in size,” “a little larger,” or “a slightly more greenish blue.” Takashi, pp. 4, 9. Using a “customer preference inference rule file 112,” a “customer preference inference device” 111 decodes this expression for further processing by Takashi’s system.

Accordingly, Takashi teaches **the “receiving” limitation** because the information inputs to its “customer preference input device 100” are “answers” to “questions” related to features or uses of a tangible product for sale.

201. Separately, Takashi explicitly shows a step for “INPUT OF USAGE ENVIRONMENT, CUSTOMER APPEARANCE, ETC.” that is discussed on p. 18 of Takashi and shown as step 201 in Takashi’s Figure 5. This “answers” a “question” of what environment the user would like to see the product in.

202. Takashi also teaches, as is explained below, what is described in **the “automatically selecting” limitation**: “automatically selecting by the computer system, in response to at least one of the answers, an image of the tangible product for sale, an image of an environment in which the tangible product for sale is to be used, and a text segment comprised of a description of product specifications and performances that are of particular interest to the customer.”

203. Depending on the customer’s input expression (“on the basis of the content sent over from the customer preference input device 100”), to retrieve product images, Takashi’s “commodity design support device 140 searches the commodity selection rule base 130 ... and determines the commodity; also, the basic structure (drawings and related specification data) of the commodity are read from the commodity structure database 120 and are sent to the controller 500. ... Next, the commodity design support device 140 extracts the outer appearance,

inner design, and the like of the commodity from the commodity image database 160, and displays same on the composite picture display device 280 via the controller 500.” p. 7. Thus, in response to the “answers” received from a customer detailing what kind of product she is interested in, Takashi “automatically select[s]” “an image of the tangible product for sale” (from the commodity image database 160) and “a text segment comprised of a description of product specifications and performances that are of particular interest to the customer” (the basic structure of the product retrieved from the commodity structure database 120).

204. Takashi also shows “automatic selection” of “an image of an environment in which the tangible product for sale is to be used”: In response to the customer’s input of usage environment information (as in step 201 of Figure 5), “The controller 500 ... upon receiving the[usage environment] picture input, inputs [the] same to the content picture database 190 via the image information comprehension device 200. The picture database 190 has stored, in advance, image data relating to anticipated circumstances, as a usage environment of the commodity.” Takashi, p. 8. Thus, Takashi teaches automatically selecting specifications (text), product images, and environment images in response to the “answers” received from a customer detailing what kind of product she is interested in.

205. Takashi also teaches, as is explained below, what is described in the “integrating” limitation: “integrating the selected images and selected text segment into a proposal for the sale of the tangible product for the customer such that a single composite customized output representing the tangible product in the environment in which the tangible product is to be used along with said text segment can be generated.”

206. Takashi teaches this through its picture compositing device, and the composite picture display device. Takashi, p. 5. In more detail, “[t]he picture compositing device 260 uses the model inside the model base 380 and the commodity specification stored in the order commodity specification base 320 to create a commodity usage image for the customer, in which the commodity image has been composited with the usage environment or appearance of the customer, and the commodity usage image is displayed on the composite picture display device 280 via the controller 500.” Takashi, pp. 8-9. This confirms Takashi teaches what the “integrating” limitation requires, namely, creating a “single visual image” composed of the selected images (of a tangible product, and of the environment in which it is to be used) and data (text). Takashi’s teaching of the “integrating” limitation is further confirmed by commentary in Takashi discussing that “[s]ales are facilitated by rapid verification” by showing a product of particular interest to the customer, in an environment also of particular interest to

the customer, so that the customer can “experienc[e] a scene where the ordered form of the commodity is being used in an environment he knows well or is being used in an environment where he wishes for it be used.” Takashi, p. 9. Here again, this passage contains every element of the “integrating” limitation, indicating that the single visual “scene” is showing the selected images (of a tangible product, and of the environment in which it is to be used) and data (text).

207. Takashi also teaches, as is explained below, what is described in **the “selection device” limitation**: “wherein a single composite customized output is generated by a selection device,” where the “selection device” is a “computer code data structure.” Takashi teaches this through its controller 500, which is a “computer code data structure” (or such a structure that runs on a hardware controller) that coordinates generation of the composite input on the composite picture display device 280. Takashi, pp. 8-9. For instance, as noted above in response to the customer’s input of usage environment information (as in step 201 of Figure 5), “The controller 500 ... upon receiving the [usage environment] picture input, inputs [the] same to the content picture database 190 via the image information comprehension device 200. The picture database 190 has stored, in advance, image data relating to anticipated circumstances, as a usage environment of the commodity.” In other words, controller 500 is the element in Takashi that is responsible for shepherding the process of creating the composite visual output.

208. Takashi also teaches, as is explained below, what is described in the “active database” limitation: that “the selection device is operatively connected to (i) an active database configured to electronically store customer information.” As required by the District Judge’s prior construction, this is a “[collection of logically related data stored together in one or more computerized files] that is alterable based on user input.”

209. Takashi teaches electronically storing customer information obtained from answers, as part of its history file 117. This history file 117 is an active database (according to the District Judge’s constructions, that is, a collection of logically related data that electronically stores customer information. As Takashi explains: “membership function extraction device 113, upon receiving the primary influence factors and the preference of the customer from the customer preference inference device 111 (for example, “sporty and small in size”) ... and sends same to the membership function synthesis device 115... [which] creates a synthesis membership function ... storing the function in the history file 117.” Takashi, pp. 9-10. In other words, history file 117 contains data that has been synthesized from customer inputs. Thus, it “electronically stores” logically related “customer information” and is “alterable based on user input.”

210. Takashi also teaches, as is explained below, what is described in the “static database” limitation: that “the selection device is operatively connected to

(ii) a static database electronically storing at least one of (a) text, (b) pictures, or (c) text and pictures relating to the tangible product” – with “static database” meaning (as the District Judge held) a “[collection of logically related data stored together in one or more computerized files] that [are] not alterable during generation of a composite visual output.”

211. As detailed above, controller 500 (the “selection device”) is connected to three databases that store logically related data: 1) a “commodity image database 160” where “images” of products are stored, 2) a “content picture database 190,” where “images” of usage environments are stored, and 3) a “commodity structure database 120” in which “drawings and related specification data” are stored (“text”). *See* Takashi, pp. 6, 8, 16, and Fig. 1 (items 500, 120, 160, and 190). There is no indication that the data in these databases 120, 160, and 190 are alterable during generation of the composite visual output. Indeed, because a product seller could not alter the stored lineup of products during the short time required to create a customer proposal, and associated composite visual images, I conclude that at least the commodity image database 160 is not alterable during generation of the composite visual output. And the contents of the other two databases are not likely to be alterable during that short time, either. Accordingly, these databases 120, 160 and 190 are each static databases, according to the

District Judge's constructions: collections of logically related data not alterable during generation of the composite visual output.

212. Thus, considering the above, if Matsuzaki's teachings as to the "receiving," "automatically selecting," "integrating," "selection device," "active database," or "static database" limitations were deemed insufficient, it would have been obvious to add Takashi's teachings for those elements to the Matsuzaki system. Nothing in either of these references teaches away from their combination. Any few implementation differences between the references are mere design choices arising from the particular applications being illustrated. There is no essential feature in Takashi in conflict with an essential feature of Matsuzaki.

H. Matsuzaki and Miyaoka Teach All Elements of Claims 22-24, 27-29, 31-32, 34-36, and 38-40 and Thus Render Those Claims Obvious

213. In my opinion, claims 22-24, 27-29, 31-32, 34-36, and 38-40 of the '904 Patent are unpatentable since each of these claims is rendered obvious by Matsuzaki in view of Miyaoka, which elaborates upon (additional) capabilities of the Matsuzaki system. Although Subsection C above makes clear that Matsuzaki anticipates the challenged claims, with respect to certain features, including image processing functions like image simulation (especially compositing of objects and their usage environments), Miyaoka strengthens and supplements the teachings of Matsuzaki.

214. I understand Matsuzaki and Miyaoka to be naturally combinable, since both address the need to improve sales through automation, by way of images that show product and usage information to customers. Since advertising through brochures, catalogs, and video have made clear the value of showing products for sale in environments in which they are used, one with skill in the art would be motivated to combine Matsuzaki and Miyaoka, by adding Miyaoka's image compositing functionality to the interfaces shown in Figures 9-10 of Matsuzaki to take advantage of the more extensive and higher quality compositing of products and environments suggested by Miyaoka.

215. For brevity, I will not repeat the detailed discussion of what Miyaoka teaches (above in Section VIII.D), except to state affirmatively that Miyaoka at least teaches the “automatically selecting” and “integrating” limitations in, *e.g.*, Photo 1 and its discussion in Section 2.2 of Miyaoka. Miyaoka supplements the teachings of Matsuzaki in at least the same ways noted above with respect to Nohmi.

216. Thus, considering the above, if Matsuzaki's teachings as to the “automatically selecting,” or “integrating” limitations were deemed insufficient, it would have been obvious to add Miyaoka's teachings for those elements to the Matsuzaki system. Nothing in either of these references teaches away from their combination. Any few implementation differences between the

references are mere design choices arising from the particular applications being illustrated. There is no essential feature in Miyaoka in conflict with an essential feature of Matsuzaki.

I. The References and Combinations Discussed Above In Further View of Detailer Teach All The Elements of Claims 25-26, and 33 and Thus Render Those Claims Obvious

217. In my opinion, the independent claims upon which challenged dependent claims 25-26, and 33 depend are either anticipated or made obvious, as explained above in Subsections B-H. So, here I focus on additional features described in those claims. In particular:

- a. the feature of printing of output (added in claim 25);
- b. the feature of configuring the printed document as a printed proposal (added in claim 26); and
- c. the feature of coupling the printer to the processing system (added in claim 33).

218. CabNetWare's The Detailer ("Detailer"), as shown in Exhibits 1006 and 1007, teaches the features discussed above regarding printing. One of ordinary skill would have been motivated to combine the teachings of the references or combinations of references discussed in Subsections B-H above with Detailer, because all of the references as well as Detailer are from the same field and aim to solve the same problem, using computers to aid customers involved in sales.

219. Before 1992, many computers had associated printers, especially the powerful computers and work stations discussed in the references, and it was common practice in sales situations to print customized sales proposals, including on color printers to further encourage a sale. Thus, modifying the referenced prior art systems to include printing, as is explained with regard to the sale of cabinets when using Detailer, would be providing a known and useful functionality, important for sales.

220. As to claims 25 and 33, Detailer teaches printing a composite customized output as a printed document. Detailer teaches, in Ex. 1006 on p. 1, a computer with a “Graphics capable, dot matrix printer (for estimates and drawings)” and an “HP or HP compatible pen plotter (for high quality line drawings).” Detailer further teaches, on p. 2, that one can “PRINT OUT YOUR PROPOSALS AND ORDER FORMS IN ANY FORMAT,” and on p. 6, that such printouts can include “Multiple drawings on a page.” Pages 3-5 and 7-12 of Ex. 1006 show examples of such composite proposals with text, images, backgrounds (environments of use), and financial information. As noted above, it would have been obvious to add this or similar functionality to the prior art discussed in Subsections B-H. Accordingly, that prior art in view of Detailer renders claims 25 and 33 obvious.

221. As to claim 26, the Detailer also teaches configuring the printed document as a printed proposal, specifically on p. 2 which states “PRINT OUT YOUR PROPOSALS AND ORDER FORMS IN ANY FORMAT... You set up the format of your proposals and order forms to include any information or comments required.” Ex. 1006 on p. 6 further confirms “Detailer automatically generates a complete proposal/contract.” As noted above, it would have been obvious to add this or similar functionality to the prior art discussed in Subsections B-H. Accordingly, that prior art in view of Dimension renders claim 26 obvious.

222. Moreover, nothing in any of these references teaches away from their combination. Any few implementation differences between the references are mere design choices arising from the particular applications being illustrated. There is no essential feature in Detailer in conflict with an essential feature of any of the other references.

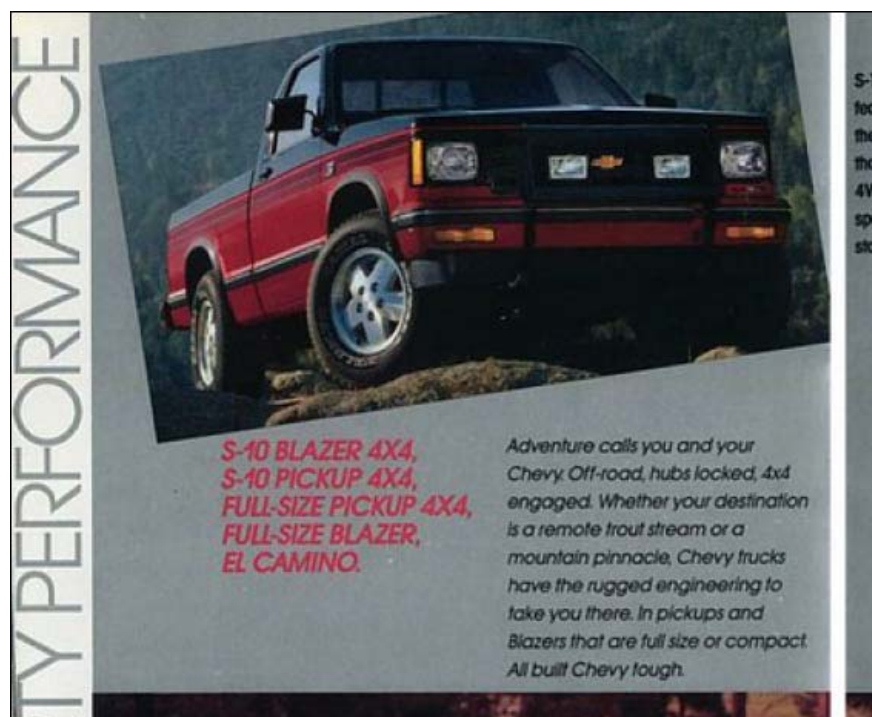
J. The References and Combinations Discussed Above In Further View of The 1987 Mailer Teach All The Elements of 27-29, 34-36, and 38 and Thus Render Those Claims Obvious

223. In my opinion, the independent claims upon which challenged dependent claims 27-29, 34-36, and 38 depend are either anticipated or made obvious by the prior art discussed above in Subsections B-H. So, here I focus on additional features described in those claims. In particular:

- a. the feature of storing “predetermined environment text segments” (added in claims 27, 34, and 38);
- b. the feature of storing “predetermined product specifications” (added in claims 27, 34, and 38); and
- c. the feature of storing “performance specifications” (added in claims 27, 34, and 38).

224. The 1987 Mailer, Exhibit 1008, teaches these features. One of ordinary skill would have been motivated to combine the teachings of the references or combinations of references discussed in Subsections B-H above with the components taught as part of The 1987 Mailer, because The 1987 Mailer is an example of a prior art product catalog, and consumers, sellers, and system developers would all have expected that such elements could be included in customizable sales presentation systems. Thus, to the extent the references and combinations discussed above are found not to explicitly disclose or teach such components, it would have been obvious to add such types of text segments to the proposals being generated by systems such as Nohmi or Matsuzaki. Indeed, Nohmi was designed to be a digital conversion of “product catalogs” such as The 1987 Mailer. *See* Ex. 1001 (Nohmi), § 2. And Matsuzaki was a general product design system that could accommodate changes to text fields “depending on the subject product.” *See* Ex. 1004 (Matsuzaki), 12:30-33.

225. Regarding the feature of storing “predetermined environment text segments” recited in claims 27, 34, and 38, The 1987 Mailer specifically includes “predetermined environment text segments related to environments in which the tangible product may be used,” such as “Adventure calls you and your Chevy. Off-road, hubs locked, 4x4 engaged. Whether your destination is a remote trout stream or a mountain pinnacle.” The 1987 Mailer, p. 8 (reproduced below). As noted above, it would have been obvious to add this or similar subject matter to the prior art discussed in Subsections B-H. Accordingly, that prior art in view of The 1987 Mailer renders claims 27, 34, and 38 obvious.



226. Regarding the feature of storing “predetermined product specifications” recited in claims 28, 35, and 38, The 1987 Mailer explicitly

includes “product specifications related to producing the tangible product in a variety of configurations,” such as the types of chassis and drivetrains available for a given model. Ex. 1008 (The 1987 Mailer), pp. 4 (“S-10 Blazer 2WD. S-10 Pickup 2WD.”), 8 (“S-10 Blazer 4x4. S-10 Pickup 4x4”). As noted above, it would have been obvious to add this or similar subject matter to the prior art discussed in Subsections B-H. Accordingly, that prior art in view of The 1987 Mailer renders claims 28, 35, and 38 obvious.

227. Regarding the feature of storing “performance specifications” recited in claims 29, 36 and 38, The 1987 Mailer explicitly includes “performance specifications related to performance of the tangible product in a variety of configurations,” such as the towing capacity of a model or the relative power and engine displacement of a model’s engine. The 1987 Mailer, pp. 10 (“Astro Cargo Van tows up to 6,000 lbs.”), 11 (“The popular 4.3 Vortec V6 with EFI gives Astro more power than any front-drive van.”). As noted above, it would have been obvious to add this or similar subject matter to the prior art discussed in Subsections B-H. Accordingly, that prior art in view of The 1987 Mailer renders claims 29, 36, and 38 obvious.

228. Moreover, nothing in any of these references teaches away from their combination, and there is no essential feature in The 1987 Mailer (which is a

preprinted example of a brochure) that could not be implemented in any of the references or combinations discussed above.

K. The References and Combinations Discussed Above In Further View of Dimension Teach All The Elements of Claims 25-26, 30, 33, and 37 and Thus Render Those Claims Obvious

229. In my opinion, the independent claims upon which challenged claims 25-26, 30, 33, and 37 depend are either anticipated or made obvious by the prior art discussed above in Subsections B-H. So, here I focus on additional features described in those claims. In particular:

- a. the feature of printing of output (added in claim 25);
- b. the feature of configuring the printed document as a printed proposal (added in claim 26);
- c. the feature of coupling the printer to the processing system (added in claim 33); and
- d. the feature of including financing information in the output, where some of the predetermined queries and resulting answers relate to financing (added in claims 30 and 37).

230. Dimension, as shown in Exhibits 1009-1012, teaches all of these features, and one of ordinary skill would have been motivated to combine the teachings of the references or combinations of references discussed in Subsections B-H above with Dimension because all of the references as well as Dimension are

from the same field and aim to solve the same problem: using computers to aid customers involved in sales. Dimension provides two particular capabilities of interest, printing of output including proposals, and inclusion of financial information.

231. Before 1992, many computers had printers, especially the powerful computers and workstations discussed in the references, and it was common practice in sales situations to print customized sales proposal, including on color printers to further encourage a sale. Thus, modifying the referenced prior art systems to include printing, as is explained with regard to the sale of cars when using Dimension, would be providing a known and useful functionality—one particularly useful for sales. Further, it would have been obvious to add the functionality of providing financial information, as shown in Dimension, to provide a user with more detailed information about the financial ramifications of the product purchase. This is especially true for Nohmi, since automobiles are financed in most cases, and for many of the other referenced systems, since customization was commonly associated with high-priced items and/or giving detailed cost information related to the many options considered.

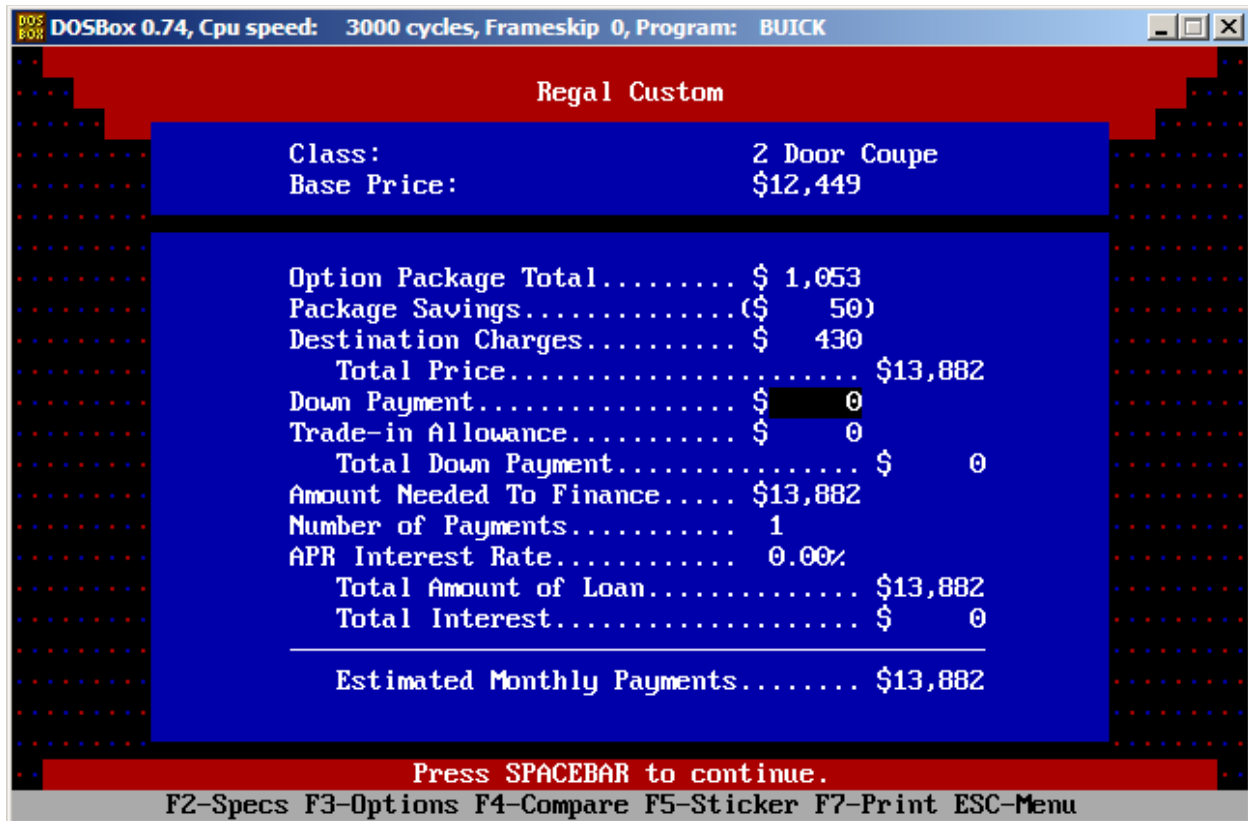
232. As to claims 25 and 33, which add the feature of printing of output: Dimension teaches the use of an “IBM, Epson, Okidata, or fully compatible ... printer,” Ex. 1009, p. 2, so that the “Window Sticker can be printed... by pressing

the F9 key inside the Window Sticker section.” Ex. 1009, p. 5. “Other information from the 1988 Buick Line section including the Purchase Plan, specifications, features, list of options, comparison information, etc. can be printed out by pressing the F7 key.” *Id.* Accordingly, Dimension’s customized output could be printed as a printed document. As noted above, it would have been obvious to add this or similar functionality to the prior art discussed in Subsections B-H. Accordingly, that prior art in view of Dimension renders claims 25 and 33 obvious.

233. As to claim 26, which adds the feature of configuring the printed document as a printed proposal: Dimension’s output is a proposal, *i.e.*, “information intended for conveyance to a customer.” Dimension teaches preparing configured output for an “IBM, Epson, Okidata, or fully compatible dot matrix printer,” Ex. 1009, p. 2. This configured output is a “printed” proposal. As noted above, it would have been obvious to add this or similar functionality to the prior art discussed in Subsections B-H. Accordingly, that prior art in view of Dimension renders claims 26 obvious.

234. As to claims 30 and 37, Dimension provides the user with a “Purchase Plan spreadsheet” having selectable fields for Down Payment, Trade-In Allowance, Number of Payments, APR Interest Rate (a “series of predetermined queries related to financing the tangible product”) and generates for inclusion in a composite customized output, based on the user’s “answers” to those queries, at

least an “automatically calculated” Estimated Monthly Payment (“financing information related to the tangible product”). *See* Ex. 1009, p. 4; *see also* Ex. 1010, p. 8 (screen shot of output from BUICK.EXE, Ex. 1012).



235. As noted above, it would have been obvious to add this or similar functionality to the prior art discussed in Subsections B-H. Accordingly, that prior art in view of Dimension renders claims 30 and 37 obvious.

236. Moreover, nothing in any of these references teaches away from their combination. Any few implementation differences between the references are mere design choices arising from the particular applications being illustrated. There is no

essential feature in Dimension in conflict with an essential feature of any of the other references.

IX. AVAILABILITY FOR CROSS-EXAMINATION

237. In signing this declaration, I recognize that the declaration is being filed as evidence in a contested case before the Patent Trial and Appeal Board at the United States Patent and Trademark Office. I also recognize that I may be subject to cross examination in connection with this *inter partes* review. If cross-examination is required of me, I will appear for such cross-examination during the time allotted for cross-examination.

X. CONCLUSION

238. Considering the above, it is my opinion that claims 22-40 of the '904 Patent are unpatentable.

Dated: January 16, 2013

A handwritten signature in cursive script, appearing to read "Edward A. Fox".

Edward A. Fox, Ph.D.

EDWARD A. FOX

PERSONAL INFORMATION:

- **HOME:** 203 Craig Dr., Blacksburg, VA 24060, +1-540-552-8667
- **WORK:** 114 McBryde Hall, Dept. of Computer Science, M/C 0106, Virginia Tech, Blacksburg, VA 24061 USA; +1-540-231-5113 [direct], x6931 [dept.], x6075 [FAX]; Digital Library Research Lab, x3615 (2030 Torgersen Hall)
- **CITIZENSHIP:** USA
- See COS expertise entry: <http://myprofile.cos.com/foxa13>

EDUCATION:

- 8/83 Ph.D. Computer Science, Cornell University
Area: information storage and retrieval
Minor: linguistics; Advisor: Gerard Salton
Title: Extending the Boolean and Vector Space Models of Information Retrieval with P-Norm Queries and Multiple Concept Types
- 1/81 M.S. Computer Science, Cornell University
- 2/72 B.S. Electrical Engineering (Computer Science Option), M.I.T.
Advisor: J.C.R. Licklider (Director of Project MAC)
Thesis advisor: Michael M. Kessler (Asst. Director of Library)

RECENT EMPLOYMENT:

- 4/95- Professor, Dept. of Computer Science, Virginia Tech (VPI&SU)
- 1/98- Director, Digital Library Research Laboratory (Virginia Tech)
- 6/90- Associate Director for Research, VPI&SU Computing Center; evolving into position of Faculty Advisor to Information Technology
- 5/88-4/95 Associate Professor, Dept. of Computer Science, VPI&SU
- 9/83-5/88 Assistant Professor, Dept. of Computer Science, Virginia Polytechnic Institute & State Univ. (Virginia Tech) Blacksburg VA 24061-0106
- 8/82-4/83 Manager of Information Systems, International Inst. of Tropical Agriculture, P.M.B. 5320, Ibadan, Nigeria
- 9/78-8/82 Instructor, Research Assistant, Teaching Assistant, Dept. of Computer Science, Cornell Univ., Ithaca NY 14853
- 9/72-8/78 Data Processing Manager, Vulcraft, Div. of NUCOR Corporation, Florence, SC 29501
- 9/71-6/72 Data Processing Instructor, Florence Darlington Technical College, Florence, SC 29501

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

- American Society for Information Science & Technology (ASIS&T)
- ACM (and SIGIR, SIGCSE)
- IEEE-CS (Senior Member)
- Sigma Xi
- Upsilon Pi Epsilon

HONORS AND AWARDS:

- While at M.I.T.
 - William Stewart Award (founding and serving as first president of the ACM student chapter,

founding and serving as first chairman of the Student Information Processing Board, serving as instructor and head of the engineering department of the student-run Saturday program for high school students)

- Election to Sigma Xi (associate member)
- While at VPI&SU
 - Virginia Tech Scholar of the Week, recognized by the Office of the Vice President for Research, for weeks of Dec. 10, 17, and 24, 2007
 - College of Engineering Dean's Award for Excellence in Service, April 2005
 - 1st Annual NDLTD Leadership Award, May 2004
 - Best Student Paper Award (as supervisor and 2nd author) at JCDL 2004: M. A. Goncalves, E. A. Fox, A. Krowne, P. Calado, A. Laender, A. S. da Silva, and B. Ribeiro-Neto. The Effectiveness of Automatically Structured Queries in Digital Libraries. pp. 98-107
 - First Prize Winner for Track 3, for presentation "Open Digital Libraries", \$1500 prize, based in part on doctoral work of Hussein Suleman, AOL-CIT Finding Common Ground University Research Day, Nov. 6, 2002, Herndon, VA
 - Honorable Mention, Poster, MARIAN - Next Generation Digital Library System Built on 5S, \$100 prize, with M. Goncalves, W. Richardson, and M. Luo, AOL-CIT Finding Common Ground University Research Day, Nov. 6, 2002, Herndon, VA
 - ACM Recognition of Service Award, 2012, for Associate Editor, ACM J. of Computing and Cultural Heritage (JOCCH) 2006-2012
 - ACM Recognition of Service Award, 1999, for Program Chair Digital Libraries '99
 - ACM Recognition of Service Award, 1996, for Program Chair Digital Libraries '96
 - ACM Recognition of Service Award, 1995, for SIGIR Chair 1991-1995
 - ACM Recognition of Service Award, 1995, for Program Chair SIGIR '95
 - ACM Recognition of Service Award, 1991, for Editor-in-Chief, ACM Press Database and Electronic Products
 - Awards for GeoSim: A GIS-Based Simulation Laboratory for Introductory Geography, L.W. Carstensen, Jr., C.A. Shaffer, R.W. Morrill, E.A. Fox:
 1. Computational Science award, Ames Lab., U.S. Dept. of Energy, 9/16/94;
 2. Best Article Related to Teaching in a University or College in National Council for Geographic Education's J. of Geography, May '92 - April '94.
 - Choice (Current Reviews for College Libraries) selection as one of 1989-90 Outstanding Academic Books and Nonprint Materials for "Hypertext on Hypertext" which I proposed, coordinated, and served as editor for ACM
 - Election to Phi Beta Delta (Honor Society for International Scholars), March 1999, <http://www.vt.edu:10021/international/PhiBetaDelta/index.html>
 - Election to Upsilon Pi Epsilon computing sciences honor society 3/17/98
 - Election to Sigma Xi (full member)
 - International Directory of Distinguished Leadership, Who's Who in the South and Southwest, Who's Who of Emerging Leaders in America, Who's Who in America, Who's Who in Science and Engineering, Who's Who in American Education, Young Community Leaders of America

PROFESSIONAL SERVICE:

CURRENT - major responsibilities:

1. 1996- Executive Director and Founder, Networked Digital Library of Theses and Dissertations (NDLTD, incorporated 5/2003), <http://www.ndltd.org>
2. 2010-2013 Member, CRA Board, and Member (and Webmaster for www.cra-e.org), CRA-E (Computing Research Association Committee on Education); Member, Review Committee, Outstanding Undergraduate Research Awards 2011; Member, Scholarly Publications Group; Co-chair (July 1, 2011 to ...) of Membership Committee
3. Group manager of Web 2.0 services: LinkedIn groups on: Digital Libraries, VT Computer Science, ...

CURRENT - Editor / Editorial Board Member:

1. 2012- Editorial Advisory Board, Thailand's National Institute of Development Administration (NIDA) Development Journal
2. 2012- Editorial Advisory Board, Thailand's National Institute of Development Administration (NIDA) International Journal of Development Administration
3. 2011- Editorial board, ACM Computers in Entertainment (CiE)
4. 2008- Editorial board, Journal of Intelligent Information Systems (JIIS)
5. 2007- Editorial board, The Open Information Systems Journal (TOIJ)
6. 2004- Editorial board, International Journal on Digital Libraries (www.dljournal.org)
7. 2002- Editorial board, ACM Transactions on Information Systems (TOIS)
8. 2001- Advisory board, IMEJ of Computer-Enhanced Learning (<http://imej.wfu.edu>)
9. 1994- Editorial board, Multimedia Tools and Applications (Kluwer)
10. 1994- Foundation Editor, The Journal for Universal Computer Science (Springer)
11. 1990- Editorial board, Journal of Educational Multimedia and Hypermedia (AACE)
12. 1987- Editorial board, Information Processing & Management (Elsevier)

CURRENT - conferences/workshops (selected):

1. Chair, Steering Committee, Joint Conference on Digital Libraries (JCDL)
2. Member, International Advisory Committee, International Conference of Asian Digital Libraries (ICADL)
3. Member, Program Committee, ICADL2012, International Conference on Asia-Pacific Digital Libraries, Taipei, Taiwan, 12-15 Nov., <http://www.icadl2012.org/>

CURRENT - other (selected):

1. 1999- Member, Advisory Board for D-Lib Forum, www.dlib.org
2. 2011- Member, CS2013 Committee for Knowledge Areas: Computational Science, Information Management

CONFERENCES/WORKSHOPS CHAIRED:

1. Chair, Emergency Informatics and Digital Libraries, 1 day (June 13-14, 2012) workshop to be held in conjunction with ACM/IEEE-CS JCDL 2012, Washington, D.C.
2. Chair, Digital Libraries and Education, 1/2 day workshop at JCDL/ICADL 2010, June 21-25, Gold Coast, Australia
3. Chair, Development and Adoption of Computational Thinking Curricular Guidelines Across Disciplines, Living In the KnowlEdge Society (LIKES) Workshop 6 (<http://www.likes.org.vt.edu/?q=node/203>), Feb. 24-26, 2010, Durham, NC, workshop for the NSF-funded LIKES project, <http://www.livingknowledgesociety.org>
4. Chair, Curricular Guidelines Connecting Computing with Other Disciplines, Living In the KnowlEdge Society (LIKES) Workshop 5 (<http://www.likes.org.vt.edu/?q=node/196>), Nov. 12-13, 2009, Virginia Tech, Blacksburg, VA, workshop for the NSF-funded LIKES project, <http://www.livingknowledgesociety.org>
5. Co-Chairs Edward A. Fox, Seungwon Yang, Steve Sheetz, Christopher Zobel, and Patrick Fan. Coordinating FDI Track E: About LIKES - Living In the KnowlEdge Society, July 21-23, 2009, Virginia Tech
6. PC chair of the Information Retrieval track, ACM CIKM 2006 (<http://sa1.sice.umkc.edu/cikm2006/>), Arlington, VA, Nov. 6-11, 2006
7. Co-chair, Program Committee, 8th International Conference of Asian Digital Libraries (ICADL 2005), Bangkok, Thailand, Dec. 12-15, 2005
8. Co-Chairs Steve Edwards, Dwight Barnette, and Edward Fox: JETT (JAVA Engagement for Teacher Training) Workshop, supported by IBM ECLIPSE, Virginia Tech, Blacksburg, VA, July 21-22, 2004
9. Chair: Digital Libraries: Global Reach and Impact, JCDL 2004 workshop, June 10-11, 2004, Tucson, AZ,

co-chair: Ching-chih Chen

10. Co-organizers/coordinators Manuel A. Perez-Quinones, Lillian Cassel, Edward Fox, John Impagliazzo, J.A.N. Lee, C. Lee Giles: Using the NSF Digital Library to Enhance Your Teaching, workshop 8 at ACM SIGCSE 2004, Norfolk, VA, March 3-7, p. 503
11. Chair: Indo-US Workshop on Open Digital Libraries and Interoperability, Arlington, VA, June 23-25, 2003, 39 participants from the United States and India, sponsored by Indo-US Science and Technology Forum and CIT, <http://fox.cs.vt.edu/IndoUSdl>
12. Chair: Open Source Roadshow, Case Study: Mozilla Project, Virginia Tech, October 24, 2002, assisted by Netscape/AOL/Mozilla and CIT, <http://fox.cs.vt.edu/opensource.htm>
13. Co-organizer: Project Kaleidoscope (PKAL) 2002 Summer Institute Cluster II (DL and CS), <http://www.pkal.org/siplanning/index.html>, June 2-5, 2002, Williamsburg, VA
14. Chair: NDLTD and OAI: A Case Study of a Worldwide Community Sharing (Multilingual, Multimedia) Electronic Theses and Dissertations through the Open Archives Initiative, CNI Spring Meeting session, 4/15/2002, Washington, D.C.
15. Chair: Open Archives: Communities, Interoperability, and Services; Workshop for 24th Annual International SIGIR Conference on Research and Development in Information Retrieval, New Orleans, ULA, Sept. 13, 2001, Proceedings (w. H. Suleman): <http://purl.org/net/oaisept01>
16. Chair: First ACM/IEEE-CS Joint Conference on Digital Libraries, JCDL'2001, Hotel Roanoke and Conference Center, Roanoke, VA, June 24-28, 2001, www.jcdl.org (and helped run PC mtg at UCLA, March 2-5, 2001)
17. Chair: Electronic Theses and Dissertations Standards Meeting. OCLC, Dublin, Ohio, Jan. 9-10, 2001.
18. Chair: Expanding the Information and Data Management (IDM) Research and Education Community, NSF-funded workshop, Hotel Roanoke and Conf. Center, Roanoke, VA, Oct. 2-4, 2000. <http://fox.cs.vt.edu/IDM/>
19. Chair: Extending Interoperability of Digital Libraries: Building on the Open Archives Initiative. ECDL Workshop, Lisbon, Portugal, Sept. 21, 2000. <http://purl.org/net/oaisept00>
20. Chair: US-Korea Joint Workshop on Digital Libraries: Removing Barriers to International Collaboration on Research and Education through Digital Libraries, Aug. 10-11, 2000, San Diego Supercomputer Center, San Diego, CA. <http://fox.cs.vt.edu/UKJWDL/>
21. Chair: Extending Interoperability of Digital Libraries: Building on the Open Archives Initiative. Workshop for ACM Hypertext'2000 and ACM Digital Libraries'2000. San Antonio, TX, June 3, 2000 <http://purl.org/net/oaijune00>
22. Chair, Steering Committee meetings of NDLTD on 3/15/2000, 9/15/2000, 3/21/2001, 10/26/2001
23. Program Chair: Virginia Internet Technology Week (VIT'99), Virginia Tech, Blacksburg, VA, September 13-17, 1999 (<http://manta.cs.vt.edu/vit/>)
24. Program Chair: ACM Digital Libraries '99, Berkeley, CA, Aug. 11-14, 1999
25. Co-Chair: 1999 NSF Information and Data Management Workshop: Research Agenda for the 21st Century - IDM'99, UCLA, March 7-9, 1999, <http://www.cs.ucla.edu/csd/IDM99/index.html>
26. Chair: Multimedia Education, workshop at ACM Multimedia'98, Bristol, England, Sept. 12, 1998 (with R. Heller, GWU).
27. Co-Chair: ETD/NTLTD Workshop, MECCA Conf., Memphis, TN, June 10-11, 1998, <http://www.mecca.org/mecca-itec-conf/conftopics.html>
28. Chair: IBM Renaissance Meeting, Oct. 20-22, 1997, Virginia Tech, Blacksburg, VA
29. Chair: Education and Curriculum Development for Multimedia, Hypertext, and Information Access: Focus on Digital Libraries and Information Retrieval workshop, sponsored by both ACM Digital Libraries'97 and ACM SIGIR'97, July 23, 1997, Philadelphia.
30. Chair: Interactive Learning with a Digital Library in Computer Science workshop, June 15-21, 1997, Virginia Tech, Blacksburg, VA funded in part by NSF (as supplement to EI grant 1993-97)
31. Chair: Courseware, Education and Curriculum in Multimedia workshop, held with ICMCS'97, IEEE International Conference on Multimedia Computing and Systems, June 6, 1997, Ottawa, Canada
32. Chair: Joining the National Digital Library of Theses and Dissertations, half-day pre-conference seminar for CAUSE/CNI regional conference, Univ. of Del., May 21, 1997
33. Chair: Courseware, Training and Curriculum in Multimedia workshop, held with ACM Multimedia'96, Boston, MA, Nov. 19, 1996
34. Chair: Courseware, Training and Curriculum in Information Retrieval workshop, held after ACM

- SIGIR'96, Zurich, Switzerland, Aug. 22, 1996.
35. Chair: Workshop on Electronic Theses and Dissertations in the Southeast, sponsored by SURF, hosted by UNC Charlotte, Charlotte, NC, Aug. 1-2, 1996.
 36. Program Chair: Digital Libraries'96, First ACM International Conference on Digital Libraries, March 20-23, 1996, Bethesda, MD
 37. Chair: Workshop for Working Group on Theses, Technical Reports, and Dissertations, in Monticello Electronic Library Initiative, sponsored by SURF and SOLINET, Aug. 12-13, 1994, Virginia Tech, Blacksburg, VA
 38. Conference chair: Workshop on Information Retrieval and Genomics, sponsored by ACM SIGIR and SIGBIO, Lister Hill National Center for Biomedical Communications, National Library of Medicine, Bethesda, MD, May 2-4, 1994
 39. Chair: Workshop on Information Access and the Networks, IANET'93, held in conjunction with ACM SIGIR '93, July 1, 1993
 40. Program chair: 18th Intern'l Conf. on R & D in Information Retrieval, SIGIR '95, July, 1995, Seattle, WA

EARLIER (major responsibilities):

1. 2006-2012 Editorial board, ACM Journal on Computers and Cultural Heritage (JOCCH), and serving 2008-2009 on search committee for next editor-in-chief
2. 2005-2009 Member, Advisory Group for Programmes on Digital Repositories and on Digital Asset Management and Preservation (assisting JISC, the NSF-equivalent in UK, including attending London meeting on 25 July 2006)
3. 2004-2008 Chairman, IEEE-CS Technical Committee on Digital Libraries
4. 2004-2008 Member, Advisory Board, DELOS Network of Excellence on Digital Libraries (<http://www.delos.info/>), funded by the European Union's 6th Framework Programme, first meeting December 9, 2004 in Athens, second meeting December 7-8, 2005 in Sophia-Antipolis, France, third meeting January 14-15, 2007 in Rome, fourth meeting Dec. 7, 2007 in Italy
5. 1995-2008 Editor, Morgan Kaufmann Publishers, Inc. Series on Multimedia Information and Systems. Books in series include:
 1. How to Build a Digital Library - by Witten and Bainbridge
 2. Digital Watermarking - by Cox, Miller, and Bloom
 3. Readings in Multimedia Computing and Networking - edited by Jeffay and Zhang
 4. Introduction to Data Compression, Second Edition - by Sayood
 5. Multimedia Servers: Applications, Environments, and Design - by Sitaram and Dan
 6. Managing Gigabytes: Compressing and Indexing Documents and Images, Second Edition - by Witten, Moffat, and Bell
 7. Digital Compression for Multimedia: Principles and Standards - by Gibson, Berger, Lookabaugh, Lindbergh, and Baker
 8. Practical Digital Libraries: Books, Bytes, and Bucks - by Lesk
 9. Readings in Information Retrieval - by Jones and Willett
6. 2005-2007 Member, Computational and Informational Sciences Directorate Review Committee, Pacific Northwest National Laboratory (PNNL), Richland, WA
7. 2001-2006 Director, Computing and Information Technology Interactive Digital Educational Library (CITIDEL), www.citidel.org
8. 2000-2006 Co-editor-in-chief, ACM Journal of Education Resources In Computing (JERIC - and lead proposer 1998-2000), <http://www.acm.org/pubs/jeric/>
9. 2000-2006 Member, ACM SIG Multimedia Executive Board
10. 2004-2005 Member, Advisory Board, Development of a Distributed Digital Library Training Certificate Program, University of North Carolina at Chapel Hill
11. 1999-2006 Member, Steering Committee, Open Archives Initiative <http://www.openarchives.org>
12. 2002-2005 Member, Policy Committee, NSDL, National Science Digital Library, old long name: National STEM (Science, Technology, Engineering, and Mathematics) education Digital Library, www.nsdl.org (the steering committee of an initiative with over \$150M NSF funding, to transform education throughout the USA at all levels in STEM areas), chair 1/2002 - 5/2003
13. 1997-2005 Editor, Computer Science Teaching Center (CSTC, www.cst.org)

14. 1998-2004 Member, Governing Board, Internet Technology Innovation Center <http://www.internettic.org>
15. 2000-2003 Executive Editor, TICtalk Newsletter, a monthly publication of Internet Technology Innovation Center
16. 1997-2003 Editorial board, IEEE Multimedia (IEEE-CS)
17. 1992-2001 Editorial board, Multimedia Systems (ACM/Springer-Verlag)
18. 1995-2001 Member, NCSTRL (Networked CS Tech. Report Library) working group (part of D-Lib working group program)
19. 1997-2000 Member, Steering Committee, ACM Preprint Database (and CoRR, Computing Research Repository, <http://xxx.lanl.gov/archive/cs/intro.html>)
20. 1995-2000 Co-chair, ACM SIGMM Education Committee
21. 1996-98 Chair, Steering Committee, ACM Digital Libraries conf. series
22. 1994-95 Past Chair, member ACM Multimedia Conferences Steering/Advisory Committee
23. 1994-99 Editorial board, Electronic Publishing - Origination, Dissemination and Design Journal (Wiley)
24. 1991-95 Chairman, ACM SIGIR (Special Interest Group on Information Retrieval)
25. 1992-94 Chair and Founder, ACM Multimedia Conferences Steering/Advisory Committee
26. 1989-93 Associate editor, ACM Transactions on Information Systems
27. 1988-92 Member ACM Publications Board
28. 1988-91 Editor-in-chief ACM Press Database and Electronic Products. Responsible for electronic publishing plans, products, and services. Publications include "Hypertext on Hypertext;" the "Resources in Computing" book series; CD-ROMs in the DALibrary and Computer Archive products; a videotape documentary, etc.
29. 1987-91 Vice chairman ACM SIGIR (Special Interest Group on Information Retrieval)
30. 1987-91 Editor ACM Press Books Database Products
31. 1985-89 Editor, mailing list maintainer, and founder of IRList, an electronic digest on information retrieval and related topics.
32. 1985-87 Co-editor for ACM SIGIR Forum, the newsletter for SIGIR

EARLIER (other):

1. Member, Program Committee, 16th International Conference on the Theory and Practice of Digital Libraries (TPDL 2012 -- <http://www.tpd12012.org/>), Cyprus, September 23-27, 2012
2. Member, Workshop Committee, 16th International Conference on the Theory and Practice of Digital Libraries (TPDL 2012 -- <http://www.tpd12012.org/>), Cyprus, September 23-27, 2012
3. Senior Member, Program Committee, JCDL 2012, Washington, D.C., June 10-14
4. Member, Steering Committee, NSF-funded CCC Vision Workshop on Computing for Disaster Management, Washington, D.C., April 24-25, 2012 (including work on report to NSF due in June)
5. Member, Program Committee, 34th European Conference on Information Retrieval (ECIR 2012), Barcelona, Spain, 1-5 April 2012 (<http://ecir2012.upf.edu>)
6. Member, Program Committee, ACM SIGCSE 2012, Feb. 29 - March 3
7. Member, Program Committee, Personal Information Management 2012, workshop at CSCW, Seattle, Feb. 11-12, 2012
8. Member, Program Committee, ACM Multimedia 2011, Scottsdale, AZ, Nov. 28 – Dec. 1, 2011
9. Member, Program Committee, ICADL2011, International Conference on Asia-Pacific Digital Libraries, Beijing, China, 24-27 Oct., <http://www.icadl2011.org/>
10. Member, Program Committee, Information and Data Management Track, 26th Brazilian Symposium on Databases, SBBD, Florianopolis, Brazil, Oct. 3-6, 2011
11. Senior Program Committee Member, International Conference on Theory and Practice of Digital Libraries, TPDL, Berlin, Germany, September 25-29, 2011 (<http://www.tpd12011.org/>)
12. Area Chair, Program Committee, 34th ACM International Conference on Research and Development in Information Retrieval (SIGIR 2011 -- <http://www.sigir2011.org/>) Beijing, China, July 24-28, 2011
13. Invited Attendee, Microsoft Research Faculty Summit, Redmond, WA, July 18-20, 2011
14. Member, Program Committee, 19th International Symposium on Methodologies for Intelligent Systems, ISMIS 2011, June 28-30, Warsaw, Poland, <http://ismis2011.ii.pw.edu.pl/>
15. Member, Program Committee (and attending PC meeting), Joint Conference on Digital Libraries (JCDL 2011), June 13-17, Ottawa, www.jdcl2011.org.

16. Member, Programme Committee, European Conference on Information Retrieval (ECIR) 2011, 18-21 April, Dublin, Ireland
17. 2009-2011, Member, DL.org (EU funded organization for digital libraries) Working Group on Functionality, meeting in Greece June 2009 and in Rome May 2010, along with periodic online meetings
18. 2009-2010, Chair, Working Group on Interdisciplinary Computing Curricula, at the 2009 Rebooting Computing Summit and following up into the future
19. Member, Program Committee, Information Retrieval track, 25th Brazilian Symposium on Databases (SBBD 2010), Belo Horizonte, Brazil, Oct. 5-8
20. Senior Program Committee Member, ECDL 2010, 14th European Conference on Digital Libraries, Glasgow, September 6-10, 2010, <http://www.ecdl2010.org/>
21. Member, Program Committee, Fourth Annual Workshop on Human Computer Interaction and Information Retrieval (HCIR 2010), New Brunswick, NJ, August 22, 2010
22. Senior Program Committee Member and Area Chair (Applications), SIGIR 2010, 33rd ACM International Conference on Research and Development in Information Retrieval, Geneva, Switzerland, July 18-23, 2010
23. Member, Program Committee, CRA Biennial Conference at Snowbird, 2010, Cliff Lodge, Snowbird Resort, Utah, July 18-20
24. Attendee, Media Computation Workshop, Virginia Tech, July 7-9, 2010
25. Member, Program Committee, ITiCSE 2010, The 15th Annual Conf. on Innovation and Technology in Computer Science Education, Bilkent, Ankara, Turkey, June 26-30, 2010, <http://iticse2010.bilkent.edu.tr/>
26. Member, Program Committee, JCDL 2010, Joint Conference on Digital Libraries, Gold Coast, Australia, June 21-25, 2010
27. Member, Program Committee, ICADL2010, International Conference on Asia-Pacific Digital Libraries, Brisbane, Australia, 21-25 June 2010, <http://www.jcdl-icadl2010.org/>
28. Member, Program Committee, Doctoral Consortium, JCDL/ICADL 2010, June 21-25, Gold Coast, Australia
29. Member, Program Committee, ETD 2010, June 16-18, Austin, TX
30. Member, Paper Review Committee, 4th International Symposium on Information Technology 2010, ITSIM 2010, Kuala Lumpur, June 15-17, <http://www.itsim.org/>
31. Member, Programme Committee, 32nd European Conference on Information Retrieval (ECIR 2010), The Open University in Milton Keynes, UK, March 28-31, <http://kmi.open.ac.uk/events/ecir2010/>
32. Member, Program Committee, ACM SIGCSE 2010, Milwaukee, March 10-13
33. 2008-2009, Co-editor of ACM TOMCCAP special issue, led by Christoph Rensing, <http://tomccap.acm.org/special2009.html>
34. Member, Program Committee, ECDL 2009, Sep. 27 - Oct. 2, 2009, Corfu
35. Member, Program Committee, ISMIS'09, Prague, Czech Republic, September 14-17, 2009
36. Area Chair (AC, Senior Program Committee member) for IR Applications, 32nd ACM International Conference on Research and Development in Information Retrieval, SIGIR 2009, <http://www.sigir2009.org>, Boston, July 19-23, 2009
37. Mentor for SIGIR 2009
38. Member, Program Committee, ITiCSE 2009, July 6-8, 2009, Paris
39. Member, Program Committee, JCDL 2009, Austin, TX, June 15-19, 2009
40. Member, Program Committee, 12th Intl. Symposium on Electronic Theses and Dissertations (ETD 2009), Pittsburgh, PA, June 10-13
41. Reviewer, DigCCurr2009: Digital Curation Practice, Promise, and Prospects, Chapel Hill, NC, April 1-3, 2009
42. Member, Program Committee, ECIR'09: 31st European Conference on Information Retrieval, April 2009
43. 2001-2008 Member, NCSTRL (Networked Computer Science Technical Reference Library, www.ncstrl.org) Committee
44. Member, Program Committee, 11th International Conference on Asian Digital Libraries, ICADL 2008, Bali, Indonesia, Dec. 2-5, 2008
45. Member, Steering Committee, 2008 NSF CISE Pathways to Revitalized Undergraduate Computing Education, CPATH 2008, Arlington, VA, Nov. 12-14, 2008
46. Member, Program Committee, SPIRE 2008, 15th String Processing and Information Retrieval Symposium, Melbourne Australia, November 10-12, 2008

47. Member, Program Committee, HCIR 2008, Workshop on Human-Computer Interaction and Information Retrieval, October 23, Microsoft Research, Redmond, Washington
48. Member, Program Committee, Brazilian Symposium on Databases (SBBD), Campinas, Brazil, October 13-15, 2008
49. Member, Program Committee, European Conference on Research and Advanced Technology for Digital Libraries: Towards the European Digital Library, ECDL2008, Aarhus, Denmark, September 14 - 19, 2008
50. Senior Member, Program Committee, SIGIR 2008, July 20-24, 2008, Singapore
51. Member, Program Committee, JCDL 2008, June 15-20, 2008, Pittsburgh
52. Member, Program Committee, ISMIS 2008, May 20-23, 2008, Toronto
53. Co-chair, Panels, ECDL 2007, Budapest, September 2007
54. Senior PC member, ACM SIGIR 2007, attending PC meeting March 29-30, 2007 in Delft, Netherlands, 30th Annual International ACM SIGIR Conference, 23-27 July 2007, Amsterdam
55. Co-chair (with Donatella Castelli), JCDL 2007 Workshop 2: 1st Workshop on Digital Library Foundations, with 2007 Joint Conference on Digital Libraries, June 23, 2007, Vancouver
56. Co-chair (with Geneva Henry) standing in for Chair Nadia Caidi who could not attend, JCDL 2007 Doctoral Consortium, with 2007 Joint Conference on Digital Libraries, June 19, 2007, Vancouver
57. Member (of 6), Organizing Committee, JCDL 2007 Workshop 1: Developing a Digital Libraries Education Program, with 2007 Joint Conference on Digital Libraries, June 18, 2007, Vancouver
58. Member, Program Committee, JCDL 2007, 2007 Joint Conference on Digital Libraries, June 17-23, 2007, Vancouver
59. Member, Program Committee, ETD 2007, 10th International Symposium on Electronic Theses and Dissertations, Uppsala, Sweden, June 13-16, 2007, <http://epc.ub.uu.se/etd2007/>
60. Member, Program Committee, MUE 2007, 26-28 April 2007, Seoul, Korea
61. Member, Program Committee, 29th European Conference on Information Retrieval (ECIR 2007), Rome, April 2-5, <http://ecir2007.fub.it>
62. Invited IMA workshop attendee, The Evolution of Mathematical Communication in the Age of Digital Libraries, Dec. 8-9, 2006, hosted by the Institute for Mathematics and its Applications (IMA), Minneapolis, <http://www.ima.umn.edu/2006-2007/SW12.8-9.06/index.html>
63. Member, Program Committee, ICADL 2006, Kyoto, Japan, Nov. 2006, <http://www.icadl.org/>
64. Member, Program Committee, SPIRE 2006, 13th ed. Symposium on String Processing and Information Retrieval (<http://www.cis.strath.ac.uk/external/spire06/>), 11-13 Oct. 2006, Glasgow
65. Member, Program Committee, ECDL 2006, Alicante, Spain, 17-22 Sept. 2006, <http://www.ecdl2006.org/>, and Accompanying Professor, Doctoral Consortium
66. Co-organizer, ETANA Workshop, Vanderbilt University, Nashville, Sept. 8-9, 2006
67. Member, Program Committee, SIGIR 2006 Workshop "Evaluating Exploratory Search Systems" (<http://www.sigir2006.org/>), Aug. 6-11, Seattle; Area Coordinator (AC) for ACM SIGIR 2006, for Web IR and Digital Libraries, coordinating the work of the reviewers in that area
68. Member, JCDL 2006 program committee, June 11-15, 2006, Chapel Hill, NC
69. Accompanying Professor, Doctoral Consortium, JCDL 2006, June 11-15, 2006, Chapel Hill, NC, <http://www.jcdl2006.org/>
70. Member, Program Committee, ETD 2006, 9th International Symposium on Electronic Theses & Dissertations, June 7-10, 2006, Quebec City, <http://www6.bibl.ulaval.ca:8080/etd2006/>
71. Member, Program Committee, Southeast Workshop on Data and Information Management, Raleigh, NC, March 30-31, 2006
72. Member, Program Committee, 10th International Conference on Extending DataBase Technology (EDBT 2006), Munich, GE, March 27-31, 2006
73. Member, Program Committee, ACM Conference on Information and Knowledge Management (CIKM) 2005 (<http://www.tzi.de/CIKM2005/>), Bremen, Germany, October 31 - November 5
74. Member, Program Committee, ETD 2005, 8th International Symposium on Electronic Theses & Dissertations, Sydney, Australia, Sept. 28-30, 2005
75. Member, Organizing Committee and Co-chair for Panels, European Conference on Digital Libraries, ECDL 2005, Vienna, September 18-23, 2005, <http://www.ecdl2005.org>
76. Reviewer, SIGIR 2005, 28th Annual International ACM SIGIR Conference, Salvador, Brazil, August 15-19, 2005
77. Member, Program Committee, Fifth Joint Conference on Digital Libraries, JCDL 2005, June 7-11, 2005,

Denver, Colorado

78. Member, Program Committee, 8th International Workshop of the DELOS Network of Excellence on Digital Libraries on Future Digital Library Management Systems (System Architecture & Information Access), Schloss Dagstuhl, Germany, March 29 - April 1st, 2005
79. 2001-2005 Member, Institutional Asset Submission Programme Steering Group (assisting JISC, the NSF-equivalent in UK, for FAIR program), including March 14, 2002 teleconference review panel
80. 2003-2004 Member, Energy Sciences & Technology Directorate Review Committee, Pacific Northwest National Laboratory (PNNL), Richland, WA
81. 2001-2004, Member, National Visiting Committee, "Web-Network Technology Curriculum Development" NSF grant to Erie Community College, SUNY Buffalo, ...; attending meetings in Buffalo, NY on 11/7/2001; June 11-13, 2002; June 18-19, 2003; June 15-16, 2004
82. Co-chair, Program Committee, ICADL 2004, 7th International Conference of Asian Digital Libraries, Shanghai, China, Dec. 13-17, 2004
83. Member, Program Committee, CIKM 2004, 13th Conference on Information and Knowledge Management, Nov. 8-13, 2004, Washington, D.C.
84. Member, Program Committee, SCCC'04, XXIV International Conference of the Chilean Computer Science Society, Nov. 11-12, 2004, Arica, Chile
85. Member, Program Committee, AIRS 2004, Asia Information Retrieval Symposium, Beijing, Oct. 14-16, 2004
86. Moderator, Discussion group on Information Integration, NSF IDM PI Workshop, Oct. 10-12, 2004, Cambridge, MA
87. Member, Program Committee, SPIRE 2004, String Processing and Information Retrieval Symposium, Padova, Italy, Oct. 5-8
88. Member, Program Committee, SIGIR 2004, 27th Annual International ACM SIGIR Conference, University of Sheffield, UK, July 25-29, 2004
89. Member, Program Committee, ELPUB 2004, ICCC 8th International Conference on Electronic Publishing, University of Brasilia, Brazil, June 23 - 26, 2004
90. Member, Program Committee, ISI-2004, 2nd Symposium on Intelligence and Security Informatics, Tucson, Arizona, June 10-11, 2004
91. Member, Program Committee, JCDL 2004, ACM/IEEE-CS Joint Conference on Digital Libraries, Tucson, Arizona, June 7-11, 2004
92. Member, Program Committee, ETD 2004, The 7th International Symposium on Electronic Theses & Dissertations: Distributing knowledge worldwide through better scholarly communication, Lexington, KY, June 3-5, 2004
93. Member, Program Committee, DLKC'04, International Symposium on Digital Libraries and Knowledge Communities in Networked Information Society, March 2-5, 2004, University of Tsukuba, Japan
94. Member, Program Committee, CIKM'2003, New Orleans, LA, Nov. 2-8, 2003
95. Member, Program Committee, SPIRE-2003, String Processing and Information Retrieval Symposium, Manaus, Brazil, October 8-10, 2003
96. Member, Program Committee, ENC 2003, Encuentro, biannual conf. of Mexican Computer Society (SMCC), Sept. 8-12, Apizaco, Mexico
97. Member, Program Committee, ECDL'2003, Trondheim, Norway, Aug. 17-22, 2003
98. Member, Program Committee, SIGIR'2003, Toronto, July 28-Aug.1, 2003
99. Member, Program Committee, Elpub 2003, 7th International Conference on Electronic Publishing, June 25-28, 2003, Guimaraes, Portugal
100. Member, Program Committee, The First NSF/NIJ Symposium on Intelligence and Security Informatics (ISI 2003), June 2-3, 2003, Tucson, AZ, <http://ecom.arizona.edu/ISI/>
101. Member, Program Committee, JCDL'2003, Houston, May 27-31, 2003
102. 2001-2 Program Co-Chair, ICADL'2002, Singapore, Dec. 17-20, 2002, <http://www.cais.ntu.edu.sg:8000/icadl02>
103. Member, Program Committee, ECDL'2002 (and co-chair, demos and posters), Rome, Sep. 16-18, 2002
104. Member, Program Committee, SPIRE'2002, Lisbon, Portugal, Sep. 11-13
105. Member, Program Committee, JCDL'2002, Portland, July 14-18, 2002 (attending PC meeting March 8-10, 2002, Chapel Hill, NC)
106. Member, Int'l Program Committee, 2002 Workshop on Multimedia Information Retrieval and

- Management, June 5, 2002, Hong Kong Poly. U.
107. Member, Organizing Committee, OCKHAM (Open Community Knowledge Hypermedia Administration and Metadata), May 3, 2002, Atlanta, GA (sponsored by Digital Library Federation)
 108. 2002 Co-organizer: Deborah Knox, Lillian Cassel, John Impagliazzo, Edward Fox, JAN Lee, Manuel Perez, and C. Lee Giles. "Submission, Evaluation, and Refinement of Resources to CITIDEL". Full day workshop (scheduled but cancelled due to attendance, attended only by co-PIs) at ACM SIGCSE Symposium 2002, <http://www.cs.cofc.edu/sigcse2002/>, in Proc. of the 33rd SIGCSE Technical Symposium on Computer Science Education, Feb. 27 - March 3, 2002, Covington, KY, p. 421
 109. 2002 Invited participant, NIMD'2002 Workshop, Jan. 7-9, 2002, Arlington, VA (Novel Intelligence from Massive Data program of ARDA)
 110. Member, Program Committee, ICADL 2001, Dec. 10-12, 2001, Bangalore, India, 4th Int'l Conf. of Asian Digital Libraries
 111. Member, Program Committee and Area Coordinator, 24th Annual International SIGIR Conference on Research and Development in Information Retrieval, New Orleans, LA, Sept. 2001 (and attending PC meeting 3/23-25/2000)
 112. Member, Program Committee, ECDL 2001, 5th European Conference on Research and Advanced Technology for Digital Libraries, September 4-8 2001, Darmstadt, Germany, <http://www.ecdl2001.org>
 113. Member, Program Committee, SPIRE'2001 - String Processing and Information RETrieval, Laguna de San Rafael, Chile, Nov. 13-15, 2001
 114. 2001 Invited participant, SMETE.ORG workshop, PKAL Summer Institute, July 15-18, 2001, Snowbird, Utah
 115. 2001 Invited participant, brainstorming meeting on "Digital Libraries: Future Directions for a European Research Programme", organized by the DELOS Network of Excellence on Digital Libraries, in cooperation with the Cultural Heritage Applications Unit of the 5th FP IST programme, 13-15 June 2001, S. Cassiano, Italy, Brainstorming Report ERCIM-02-W02, <http://delos-noe.org/>
 116. 2001 Member, Steering Committee, NSF IDM'2001, April 29 - May 1, 2001, Fort Worth, Texas, <http://itlab.uta.edu/idm01/>
 117. 2001 Member, Review team for UMBC CS program, April 16, 2001, Baltimore
 118. 2000-01 Member, Program Committee, WWW10 Conference, 10th International World Wide Web Conference, Hong Kong, June 2001, <http://www.www10.org>
 119. 1999-01 Member, ACM Content Steering Committee (w. John White, charge at <http://www.cs.arizona.edu/people/rts/Portal/hidden/steering.charge>)
 120. 1998-01 Member, Curriculum 2001 (CC2001) Review Committee (and member of focus group on Information Management)
 121. 1998-01 Member, Ad Hoc Committee on Being a Scholar in the Digital Age, that helped to prepare "Issues for Science and Engineering Researchers in the Digital Age", National Research Council, ISBN 0-309-07417-7, Washington, D.C.: National Academy Press, 2001, 57 pages
 122. 2000 Member, Board of Experts for NCLIS
 123. 2000 Member, Program Committee, MMM 2000, November, 13-15, 2000, Nagano Japan, <http://www.phys.waseda.ac.jp/shalab/mmm2000/>
 124. 2000 Member, Program Committee for The Ninth International Conference on Information and Knowledge Management (CIKM'2000), Nov. 6-11, 2000, Washington, DC, <http://www.csee.umbc.edu/cikm/2000/>
 125. 2000 Member, Organizing Committee (OC) for the International Conference on Information Society in the 21 Century: Emerging Technologies and New Challenges (IS2000), November 5-8, 2000, The University of Aizu, Aizu-Wakamatsu City, Fukushima, Japan
 126. 2000 Member, review panels, NSF, Jan. 12-13, 2000 and May 22-25, 2000
 127. 1999-2000 Member, Committee for National Research Council to prepare "On Being a Researcher in the Digital Age", for booklet published by NRC/NAS
 128. 1999-2000 Member, Program Committee, ACM Multimedia 2000, Los Angeles, Oct. 30 - Nov. 3, 2000, <http://www.acm.org/sigs/sigmm/MM2000/>
 129. 1999-2000 Member of the International Program Committee, SIGIR 2000, Athens, July 25-28, 2000
 130. 1999-2000 Member, Coordination Group (led by R. Steinmetz, with W. Effelsberg and N. Georganas), "Multimedia for Multimedia: Learning and Teaching in the Next Decade", Dagstuhl seminar, Castle Dagstuhl, Germany, June 11-16, 2000

131. 1999-2000 Member, Program Committee, ACM Digital Libraries '2000, San Antonio, TX, June 2-7, 2000, <http://www.dl00.org/>
132. 1999-2000 Member, Program Committee, Web9 Conference, 9th International World Wide Web Conference, The Web: The Next Generation, Amsterdam, May 15-19, 2000, <http://www.www9.org>
133. 1999-2000 Member, Steering Committee, NSF IDM'2000, Chicago, March 5-7, 2000, <http://boston.cwru.edu/idm00/>
134. 1999-2000 Member, Program Committee, ICDE'2000, 16th International Conf. on Data Engineering, San Diego, CA, Feb. 28-March 3, 2000 <http://research.microsoft.com/icde2000/>
135. 1999 Member, Program Committee, 5th International Computer Science Conference (ICSC '99), Hong Kong, December 15-17, 1999
136. 1999 Participant, 7th Dublin Core Metadata Workshop, Die Deutsche Bibliothek, Frankfurt, October 25-27, 1999 (and presenter at Discussion Group - Dissertation Online - Oct. 27)
137. 1999 Invited participant and presenter, Workshop on an international project of electronic dissemination of theses and dissertations, UNESCO, Paris, Sep.27-28, 1999
138. 1999 Chair, Steering Committee meeting of NDLTD, 9/24/99, Washington
139. 1999 Member, Program Committee, 5th Eurographics Workshop on Multimedia Media Convergence: Models, Technologies and Applications, EG Multimedia'99, Milan, Italy, Sep. 7-8, 1999 <http://egmm99.di.fct.unl.pt>
140. 1999 Invited expert, by NSF, for Digital Library for Education (DLE) meeting, Washington, D.C., June 10, 1999
141. 1998- Member, Steering Committee, ACM Digital Libraries conf. series
142. 1998-2000 Member, Program Committee of 4th European Conf. for Digital Libraries, ECDL'2000, Lisbon, Sept. 18-21, 2000, <http://www.bn.pt/org/agenda/ecdl2000/>
143. 1998-99 Member, Program Committee for The Eighth International Conference on Information and Knowledge Management (CIKM'99), Kansas City, Missouri, Nov. 2-6, 1999, <http://www.cs.umbc.edu/cikm>
144. 1998-99 Member, Program Committee, Fifth International Workshop on Multimedia Information Systems (MIS'99), Palm Springs Desert Resorts area, CA, Oct. 21-23, 1999
145. 1998-99 Member, Program Committee, ICON'99, International IEEE Conf. on Computer Networks, Brisbane, Australia, Sept. 9-10, 1999
146. 1998-99 Member, Review Committee for ACM SIGIR'99, Aug.15-19, Berkeley, CA
147. 1997-99 Associate Program Chair, ACM Multimedia'99, 7th ACM Int'l Multi- media Conf., Nov. 1999, Orlando, <http://www.acm.org/sigmm/MM99/>
148. 1997-99 Member, Program Committee for CoLIS 3, Dubrovnik, May 1999
149. 1999 Chair of Technical Committee meeting, for Networked Digital Library of Theses and Dissertations, held before Coalition for Networked Information Spring Meeting, Renaissance Washington D.C. Hotel, April 26-27, 1999
150. 1999 Participant, NSF Digital Library Workshop on undergraduate education, Arlington, VA, Jan. 4-6, <http://www.dlib.org/smete/>
151. 1998-99 Member, ASIS 1999 Mid-Year Meeting program committee
152. 1996-99 Member, OCLC's Research Advisory Council
153. 1995-99 Member, Columbia U. Digital Library Advisory Committee
154. 1998 Participant, University of Missouri-Columbia's Delphi Study of Digital Libraries. For details of the study and report see http://www.coe.missouri.edu/~is334/projects/Delphi_DL/Default.htm
155. 1998 Participant, NSF Workshop on Digital National Library for Undergraduate Science, Mathematics, Engineering, and Technology Education, Arlington, VA, July 21-23, <http://www.dlib.org/smete/>
156. 1998 Chair of Steering Committee meetings, for Networked Digital Library of Theses and Dissertations, held at Coalition for Networked Information offices, Washington, D.C, March 27, 1998; Sept.25,1998
157. 1998 Chair of Technical Committee meeting, for Networked Digital Library of Theses and Dissertations, held before Coalition for Networked Information Spring Meeting, Arlington, VA, April 14, 1998
158. 1998 Participant, D-Lib Metrics Working Group Meeting, Stanford, CA, Jan. 7-8, 1998
159. 1997-98 Member, Program Committee for IEEE Multimedia Systems'98, IEEE MM98
160. 1997-98 Member, Program Committee for ACM SIGIR '98, Aug., Melbourne, Australia
161. 1997-98 Member, Program Committee for The Seventh International Conference on Information and Knowledge Management (CIKM'98), Nov. 1998

162. 1997-98 Associate Program Chair, ACM Multimedia '98, 6th ACM Int'l Multimedia Conf., 12-16 Sept. 1998, Bristol, UK <http://www.acm.org/sigmm/MM98/>
163. 1997-98 Member, Program Committee of 2nd European Conf. for Digital Libraries, Crete
164. 1997-98 Member, Program Committee, SICON '98, IEEE Int'l Conf. on Networks, 30 June - 3 July 1998, Singapore (and session chair)
165. 1997-98 Member, Program Committee for ACM Digital Libraries '98, Pittsburgh, PA, June 23-26, 1998, <http://www.ks.com/dl98> (also, Workshop Chair, committee to select winner of the Vannevar Bush award)
166. 1997-98 Member, Program Committee for BAS98, The 3rd Symposium on Computer Networks, June 25-26, 1998, Dokuz Eylul University, Izmir, Turkey
167. 1997-98 Member, Program Committee for RIDE98, Eighth International Workshop on Research Issues in Data Engineering: Continuous-Media Databases and Applications, February 23-24, 1998, Orlando, Florida, Sponsored by IEEE Computer Society Technical Committee on Data Engineering
168. 1996-98 Member, Steering Committee, Monticello Electronic Library, a project of SURA and SOLINET (re TIAPP grant)
169. 1995-98 Member, ACM SIGIR Executive Committee (as Past Chair)
170. 1995-98 Member, ACM SIGIR Electronic Publishing Committee
171. 1993-98 Member, ACM SIGIR Education Committee
172. 1997 Chair, Nominations Committee, ACM SIGIR
173. 1997 Chair of Technical Committee meeting, for Networked Digital Library of Theses and Dissertations, held before Coalition for Networked Information Spring Meeting, Minneapolis, Oct. 26, 1997
174. 1997 US Representative, Workshop on Curricular Development on Information Management and Digital Libraries, Lisbon, Portugal, Oct. 3-4, 1997
175. 1997 Chair of Steering Committee meeting, for Networked Digital Library of Theses and Dissertations, held at Coalition for Networked Information offices, Washington, D.C, Sept. 19, 1997
176. 1997 Member, workshop on a Digital National Library for Science, Mathematics, Engineering and Technology, sponsored by National Research Council, Washington, D.C., August 7-8, 1997
177. 1996-97 Program committee member, First European Conference in Research and Advanced Technology for Digital Libraries, Pisa, Italy, 9/1-3/97
178. 1996-97 Program committee member, 20th Intern'l Conf. on R&D in Information Retrieval, SIGIR '97, July 27-31, 1997, Philadelphia; also chair of session on Image Retrieval; also on Best Paper Committee
179. 1996-97 Technical papers committee member, 2nd ACM Int'l Conf. on Digital Libraries, DL'97, July 21-23, 1997, Philadelphia
180. 1995-97 Program committee member, IEEE Multimedia Systems'97, the IEEE International Conference on Multimedia Computing and Systems (ICMCS), June 3-6, 1997, Ottawa, Canada
181. 1995-97 Program comm. member, 1997 International Conference on Software Engineering, ICSE 97, May 17-24, 1997, Boston, MA
182. 1996-97 Organizing comm. member, Workshop on R&D Opportunities in Federal Information Services, 5/13-15/97, Arlington, VA; also met 12/3-5/96
183. 1997 Chair of Technical Committee meeting, for National Digital Library of Theses and Dissertations, held before Coalition for Networked Information Spring Meeting, Crystal City, VA, 4/1-2/97
184. 1997 Invited attendee, Computing and Humanities workshop, Computer Science and Telecommunications Board, National Research Council, March 28, 1997, Washington, D.C.
185. 1997 Chair of Steering Committee meeting, for National Digital Library of Theses and Dissertations, held at Coalition for Networked Information offices, Washington, D.C, March 14, 1997
186. 1997 Invited attendee and co-chair of one of four working groups, NSF Workshop for a Research Initiative on Distributed Knowledge-Work Environments, Santa Fe, March 9-11, 1997
187. 1997 NSF Database and Expert Systems panel, Feb. 3, 1997
188. 1996-97 Program committee member, Multimedia Computing and Networking 1997 (MMCN97) Conference (sponsored by SPIE and IS&T), San Jose, Feb. 10-12, 1997.
189. 1996 Chair of Technical Committee meeting, for National Digital Library of Theses and Dissertations, held after Coalition for Networked Information Fall Meeting, San Francisco, Dec. 7, 1996
190. 1996 Program review committee member, ACM Multimedia '96 conference, November 18-22, 1996, Boston, MA, <http://www.acm.org/sigmm/MM96/>
191. 1996 Member, NSF DLI Site Review Team, visiting 2 institutions, May, 1996
192. 1995-96 Steering committee member, NSF-sponsored 38th Allerton Institute, Oct. 27-29, 1996,

- Monticello, IL; co-chaired session with G. Marchionini
193. 1995-96 Program committee member, 19th Intern'l Conf. on R&D in Information Retrieval, SIGIR '96, Aug. 18-22, 1996, Zurich, Switzerland
 194. 1995-96 Technical Program Committee member, HPDC Focus Workshop on Multimedia and Collaborative Environments, part of Fifth IEEE Int. Symp. on High Performance Distributed Computing (HPDC-5), Aug. 6-9, 1996, Syracuse, NY
 195. 1995-96 Program committee member for Multimedia Computing and Networking 1996 - part of the IS&T/SPIE Symposium on Electronic Imaging Science and Technology, Jan. 29-31, 1996, San Jose, CA
 196. 1995-96 Program committee member, Pacific Workshop on Distributed Multimedia Systems, DMS'96, June 25-28, 1996, Hong Kong
 197. 1995 Steering committee member, NSF-sponsored 37th Allerton Institute, "How We Do User-Centered Design and Evaluation of Digital Libraries: A Methodological Forum," 10/29-31/95, Monticello, IL
 198. 1995 Program committee member, Curriculum Development in Computer Information Science: A Framework for Developing a New Curriculum in IR, workshop following ACM SIGIR'95, July 13, 1995, Seattle, WA
 199. 1995 Invited participant, ARPA sponsored HPCC/IITA DigLib Workshop, May 18-19, 1995, Tysons Corner, VA.
 200. 1995 Organizing Committee, NSF hosted workshop on Computer Science Technical Reports, NSF, Arlington, VA, April 7-8, 1995
 201. 1994-96 Program committee member, ISMIS'96, organized with the assistance of the Polish Academy of Sciences, 6/10-13/96, Zakopane, Poland
 202. 1994-95 Senior Member of the Program Committee, member of conference executive committee, ACM Multimedia '95, Third ACM International Conference on Multimedia, Nov. 5-9, 1995, San Francisco, CA
 203. 1994-95 Program committee member, CIKM 95, Fourth International Conference on Information and Knowledge Management, Nov. 28 - Dec. 2, 1995, Baltimore, MD
 204. 1994-95 Organizing Committee Member, Digital Libraries '95, June 11-13, 1995, Austin, TX
 205. 1994-95 Program committee member, Electronic Publishing and the Information Superhighway, DAGS'95 (Dartmouth Institute for Advanced Graduate Studies 4th Annual Summer Meeting), May 31-June 2, Boston
 206. 1994-95 Program committee member, 1995 Pacific Workshop on Distributed Multimedia Systems, March 30-31, 1995, Honolulu, Hawaii
 207. 1994-95 Member, IBM Digital Library Council
 208. 1994 Participant, Oct. 31, 1994 NSF Workshop on World-Wide Web in support of Computer Science Research and as a Means for NSF to Disseminate Information, NSF Headquarters, Arlington, VA
 209. 1994 Assoc. Program Chair, Digital Libraries '94, June 19-21, 1994, College Station, TX.
 210. 1994 Session Chair on Architectures, EG-MM '94, Eurographics Symposium and Workshop on Multimedia: Multimedia/Hypermedia in Open Distributed Environments, June 6-9, 1994, Graz, Austria. Also, invited workshop participant.
 211. 1994 Member, ACM Electronic Membership Directory task force
 212. 1994 NSF Instrumentation and Laboratory Improvement Program panel, Jan. 19-22, 1994.
 213. 1994 NSF Database and Expert Systems panel, March 29-30.
 214. 1993-94 Program vice-chair, CIKM 94, Third International Conference on Information and Knowledge Management, Nov. 29-Dec. 2, 1994, NIST, Gaithersburg, MD
 215. 1993-94 Program and conference executive committees member, ACM Multimedia 94, Second ACM International Conference on Multimedia, Oct. 15-20, 1994, San Francisco, CA
 216. 1993-94 Program committee member, 2nd International Workshop on Advanced Teleservices and High-Speed Communication Architectures (IWACA), Sept. 26-28, 1994, Heidelberg, Germany
 217. 1993-94 Member, NSF Information Engineering Task Force, initial meeting Nov. 4-6, 1993, Alexandria, VA, preparing NSF Task Force Report on Developing a Framework for Academic Programs in Informatics: Educating the Next Generation of Information Specialists
 218. 1993-94 Organizing committee member, Workshop on Intelligent Access to On-line Digital Libraries, in connection with IEEE CAIA '94, San Antonio, TX, March 1, 1994
 219. 1993 NSF panels on Jan. 7-8, March 19, April 15, May 7, June 21-22, 1993
 220. 1993 NIH RADIX review panel, March 26, Bethesda, MD
 221. 1992-94 Program committee member, 17th Intern'l Conf. on R & D in Information Retrieval, SIGIR '94,

Dublin, Ireland, July, 1994

222. 1992-94 Program committee member, IS&T/SPIE Symposium on Electronic Imaging Science and Technology --- two workshops: 1) Digital Video Compression and Processing on Personal Computers: Algorithms and Technologies, 2) High-Speed Networking and Multimedia Computing (and session chair). Feb. 6-10, 1994, San Jose, CA
223. 1992-94 Member, ACM Electronic Publishing Volunteer Advisory Committee
224. 1992-93 Member, Design Team, The Capture and Storage of Electronic Theses and Dissertations, sponsored by Coalition for Networked Information (CNI), VPI&SU, Council of Graduate Schools, and University Microfilms Int., including Information Technology group leader for 11 Oct. 1992 Design Meeting, Washington, D.C., speaker at 2 sessions of the CNI 1993 Spring Meeting, March, San Francisco.
225. 1992-93 Program committee member, ACM Multimedia '93, First ACM International Conference on Multimedia, Aug. 2-6, 1993, Anaheim, CA
226. 1992-93 Editorial board, NSF funded SCID3B (Scientific Database Bulletin Board)
227. 1992 Steering committee member, Hyperbases workshop, sponsored by the National Science Foundation and Texas A&M, 15-16 Oct., 1992, Washington, D.C.
228. 1992 Invited member, NSF Workshop on Visual Information Management Systems, org. by U. of Mich. and IBM Almaden Res. Cntr., 24-24 Feb. 1992, San Francisco.
229. 1992 Review panel member, NSF CISE Education Infrastructure Program
230. 1991-95 Jury, ASIS (Amer. Soc. for Inf. Science) Award for Research in Information Science: member 1991-93, chair 1994, member 1995
231. 1991-92 Program comm. member, 1992 Symposium on Applied Computing (SAC '92)
232. 1991 Review panel member, NSF Research Initiation Awards
233. 1991 Steering committee member, "Emerging Technologies" panel chair: Directions in Text Analysis, Retrieval and Understanding workshop, sponsored by the National Science Foundation and U. Nebraska, 11-12 Oct., 1991, Chicago IL.
234. 1991 Invited workshop member, "User Interfaces for Online Public Access Catalogs" Invitational Research Workshop, sponsored by the U. of Maryland Human-Computer Interaction Lab. and the Library of Congress Information Technology Office, Nov. 1, 1991, Library of Congress, Washington, D.C.
235. 1990-93 Member, Chemical Abstracts Service Research Council
236. 1990-92 Program committee member, 15th Intern'l Conf. on R & D in Information Retrieval, SIGIR '92, June 21-24, 1992, Copenhagen, Denmark
237. 1990-92 Member, Working Group on Hypermedia, Text Encoding Initiative
238. 1990-91 Member, Editorial Board, Applied Computing Review
239. 1990-91 Member, ACM Press CD-ROM Advisory Panel
240. 1990-91 Program committee member, publicity chair, 14th Intern'l Conf. on R & D in Information Retrieval, SIGIR '91, October 13-16, 1991, Chicago
241. 1990-91 Organizing committee member, AAAI-91 Workshop on Natural Language Text Retrieval, July 15, 1991, Anaheim, CA
242. 1990-91 Program committee member, RIAO (Recherche d'Informations Assistee par Ordinateur) 91, April 2-5, 1991, University Autonoma of Barcelona
243. 1990 Invited participant at Scientific Database Workshop, sponsored by NSF and Univ. of Virginia Dept. of Comp. Sci., Charlottesville VA, Mar. 12-13, 1990.
244. 1990 Organizer and chairman of planning meeting on Electronic Submissions at ACM Computer Science Conference, Feb. 20, 1990, Washington, D.C.
245. 1989-91 Member of ad hoc committee of the ACL: ACL Data Collection Initiative
246. 1989-91 Program comm. member, International Conference on Multimedia Information Systems, Singapore, Jan. 16-18, 1991
247. 1989-91 Member, Research Committee, American Society for Information Science
248. 1988-90 Technical program comm. member, The Fifth Annual AI Systems in Gov. Conf., May, 1990, Washington, D.C.
249. 1988-90 Member Advisory Board, Lexical Research Program, Applied Information Technologies Research Center, Columbus, Ohio
250. 1988-90 Program committee member, 13th Intern'l Conf. on R & D in Information Retrieval, Sept. 5-7, 1990, Brussels, Belgium. Access Methods session chair.
251. 1988-89 Technical program comm. member, Intelligent Systems - Realizing the Payoff, AI Systems in

Gov. Conf., March 27-31, 1989, Washington, D.C.

252. 1988 Invited participant in AITRC sponsored workshop on lexicons and text collections, April 20, 1988, Dublin, Ohio
253. 1988 Review panel member, NSF Science & Tech. Research Centers
254. 1987-94 Editorial board, CD-ROM Professional(formerly Laserdisc Professional)
255. 1987-89 Publicity chairman, program committee member, 1989 ACM SIGIR Intern'l Conf. on R & D in Information Retrieval, June 25-27, 1989, Cambridge, MA
256. 1987-88 Program committee, hypertext session chair: RIAO (Recherche d'Informations Assistee par Ordinateur) 88: User-Oriented Text and Image Handling, March 21-24, 1988, Cambridge, MA.
257. 1987 Invited participant in AAP/UMI Workshop on Dissertation Markup, April 15, 1987, Ann Arbor, MI
258. 1986-87 Planning committee for Workshop on Distributed Expert-Based Information Systems, March 5-7, 1987, New Brunswick, NJ
259. 1985 Conference Committee, Virginia Networking and Telecommunications Planning Conference, Oct. 15 -16, 1985, Fredericksburg, VA

UNIVERSITY SERVICE:

CURRENT:

1. 2007- Faculty Advisor to Information Technology, special staff member reporting to VP for Information Technology
2. 2009- Member, Search Committee(s), Dept. of Computer Science
3. 2000- Fellow, Institute for the Social Assessment of Information Technology (ISAIT). Virginia Tech, <http://www.uap.vt.edu/classes/uap3344/ISAITInfo/>
4. 1998- Director, Digital Library Research Laboratory, www.dlib.vt.edu

PRIOR:

1. 2009-2012 Member, Personnel Committee, Dept. of Computer Science
2. 2007-2010 Member, Commission on Undergraduate Studies and Policies (CUSP)
3. 2007-2010 Member, Committee on Undergraduate Curricula (CUC)
4. 2007-2010 Member, College of Engineering Undergraduate Curricular Committee
5. 2003-2009 Chair, Undergraduate Program Committee, Dept. of Computer Science
6. 2007-2008 Chair, Search Committee for next Head of Dept. of Computer Science
7. 2005-2007 Member, Personnel Committee, Dept. of Computer Science
8. 2005 Member, Review Committee for Dean of the College of Business
9. 2003-2004 Member, College of Engineering Undergraduate Curriculum Committee
10. 2002-2004 Member, Information Sciences and Technology Advisory Committee of the Administrative Coordinating Council for Engineering, Physical Sciences, and Information Sciences and Technology (ACCEPSIST)
11. 1998-2005 Director, Internet Technology Innovation Center at Virginia Tech (a University Center), <http://fox.cs.vt.edu/itic/>, www.internettic.org
12. 1996-2003 Member, Electronic Thesis and Dissertation Advisory Committee
13. 2003-2004 Member, College of Engineering Executive Committee
14. 2000-2003 Member, Undergraduate Program Committee, Dept. of Computer Science
15. 2001-2002 Member, University Council
16. 1996-2002 Chair, Commission on University Support (2001-2002, Vice chair 2001, member in previous years)
17. 2001 Member, Technical Advisory Group for WPI, meeting 1/19/2001
18. 1999-00 Member, Review Committee for Center for Wireless Telecommunications (CWT)
19. 1997- Member, Personnel Committee of Dept. of Computer Science
20. 1995-99 Member, University Computing and Communications Resources Committee (chair for AY 1995-1996)
21. 1995-99 Coordinator, College of Arts and Sciences, Advanced Communication and Information

Technology Center (ACITC)

22. 1997-98 Member, University Libraries Serials Collection Committee
23. 1996-98 Member, Steering Committee, University Self Study
24. 1996-98 Member, 125th Anniversary Steering Committee
25. 1996-98 Chair, Traditional Students Subcommittee, University Self Study
26. 1995-97 Member, Computing Resources Committee of Dept. of Computer Science
27. 1994-97 Member, Faculty Senate (and chair, 1995-96, of working group on distance learning)
28. 1994-95 Member, University Research Computing Advisory Group
29. 1994-95 Member, Blacksburg Electronic Village Research Advisory Group
30. 1992-95 Member, Executive Committee of Department of Computer Science
31. 1992-93 Faculty advisor, Organization for Student Computing
32. 1991-93 Chair, Search Committee, for Head of Department of Computer Science
33. 1991 Member, Search Committee for Asst. Dean for Engineering Computing
34. 1991 Member, Planning Comm. for 2nd Annual University/Industry Cooperation Conf.
35. 1991 Member, Task Group for Innovations in Teaching: The Information Resources
36. 1990-94 Member (for Arts & Sciences), University's Library Committee
37. 1990-92 Chair, Arts & Sciences' Ad Hoc College Library Committee
38. 1989-93 Member, Scholarly Publications Project subcommittee
39. 1989-92 Chair, Dept. of Computer Science's Computing Resources Committee
40. 1988-95 Member (for Arts & Sciences), University's Communications Resources Committee
41. 1988-89 Member, Dept. of Comp. Science's Graduate Program & Research Activities Comm.
42. 1987-91 Departmental representative, Sigma Xi
43. 1987-90 Member, Arts & Sciences' Ad Hoc College Library Committee
44. 1987-88 Member, PC Selection Committee (selecting CS computer system for requirement)
45. 1987-88 Faculty Counselor for University's Honor System
46. 1983-89 Member, Dept. of Computer Science's Computing Resources Committee, wrote first draft of request for proposal leading to 1985 UNIX requirement for CS students
47. 1986-87 Member, LRC Teaching Learning Grant Committee
48. 1986-87 Member, Computing and Information Services Committee of University Self Study (serving on 2 of the 4 task forces, responsible for helping prepare final report)
49. 1986 Member, review team, CNS Single System Image project
50. 1986 Member, Task Force, Library's role in relation to other units in an electronic campus
51. 1985 Member, Ad Hoc Committee on Library Futures
52. 1983-87 Technical liaison for Virginia Tech to CSNET (proposed joining the Computer Science Network, and coordinated this effort that was taken over in 1987 by CNS, leading to university Internet connection)

SELECTED COURSES TAUGHT:

- **Regular:** Data Structures; Information Storage and Retrieval; Information Systems Project; Intro. to Artificial Intelligence; Intro. to Computer Science; Intro. to Data Base Management Systems, Intro. to LIKES (Living In the KnowlEdge Society), Intro. to Networked Information (team); Multimedia, Hypertext and Information Access; Multimedia Technology and Projects (team)
- **Special Topics:** CD-ROM Publishing and Access, Digital Libraries, Intelligent Multimedia, Information Systems, Interactive Accessibility, Natural Language Processing, Office Information Systems, UNIX/C

PUBLICATIONS:

(with h index of ≥ 41 ; see [The h Index for Computer Science](#))

CD-ROMS (in quantity, among earliest at Virginia Tech):

1. E. Fox, editor and project manager. Virginia Disc One. Produced by Nimbus Records, 1990. Blacksburg VA: VPI&SU Press. Contains about 600 megabytes in about 6000 files of data and DOS executable

programs. ISBN 0-929900-00-6.

2. E. Fox, editor and project manager. Virginia Disc Two. Produced by Nimbus Records, 1990. Blacksburg VA: VPI&SU Press. Contains 2 searchable library catalog collections accessible with MicroVTLS and Personal Librarian. ISBN 0-929900-02-2.
3. E. Fox, editor and project manager. Virginia Disc Three. Produced by Nimbus Records, 1990. Blacksburg VA: VPI&SU Press. Contains about 300 megabytes of data and software of interest for Macintosh systems running the A/UX version of UNIX. ISBN 0-929900-01-4.

VIDEOTAPES:

1. E. Fox, executive producer, script writer. Interactive Digital Video. Five minute preview (Aug. 1989), hour final program (Jan. 1990), supplementing July 1989 Communications of the ACM, produced for ACM Press Database and Electronic Products with assistance from IBM T. J. Watson Research Center (with producer/director Guillermo Pulido).
2. E. Fox, executive producer. Advanced Naval Message Analyzer. Fifteen minute (Nov. 1990) VPI&SU videotape description of results for NSWC contract about the CODER system, producer/director Jim Ruggiero, host/script/graphics Richard Barnhart.

BOOKS:

1. Edward A. Fox, Marcos Andre Goncalves, and Rao Shen. Theoretical Foundations for Digital Libraries: The 5S (Societies, Scenarios, Spaces, Structures, Streams) Approach. Morgan & Claypool Publishers, San Francisco, 2012, ISBN paperback 9781608459100, ebook 9781608459117, DOI 10.2200/S00407ED1V01Y201203CRM004, xxii, 157
2. Rao Shen, Marcos Andre Goncalves, and Edward A. Fox. Key Issues Regarding Digital Libraries: Integration and Evaluation. Morgan & Claypool Publishers, San Francisco, contract for 100-150 pages, expected to appear in Jan. 2013
3. Edward A. Fox, editor. Digital Libraries: A 5S Approach. With its 15 chapters authored with: Monika Akbar, Pranav Angara, Yinlin Chen, Lois M. Delcambre, Noha Elsherbiny, Eric Fouh, Marcos Andre Goncalves, Nadia P. Kozievitch, Spencer Lee, Jonathan Leidig, Lin Tzy Li, Mohamed Magdy Gharib Farag, Uma Murthy, Sung Hee Park, Rao Shen, Venkat Srinivasan, Ricardo da Silva Torres, and Seungwon Yang. 527 page draft textbook, used in VT's Digital Libraries class (CS6604) in Fall 2011, released selectively for review and testing (including in a Villanova DL course), most recent version Feb. 8, 2012
4. Philip S. Yu, Vassilis Tsotras, Edward Fox, and Bing Liu (eds.). Proceedings 15th ACM Conference on Information and Knowledge Management (CIKM 2006), November 6-11, 2006, Arlington, VA, USA, ACM Press, ISBN 1-59593-433-2
5. Fox, E.A.; Neuhold, E.; Premssmit, P.; Wuwongse, V. (Eds.) Digital Libraries: Implementing Strategies and Sharing Experiences; Proceedings 8th International Conference on Asian Digital Libraries, ICADL 2005, Bangkok, Thailand, December 12-15, 2005, Lecture Notes in Computer Science, Vol. 3815, XVII, 529 p., ISBN: 3-540-30850-4, DOI: 10.1007/11599517
6. Zhaoneng Chen, Hsinchun Chen, Qihao Miao, Yuxi Fu, Edward Fox, Ee-Peng Lim, eds. Digital Libraries: International Collaboration and Cross-Fertilization; Proceedings 7th International Conference on Asian Digital Libraries, ICADL 2004, Shanghai, Dec. 2004. Springer, Lecture Notes in Computer Science 3334, ISBN 3-540-24030-6.
7. Edward A. Fox, Shahrooz Feizbadi, Joseph M. Moxley, and Christian R. Weissner, eds., Electronic Theses and Dissertations: A Sourcebook for Educators, Students, and Librarians, New York: Marcel Dekker, April 2004, ISBN 0-8247-0973-X
8. Ee-Peng Lim, Schubert Foo, Chris Khoo, Hsinchun Chen, Edward Fox, Shalini Urs, Thanos Constantino, eds. Digital Libraries: People, Knowledge, and Technology; Proceedings 5th International Conference on Asian Digital Libraries, ICADL 2002, Singapore, Dec. 2002. Springer, Lecture Notes in Computer Science 2555.
9. L. Kalinichenko (coordinating author), with working group (D. Atkins, E. Fox, D. Fulker, Y. Ioannidis, S. Koernig, B. Ludascher, M. Marlino, P. Savino, N. Seshagiri, T. Sumner, M. Wright). Digital Libraries in

- Education: Analytical Survey. UNESCO Institute for Information Technologies in Education, 2003, Moscow, 68 pages, http://www.iite.ru/img/upload/Digital_Libraris.pdf
10. Joseph M. Moxley, Diane Masiello, and E. Fox, eds., *The Guide for Electronic Theses and Dissertations*, over 425 pages, completed in English in 2001, translated into French and Spanish in 2002, and in process for later translation into a number of other languages, funded in part and made available by UNESCO as book and web site (www.etdguide.org), 2001-2002; in 2008 updated and converted for inclusion in Wikibooks at http://en.wikibooks.org/wiki/ETD_Guide
 11. C. Borgman and E. Fox. *Proceedings of the First ACM/IEEE-CS Joint Conference on Digital Libraries, JCDL'2001*, Hotel Roanoke, Roanoke, VA, June 24-28, 2001
 12. E. Fox, N. Rowe, and D. Watkins, eds., *Proceedings of the Fourth ACM International Conference on Digital Libraries, DL'99*, Berkeley, CA, Aug. 11-14, 1999.
 13. A. Cardenas, W. Chu, and E. Fox, eds. *Proceedings of the NSF Information and Data Management Workshop*, UCLA, Los Angeles, March 7-9, 1999.
 14. E. Fox and G. Marchionini, eds., *Proceedings of the First ACM International Conference on Digital Libraries, DL'96*, Bethesda, MD, March 20-23, 1996.
 15. E. Fox, P. Ingwersen, R. Fidel, eds., *Proceedings SIGIR'95*, 18th International Conference on Research and Development in Information Retrieval, New York: ACM Press, 1995.
 16. E. Fox, ed. *Sourcebook on Digital Libraries: Report for the National Science Foundation*, TR-93-35, VPI&SU Computer Science Dept., Dec. 1993, Blacksburg, VA. Available by anonymous FTP from directory [pub/DigitalLibrary](ftp://pub/DigitalLibrary) on fox.cs.vt.edu, over 400 pages, <ftp://fox.cs.vt.edu/pub/DigitalLibrary/>

JOURNAL/MAGAZINE ARTICLES:

1. Murthy, U., Hallerman, E., Fox, E.A., Torres, R., Tzy Li, L., Chen, Y., Kozievitch, N., Orth, D. J., Andrade, F., Falcao, T., Ramos, E. SuperIDR: A tool for fish identification and information retrieval. *Fisheries*, a journal managed by Taylor & Francis, in press
2. Kozievitch, N. P.; Almeida, J. G. A.; Torres, R. da S.; Santanche, A.; Leite, N. J.; Murthy, U.; Fox, E.A. Reusing a Compound-Based Infrastructure for Searching and Annotating Video Stories. *International Journal of Multimedia Technology*, in press
3. Kavanaugh, A.L., Fox, E.A., Sheetz, S.D., Yang, S., Li, L.T., Whalen, T., Shoemaker, D. J., Natsev, P., Xie L. Social Media Use by Government: From the Routine to the Critical. *Government Information Quarterly (GIQ)* 29(4): 480-491, <http://dx.doi.org/10.1016/j.giq.2012.06.002>
4. Davinia Hernandez-Leo, Monika Akbar, Deborah Tatar, and Edward A. Fox. Social tools for educators: supporting the needs of specific communities. *IEEE Learning Technology Newsletter* Vol. 14, Issue 2, April 2012, special theme section on "Social Networks and Social Computing in Technology-Enhanced Learning", 2012, <http://www.ieeetclt.org/issues/april2012/IEEE-LT-Apr2012.htm>
5. N.J. Short, A. Lynn Abbott, M.S. Hsiao, E.A. Fox. Reducing descriptor measurement error through Bayesian estimation of fingerprint minutia location and direction. *IET Biometrics*, a journal of The Institution of Engineering and Technology, 1(1): 82-90, 2012. <http://dx.doi.org/10.1049/iet-bmt.2011.0010>
6. Edward A. Fox. Constructivist Learning with Modularization, Personalization, and Teams. In *Pedagogy in Practice*, a magazine of Virginia Tech's Center for Instructional Development and Educational Research (CIDER), Blacksburg, VA, Spring 2012, 14-15
7. Nadia P. Kozievitch, Jurandy Almeida, Ricardo da S. Torres, Neucimar A. Leite, Marcos A. Goncalves, Uma Murthy, Edward A. Fox. Towards a Formal Theory for Complex Objects and Content-Based Image Retrieval. *Journal of Information and Data Management*, 2(3): 321-336 (Oct. 2011), <http://seer.lcc.ufmg.br/index.php/jidm/article/view/142>
8. Nadia P. Kozievitch, Ricardo da S. Torres, A. Santanche, D.C.G. Pedronette, R.T. Calumby, Edward A. Fox. An Infrastructure for Searching and Harvesting Complex Image Objects. *Information Interaction Intelligence Journal*, 11(2): 39-68, 2011. <http://www.irit.fr/journal-i3/volume11/numero02/>
9. Delcambre, L. Archer, D., Price, S., Britell, S. Murthy, U., Fox, E. A., and Cassel, C. 2011. Superimposing a strand map over lectures and textbook content (in a database class). *Journal of Computing Sciences in College*. 27(1), 143-151.
10. Leonardo Candela, Donatella Castelli, Edward A. Fox and Yannis Ioannidis. On Digital Library Foundations. *International Journal on Digital Libraries (IJDL)* 11(1): 37-39, March 2010,

- <http://www.springerlink.com/content/r467157673711028/fulltext.pdf>
11. Jeffrey Pomerantz, Barbara M. Wildemuth, Sanghee Oh, Seungwon Yang, and Edward A. Fox. Evaluation of a Curriculum for Digital Libraries. *Bulletin of IEEE Technical Committee on Digital Libraries (TCDL Bulletin)*, 5(1), Spring 2009, <http://www.ieee-tcdl.org/Bulletin/v5n1/Pomerantz/pomerantz.html>
 12. Venkat Srinivasan, Edward A. Fox. Global Science and Technology Assessment by Analysis of Large Collections of Electronic Dissertations, in Hsinchun Chen, Ronald N. Kostoff, Chaomei Chen, Jian Zhang, Michael S. Vogeley, Katy Borner, Nianli Ma, Russell J. Duhon, Angela Zoss, Venkat Srinivasan, Edward A. Fox, Christopher C. Yang, Chih-Ping Wei, "AI and Global Science and Technology Assessment," *IEEE Intelligent Systems*, 24(4): 68-88, July/August, 2009 <http://www.computer.org/portal/web/csdl/magazines/intelligent#4>
 13. Barbara L. Moreira, Marcos Andre Goncalves, Alberto H.F. Laender, and Edward A. Fox. Automatic Evaluation of Digital Libraries with 5SQual. *Journal of Informetrics*, 3(2): 102-123, April 2009, linked from <http://www.sciencedirect.com/science/journal/17511577>
 14. R. S. Torres, A. Falcao, M. A. Goncalves, J. P. Papa, B. Zhang, W. Fan, and E. A. Fox. A genetic programming framework for content-based image retrieval, *Pattern Recognition*, 42(2): 283-292, Feb. 2009, doi:10.1016/j.patcog.2008.04.010
 15. Rao Shen, Naga Srinivas Vemuri, Weiguo Fan, Edward A. Fox. Integration of Complex Archaeology Digital Libraries: An ETANA-DL Experience. *Information Systems*. 33(7-8): 699-723, Nov.-Dec. 2008, DOI: <http://dx.doi.org/10.1016/j.is.2008.02.006>
 16. Edward A. Fox. Porque ETDs? *Boletim de Teses e Dissertacoes Eletronicas* 3, Numero 3, 17 Nov. 2008, <http://www.maxwell.lambda.ele.puc-rio.br/index.php?msg=22>
 17. W. Ryan Richardson, Venkat Srinivasan, and Edward A. Fox. Knowledge Discovery in Digital Libraries of Electronic Theses and Dissertations: An NDLTD Case Study. *Int. J. Digital Libraries*, 9(2):163-171, Nov. 2008, <http://www.springerlink.com/content/w3182840w7j17117/>
 18. Barbara M. Wildemuth, Jeffrey Pomerantz, Sanghee Oh, Seungwon Yang, and Edward A. Fox. A Digital Libraries Curriculum: Expert Review and Field Testing. *D-Lib Magazine*, 14(7/8), July/August 2008, doi:10.1045/july2008-inbrief
 19. Heines, J. M., Goldman, K. J., Jeffers, J., Fox, E. A., and Beck, R. 2008. Interdisciplinary approaches to revitalizing undergraduate computing education. *J. Comput. Small Coll.* 23, 5 (May. 2008), 68-72.
 20. Marcos Andre Goncalves, Edward A. Fox, and Layne T. Watson. Towards a Digital Library Theory: A Formal Digital Library Ontology. *Int. J. Digital Libraries* 8(2): 91-114, April 2008, DOI: 10.1007/s00799-008-0033-1
 21. Edward A. Fox, Christopher Andrews, Weiguo Fan, Jian Jiao, Ananya Kassahun, Szu-Chia Lu, Yifei Ma, Chris North, Naren Ramakrishnan, Angela Scarpa, Bruce H. Friedman, Steven D. Sheetz, Donald Shoemaker, Venkat Srinivasan, Seungwon Yang, & Laura Boutwell, A Digital Library for Recovery, Research, and Learning from April 16, 2007 at Virginia Tech. *Traumatology*, 14(1): 64-84 (2008), DOI: 10.1177/1534765608315632
 22. Donatella Castelli & Edward Fox. (2007). In Brief: Series of Workshops on Digital Library Foundations. *D-Lib Magazine* 12(9). <http://www.dlib.org/>
 23. Marcos Andre Goncalves, Barbara L. Moreira, Edward A. Fox, and Layne T. Watson. "What is a good digital library?" - A quality model for digital libraries. *Information Processing and Management*, Volume 43, Issue 5, September 2007, Pages 1416-1437, <http://dx.doi.org/10.1016/j.ipm.2006.11.010>
 24. Jeffrey Pomerantz, Sanghee Oh, Seungwon Yang, Edward A. Fox, and Barbara M. Wildemuth. The Core: Digital Library Education in Library and Information Science Programs. *D-Lib Magazine*, Nov. 2006 (Vol. 12 No. 11), <http://www.dlib.org/dlib/november06/pomerantz/11pomerantz.html>
 25. Edward A. Fox, Seungwon Yang, Seonho Kim. ETDs, NDLTD, and Open Access: A 5S Perspective. *Ciencia da Informacao* (leading journal of library and information science in Brazil), 35(2), May/Aug. 2006, ISSN 0100-1965, Brasilia
 26. Pomerantz, J., Wildemuth, B. M., Oh, S., Yang, S., & Fox, E. A. (2006). Briefing: Digital libraries curriculum development. *D-Lib Magazine* 12(7/8). <http://www.dlib.org/dlib/july06/07inbrief.html#POMERANTZ>
 27. Edward A. Fox, A Forward-Looking European Digital Library? Hence 5S?. Invited article for *ERCIM News*, No. 66 (http://www.ercim.org/publication/Ercim_News/enw66/), July 2006, pp. 16-17
 28. Byron B. Marshall, Hsinchun Chen, Rao Shen, and Edward A. Fox. Moving digital libraries into the

- student learning space: the GetSmart experience. *ACM Journal on Educational Resources in Computing (JERIC)*, 6(1), 2006, <http://doi.acm.org/10.1145/1217862.1217864> (March, but published late in 2006)
29. Edward A. Fox, Fernando Das Neves, Xiaoyan Yu, Rao Shen, Seonho Kim, and Weiguo Fan. Exploring the computing literature with visualization and stepping stones & pathways. *Communications of the ACM (CACM)*, 49(4): 52-58, April 2006
 30. Ricardo da S. Torres, Claudia Bauzer Medeiros, Marcos Andre Goncalves, and Edward A. Fox. A Digital Library Framework for Biodiversity Information Systems. *International Journal on Digital Libraries*, Special issue on Multimedia Contents and Management in Digital Libraries, 6(1): 3-17, Feb. 2006, ISSN: 1432-5012 (Paper) 1432-1300 (Online), <http://dx.doi.org/10.1007/s00799-005-0124-1>
 31. Xiaoyan Yu, Fernando Das-Neves, and Edward A. Fox. Hard Queries can be Addressed with Query Splitting Plus Stepping Stones and Pathways. *Bulletin of the IEEE Computer Society Technical Committee on Data Engineering*, 28(4): 29-38, December 2005, <http://sites.computer.org/debull/A05dec/yu.pdf>
 32. Yannis Ioannidis, David Maier, Serge Abiteboul, Peter Buneman, Susan Davidson, Edward Fox, Alon Halevy, Craig Knoblock, Fausto Rabitti, Hans Schek and Gerhard Weikum. Digital library information-technology infrastructures. *International Journal on Digital Libraries* 5(4): 266-274, <http://dx.doi.org/10.1007/s00799-004-0094-8>
 33. Edward A. Fox and Elisabeth Logan. An Asian Digital Libraries Perspective (intro. by guest editors to special issue with 8 other papers). *Information Processing and Management*, Jan. 2005, 41(1): 1-4.
 34. Morgan, Eric Lease, Jeremy Frumkin, Edward A. Fox, "The OCKHAM Initiative - Building Component-based Digital Library Services and Collections", *D-Lib Magazine*, November 2004 (Vol. 10 No. 11). <http://dlib.org/dlib/november04/11inbrief.html#FOX>
 35. S. Perugini, M. A. Goncalves, and E. A. Fox. Recommender Systems Research: A Connection-Centric Survey. *Journal of Intelligent Information Systems*, Vol. 23(2): 107-143, Sept. 2004.
 36. Weiguo Fan, Edward A. Fox, Praveen Pathak, and Harris Wu. The effects of fitness functions on genetic programming-based ranking discovery for web search, *Journal of the American Society for Information Science and Technology (JASIST)*, 2004, 55(7): 628-636.
 37. M. Goncalves, E. Fox, L. Watson, N. Kipp. Streams, Structures, Spaces, Scenarios, Societies (5S): A Formal Model for Digital Libraries. *ACM Transactions on Information Systems*, April 2004, 22(2): 270-312.
 38. Hussein Suleman, Edward A Fox, Rohit Kelapure, Aaron Krowne, Ming Luo. Building digital libraries from simple building blocks, *Online Information Review* Volume 27 Number 5, Oct. 2003, 301-310, <http://oberon.emeraldinsight.com/vl=1389995/cl=44/nw=1/rpsv/cgi-bin/linker?ini=emerald&reqidx=/cw/mcb/14684527/v27n5/s1/p301>.
 39. H. Suleman and E. Fox. Leveraging OAI Harvesting to Disseminate Theses. *Library Hi Tech*, 21(2): 219-227, 2003, issue table of contents: <http://www.emeraldinsight.com/0737-8831.htm>.
 40. E. Fox, R. Moore, R. Larsen, S. Myaeng, S. Kim. Toward a Global Digital Library: Generalizing US-Korea Collaboration on Digital Libraries. *D-Lib Magazine*, Oct. 2002, 8(10), <http://www.dlib.org/dlib/october02/fox/10fox.html>
 41. E. Fox, M. Goncalves, G. McMillan, J. Eaton, A. Atkins, and N. Kipp. The Networked Digital Library of Theses and Dissertations: Changes in the University Community. In special issue on "Information Technology and Educational Change" of *The Journal of Computing in Higher Education*, 13(2): 3-24, Spring 2002.
 42. Hussein Suleman and Edward Fox. The Open Archives Initiative: Realizing Simple and Effective Digital Library Interoperability. In special issue on "Libraries and Electronic Resources: New Partnerships, New Practices, New Perspectives" of *J. Library Automation*, 35(1/2):125-145, 2002.
 43. M. Goncalves and E. Fox. Technology and Research in a Global Networked University Digital Library (NUDL). *Ciencia da Informacao* (leading journal of library and information science in Brazil), 30(3): 13-23, Sep./Dec. 2001.
 44. Hussein Suleman and Edward A. Fox. A Framework for Building Open Digital Libraries. *D-Lib Magazine*, 7(12), Dec. 2001, <http://www.dlib.org/dlib/december01/suleman/12suleman.html>
 45. Hussein Suleman, Anthony Atkins, Marcos A. Goncalves, Robert K. France, and Edward A. Fox, Virginia Tech; Vinod Chachra and Murray Crowder, VTLS, Inc.; and Jeff Young, OCLC. Networked Digital Library of Theses and Dissertations: Bridging the Gaps for Global Access - Part 1: Mission and Progress. *D-Lib Magazine*, 7(9), Sept. 2001, <http://www.dlib.org/dlib/september01/suleman/09suleman-pt1.html>

46. Hussein Suleman, Anthony Atkins, Marcos A. Goncalves, Robert K. France, and Edward A. Fox, Virginia Tech; Vinod Chachra and Murray Crowder, VTLS, Inc.; and Jeff Young, OCLC. Networked Digital Library of Theses and Dissertations: Bridging the Gaps for Global Access - Part 2: Services and Research. *D-Lib Magazine*, 7(9), Sept. 2001, <http://www.dlib.org/dlib/september01/suleman/09suleman-pt2.html>
47. E. Fox and G. Marchionini. Digital Libraries: Extending Traditional Values. Guest Editors' Introduction to special section on Digital Libraries. *Commun. of the ACM*, 44(5):30-32, May 2001, <http://doi.acm.org/10.1145/374308.374329>
48. L. Cassel and E. Fox. Introducing the ACM Journal of Educational Resources in Computing (JERIC), editor-in-chiefs' introduction. 1(1), March 2001, <http://doi.acm.org/10.1145/376697.382399>
49. E. Fox. Short pieces (In Brief) in *D-Lib Magazine* (www.dlib.org):
 - o Suzie Allard and Edward A. Fox. The 4th International Conference of Asian Digital Libraries (ICADL 2001): "Digital Libraries: Dynamic Landscapes for Knowledge Creation, Access and Management", December 10-12, 2001, Bangalore, India,
 - o Fox, Edward A., A Sustainable, OAI-Based Implementation of NCSTRL, <http://www.dlib.org/dlib/september01/09inbrief.html#FOX-IB>
 - o Fox, Edward A., Open Archives Initiative, <http://www.dlib.org/dlib/june00/06inbrief.html#FOX>
 - o Fox, Edward A., First ACM/IEEE CS Joint Conference on Digital Libraries Announced, <http://www.dlib.org/dlib/june00/06inbrief.html#FOX2>
 - o Fox, Edward A., Fernando Adrian Das Neves, Robert France, Marcos Goncalves, and Hussein Suleman, Digital Libraries 2000, Fifth ACM Conference on Digital Libraries, <http://www.dlib.org/dlib/july00/07inbrief.html#FOX>
50. E. Fox. The Digital Libraries Initiative: Update and Discussion. Guest editor's introduction to Special Section. *Bulletin of the American Society of Information Science*, 26(1):7-11, Oct/Nov 1999
51. Rekha Kengeri, Cheryl D. Seals, Hope D. Harley, Himabindu P. Reddy, Edward A. Fox: Usability study of digital libraries: ACM, IEEE-CS, NCSTRL, NDLTD. *Int J Digit Libr* 2 (1999) 2/3, 157-169, <http://link.springer.de/link/service/journals/00799/bibs/9002002/90020157.htm>
52. E. Fox. Networked Digital Library of Theses and Dissertations, *Nature Web Matters*, <http://helix.nature.com/webmatters/>, invited short essay, 12 August 1999, <http://helix.nature.com/webmatters/library/library.html>
53. G. Marchionini and E. Fox. Progress toward digital libraries: augmentation through integration. Guest editors' introduction to Special Issue: Progress Toward Digital Libraries, *Information Processing & Management*, 1999, 35(3): 219-225.
54. E. Fox. Networked Digital Library of Theses and Dissertations, *ERCIM News* No. 35, October 1998, http://www.ercim.org/publication/Ercim_News/enw35/fox.html
55. B. Liu and E. Fox. Web Traffic Latency: Characteristics and Implications. *Journal of Universal Computer Science*, 4(9), Sept. 1998, http://www.iicm.edu/jucs_4_9/web_traffic_latency_characteristics
56. J. Powell and E. Fox. Multilingual Federated Searching Across Heterogeneous Collections, *D-Lib Magazine*, The Magazine of Digital Library Research, ISSN 1082-9873, Sep. 1998, <http://www.dlib.org/dlib/september98/powell/09powell.html>
57. E. Fox, N. Kipp, and P. Mather. How Digital Libraries Will Save Civilization. *Database Programming & Design*, 11(8):60-65, Aug. 1998, See also online Suggested Resources <http://www.dbpd.com/foxweb.html>
58. E. Fox and G. Marchionini. Toward a Worldwide Digital Library. Guest Editors' Introduction to special section (pp. 28-98) on Digital Libraries: Global Scope, Unlimited Access. *Commun. of the ACM*, Apr. 1998, 41(4): 28-32. <http://purl.lib.vt.edu/dlib/pubs/CACM199804>
59. E. Fox. Networked Digital Library of Theses and Dissertations: An International Collaboration Promoting Scholarship. *ICSTI Forum*, Quarterly Newsletter of the International Council for Scientific and Technical Information, No. 26: 8-9, Nov. 1997.
60. E. Fox, R. Hall, and N. Kipp. NDLTD: Preparing the Next Generation of Scholars for the Information Age. *The New Review of Information Networking (NRIN)*, 3: 59-76, 1997.
61. E. Fox, Robert Hall, Neill A. Kipp, John L. Eaton, Gail McMillan, and Paul Mather. NDLTD: Encouraging International Collaboration in the Academy. In Special Issue on Digital Libraries, *DESIDOC Bulletin of Information Technology (DBIT)*, 17(6): 45-56, Nov. 1997.
62. E. Fox, J. Eaton, G. McMillan, N. Kipp, P. Mather, T. McGonigle, W. Schweiker, and B. DeVane. Networked Digital Library of Theses and Dissertations: An International Effort Unlocking University Resources. *D-Lib Magazine*, The Magazine of Digital Library Research, ISSN 1082-9873, Sep. 1997,

- <http://www.dlib.org/dlib/september97/theses/09fox.html>
63. E. Fox, J. Eaton, G. McMillan, N. Kipp, L. Weiss, E. Arce, S. Guyer. National Digital Library of Theses and Dissertations: A Scalable and Sustainable Approach to Unlock University Resources. D-Lib Magazine, The Magazine of Digital Library Research, ISSN 1082-9873, Sep. 1996, <http://www.dlib.org/dlib/september96/theses/09fox.html>
 64. J. N. Guidi and E. A. Fox. Information Retrieval and Genomics - An Introduction. Computers in Biology and Medicine, Pergamon, Guest Editor Intro. to Special Issue, 26(3): 179-182, May 1996.
 65. S. Chen and E. Fox. Guest Editors' Introduction to Special Issue on Digital Libraries, Journal of Visual Communication and Image Representation, 7(1), March 1996, Academic Press.
 66. C. Crouch, M. McGill, M. Lesk, K.S. Jones, E. Fox, D. Harman, and D. Kraft. In Memoriam - Gerard Salton, March 8, 1927 - August 28, 1995. Journal of the American Society for Information Science (JASIS), 1996, 47(2): 108-115.
 67. E. Fox and L. Kieffer. Multimedia Curricula, Courses and Knowledge Modules, ACM Computing Surveys, Dec. 1995, 27(4): 549-551.
 68. F. Can, E. Fox, C. Snively, and R. France. Incremental Clustering for Very Large Document Databases: Initial MARIAN Experience. Information Systems, 84:101-114, 1995.
 69. W. C. Dougherty and E. A. Fox. TULIP at Virginia Tech. Library Hi Tech, 13(4): 54-60, 1995.
 70. E. Fox. Hypermedia Support for a Digital Library in CS. SIGLINK Newsletter, Sept. 1995, 4(2), Special Issue on Digital Libraries.
 71. N. J. Belkin, P. Kantor, E. A. Fox and J. A. Shaw. Combining the Evidence of Multiple Query Representations for Information Retrieval. Information Processing & Management, 31(3), 431-448, May-June 1995.
 72. E. Fox, R. Akscyn, R. Furuta, and J. Leggett. Guest Editors' Introduction to Digital Libraries. Commun. of the ACM, Apr. 1995, 38(4):22-28.
 73. E. Fox. World-Wide Web and Computer Science Reports. Commun. of the ACM, Apr. 1995, 38(4):43-44.
 74. L. Heath, D. Hix, L. Nowell, W. Wake, G. Averbach, and E. Fox. Envision: A User-Centered Database from the Computer Science Literature. Commun. of the ACM, Apr. 1995, 38(4):52-53.
 75. J. French, E. Fox, K. Maly, and A. Selman. Wide Area Technical Report Service --- technical reports online. Commun. of the ACM, Apr. 1995, 38(4):45.
 76. E. Fox. SIGIR. ACM Computing Surveys, March 1995, 27(1):130-132.
 77. L. W. Carstensen, Jr., C. A. Shaffer, R. W. Morrill, E. A. Fox. GeoSim: A GIS-Based Simulation Laboratory for Introductory Geography. Journal of Geography, 1993, 92(5): 217-222. Winner of Best Article Related to Teaching in a University or College award from all articles in this National Council for Geographic Education's journal, May'92-April'94.
 78. E. Fox. Digital Libraries ("hot topics" section), IEEE Computer, Nov. 1993, 26(11): 79-81.
 79. E. Fox and L. Lunin. Introduction and Overview to Perspectives on Digital Libraries. Journal of the American Society for Information Science (JASIS), Sept. 1993, 44(8): 441-443. (Guest editor's introduction to special issue)
 80. E. Fox, D. Hix, L. Nowell, D. Brueni, W. Wake, L. Heath, and D. Rao. Users, User Interfaces, and Objects: Envision, a Digital Library. Journal of the American Society for Information Science (JASIS), Sept. 1993, 44(8): 480-491.
 81. E. A. Fox, L. S. Heath, Q.-F. Chen, and A. M. Daoud. Practical Minimal Perfect Hash Functions for Large Databases. Commun. of the ACM, Jan. 1992, 35(1): 105-121.
 82. E. Fox. Advances in Interactive Digital Multimedia Systems. IEEE Computer, Oct. 1991, 24(10): 9-21. Reprinted in Readings in Groupware and Computer Supported Cooperative Work, ed. Ron Baecker, Morgan Kaufmann, San Mateo, CA, 1993, 342-354 and as Chapter 1 of Multimedia Computing: Preparing for the 21st Century, ed. Sorel Reisman, Idea Group Publishing, Harrisburg, PA, 1994, 3-33.
 83. A. Siochi, E.A. Fox, D. Hix, E.E. Schwartz, A. Narasimhan, and W. Wake. The Integrator: A prototype for flexible development of interactive digital multimedia applications. Interactive Multimedia, July-Sept. 1991, 2(3): 5-26.
 84. E. Fox, Q.-F. Chen, A. Daoud, and L. Heath. Order-Preserving Minimal Perfect Hash Functions and Information Retrieval. ACM Transactions on Information Systems, July 1991, 9(3), 281-308.
 85. E. Fox. Standards and the Emergence of Digital Multimedia Systems. Commun. of the ACM, Apr. 1991, 34(4):26-29. Guest ed. intro., Special Section on Digital Multimedia.
 86. J.T. Nutter, E.A. Fox, and M.W. Evens. Building a Lexicon from Machine-Readable Dictionaries for

- Improved Information Retrieval. *Literary and Linguistic Computing*, 1990, 5(2): 129-138.
87. E. Fox. How to Proceed Toward Electronic Archives and Publishing. *Psychological Science*, Nov. 1990, 1(6): 355-8.
 88. E. Fox and S. Winett, Using Vector and Extended Boolean Matching in an Expert System for Selecting Foster Homes. *Journal of the American Society for Information Science (JASIS)*, 1990, 41(1): 10-26.
 89. M. Weaver, R. France, Q. Chen, E. Fox. Using a Frame-Based Language for Information Retrieval. *Int. Journal of Intelligent Systems*, 1989, 4(3): 223-257.
 90. E. Fox. The Coming Revolution in Interactive Digital Multimedia Systems. *Commun. of the ACM*, 1989, 32(7): 794-801. Guest ed. intro. Spec. Section on Interactive Technologies.
 91. E. Fox. Research and Development of Information Retrieval Models and their Application. *Information Processing and Management (IP&M)*, 1989, 25(1): 1-5. Guest editor's introduction to Special Issue on Information Retrieval Models and their Application.
 92. E. Fox. ACM Press Database and Electronic Products -- New Services for the Information Age. *Commun. of the ACM*, Aug. 1988, 31(8): 948-951.
 93. E. Fox and M. Koll. Practical Enhanced Boolean Retrieval: Experiences with the SMART and SIRE Systems. *IP&M*, 24(3): 257-267, 1988.
 94. E. Fox and M. Weaver. Highlights of CD-ROM Hardware. *The Laserdisk Professional*, May 1988, 1(1): 18-27.
 95. E. Fox, M. Weaver, and N. Herther. Optical Laser Technology -- A Glossary of Basic Terms. *Laserdisk Professional*, May 1988, 1(1): 102-103.
 96. E. Fox. Testing the Applicability of Intelligent Methods for Information Retrieval. *Information Services and Use*, 1987, 7: 119-138.
 97. E. Fox. Development of the CODER System: A Testbed for Artificial Intelligence Methods in Information Retrieval. *IP&M*, 1987, 23(4): 341-366.
 98. E. Fox and R. France. Architecture of an Expert System for Composite Document Analysis, Representation and Retrieval. *International Journal of Approximate Reasoning*, 1987, 1(2):151-175. Reprinted in *Readings in Information Retrieval*, eds. K.S. Jones and P. Willett San Francisco: Morgan Kaufmann, 1999
 99. M. Tischler and E. Fox. An Expert System for Selecting Liquid Chromatographic Separation Methods. *Computers and Chemistry*, 1987, 11(4): 235-240.
 100. N. Belkin, C. Borgman, H. Brooks, T. Bylander, W. Croft, P. Daniels, S. Deerwester, E. Fox, P. Ingwersen, R. Rada, K. Sparck Jones, R. Thompson, and D. Walker. Distributed Expert-Based Information Systems: An Interdisciplinary Approach. *IP&M*, 1987, 23(5): 395-409.
 101. E. Fox and S. Birch. UNIX Micros for Students Majoring in Computer Science and Personal Information Retrieval. *Microcomputers for Information Management*, 1986, 3(1): 15-29.
 102. G. Salton, E. Fox, and E. Voorhees. Advanced Feedback Methods in Information Retrieval. *JASIS*, 1985, 36(3): 200-210.
 103. G. Salton, E. Voorhees, and E. Fox. A Comparison of Two Methods for Boolean Query Relevance Feedback. *IP&M*, 1984, 20(5-6): 637-651.
 104. G. Salton, E. Fox, and H. Wu. Extended Boolean Information Retrieval. *Communications of the ACM*, 1983, 26(11): 1022-1036.
 105. G. Salton, C. Buckley, and E. Fox. Automatic Query Formulations in Information Retrieval. *JASIS*, 1983, 34(4): 262-280.

BOOK CHAPTERS:

1. Edward A. Fox, Monika Akbar, Sherif Hanie El Meligy Abdelhamid, Noha Ibrahim Elsherbiny, Mohamed Magdy Gharib Farag, Fang Jin, Jonathan P. Leidig, Sai Tulasi Neppali Digital Libraries. In *Computing Handbook Vol. 2 (Information Systems and Information Technology)*, Section 3, ed. by Heikki Topi, Chapman & Hall/CRC Press, Taylor and Francis Group, accepted to appear in 2013
2. Nadia P. Kozievitch, Ricardo da Silva Torres, Edward A. Fox, Sung Hee Park, Nathan Short, Lynn Abbott, Supratik Misra, Michael Hsiao: Rethinking fingerprint evidence through integration of very large digital libraries. In: Castelli, D., Ioannidis, Y., Manghi, P., Pagano, P., Ross, S. (eds.). *Proceedings of the Second DL.org Workshop on Making DLs Interoperable: Challenges & Approaches (MDLI2010)* and *Proceedings of the Third Workshop on Very Large Digital Libraries (VLDL2010)*, In conjunction with

- the European Conference on Digital Libraries 2010, Glasgow, Scotland (UK), 10th of September 2010, Springer LNCS
3. George Athanasopoulos, Katerina El Raheb, Edward Fox, George Kakalettris, Natalia Manola, Carlo Meghini, Andreas Rauber, and Dagobert Soergel. Framework for Digital Library Function Description, Publication, and Discovery: A prerequisite for interoperable digital libraries. In: Castelli, D., Ioannidis, Y., Manghi, P., Pagano, P., Ross, S. (eds.). Proceedings of the Second DL.org Workshop on Making DLs Interoperable: Challenges & Approaches (MDLI2010) and Proceedings of the Third Workshop on Very Large Digital Libraries (VLDL2010). In conjunction with the European Conference on Digital Libraries 2010, Glasgow, Scotland (UK), 10th of September 2010, Springer LNCS
 4. Jonathan Leidig, Edward A. Fox, Madhav Marathe, and Henning Mortveit. Epidemiology Experiment and Simulation Management through Schema-Based Digital Libraries. In: Castelli, D., Ioannidis, Y., Manghi, P., Pagano, P., Ross, S. (eds.). Proceedings of the Second DL.org Workshop on Making DLs Interoperable: Challenges & Approaches (MDLI2010) and Proceedings of the Third Workshop on Very Large Digital Libraries (VLDL2010), In conjunction with the European Conference on Digital Libraries 2010, Glasgow, Scotland (UK), 10th of September 2010, Springer LNCS
 5. Edward A. Fox and Noha ElSherbiny. Security and Digital Libraries. Chapter 8 in "Digital Libraries: Methods and Applications", ed. Kuo Hung Huang, ISBN 978-953-307-203-6. InTech, Rijeka, Croatia. Free online from www.intechopen.com. 2011, pp. 151-160
 6. Seungwon Yang, Sanghee Oh, Barbara M. Wildemuth, Jeffrey P. Pomerantz, and Edward A. Fox. Educational Resource Development for Information Retrieval in a Digital Libraries Context. Chapter 14 in Efthimis N. Efthimiadis, Juan Manuel Fernandez-Luna, Juan F. Huete, Andrew MacFarlane, eds., Teaching and Learning in Information Retrieval, 2011, Berlin: Springer Verlag, ISSN 1387-5264, ISBN 978-3-642-22510-9, 199-212
 7. Edward Fox, Uma Murthy, Seungwon Yang, Ricardo da S. Torres, Javier Velasco-Martin, and Gary Marchionini. Pedagogical Enhancements for Information Retrieval Courses. Chapter 4 in Efthimis N. Efthimiadis, Juan Manuel Fernandez-Luna, Juan F. Huete, Andrew MacFarlane, eds., Teaching and Learning in Information Retrieval, 2011, Berlin: Springer Verlag, ISSN 1387-5264, ISBN 978-3-642-22510-9, 47-60
 8. Edward A. Fox, Venkat Srinivasan, and Gail McMillan. Electronic Theses and Dissertations: Progress, Issues, and Prospects. Chapter 8 in Timothy W. Luke and Jeremy W. Hunsinger, eds., Putting Knowledge to Work & Letting Information Play: The Center for Digital Discourse and Culture, 10th Anniversary book, Dec. 2009, ISBN 978-1-933217-00-0, Virginia Tech, Blacksburg, VA, 126-148
http://www.cddc.vt.edu/10th-book/putting_knowledge_to_work.pdf
 9. Venkat Srinivasan, Seungwon Yang, and Edward A. Fox. Digital Libraries. In Encyclopedia of Database Systems. Eds. Ling Liu and M. Tamer Ozsu. Springer Berlin, 2009, ISBN 978-0-387-35544-3
 10. Rao Shen and Edward A. Fox. Browsing in Digital Libraries. In Encyclopedia of Database Systems. Eds. Ling Liu and M. Tamer Ozsu. Springer Berlin, 2009, ISBN 978-0-387-35544-3
 11. Xiaoyan Yu, Manas Tungare, Weiguo Fan, Manuel Perez-Quinones, Edward A. Fox, William Cameron, Lillian Cassel: Automatic Genre-specific Text Classification. In Encyclopedia of Data Warehousing and Mining (2nd edition), edited by John Wang, Idea Group Inc., 2008
 12. Xiaoyan Yu, Manas Tungare, Weiguo Fan, Yubo Yuan, Manuel Perez-Quinones, Edward A. Fox, William Cameron, Lillian Cassel: Automatic Syllabus Classification using Support Vector Machines. In Handbook of Research on Text and Web Mining Technologies, edited by Min Song, Yi-Fang Wu, Idea Group Inc., 2008
 13. Seungwon Yang, Barbara M. Wildemuth, Jeffrey P. Pomerantz, Sanghee Oh and Edward A. Fox. Core Topics in Digital Library Education. In Handbook of Research on Digital Library: Design, Development, and Impact (ISBN 978-1-59904-879-6), eds. Ying-Leng Theng, Schubert Foo, Dion Hoe-Lian Goh, and Jin-Cheon Na, Publisher: IGI Global, 2009
 14. Baoping Zhang, Weiguo Fan, Yuxin Chen, Edward A. Fox, Marcos Andre Goncalves, Marco Cristo and Pavel Calado. A Genetic Programming Approach for Combining Structural and Citation-Based Evidence for Text Classification in Web Digital Libraries. In Soft Computing in Web Information Retrieval: Models and Applications, in series: Studies in Fuzziness and Soft Computing, Vol. 197, Herrera-Viedma, Enrique; Pasi, Gabriella; Crestani, Fabio (Eds.), Jan. 2006, pp. 65-83, ISBN: 3-540-31588-8, http://dx.doi.org/10.1007/3-540-31590-X_4.
 15. Edward A. Fox, Hussein Suleman, Ramesh C. Gaur, Devika P. Madali. Design Architecture: An

- Introduction and Overview. Chapter II (pages 22-37) in *Design and Usability of Digital Libraries: Case Studies in the Asia Pacific*, eds. Yin-Leng Theng and Schubert Foo, Hersey, PA: Idea Group Inc., 2005
16. Edward A. Fox, Marcos Andre Goncalves, and Rao Shen. The Role of Digital Libraries in Moving Toward Knowledge Environments. Invited chapter in "From Integrated Publication and Information Systems to Information and Knowledge Environments: Essays Dedicated to Erich J. Neuhold on the Occasion of His 65th Birthday", eds. Matthias Hemmje, Claudia Niederee, and Thomas Risse, *Lecture Notes in Computer Science*, Volume 3379, Jan. 2005, pp. 96-106, Springer-Verlag GmbH, <http://www.springerlink.com/openurl.asp?genre=article&issn=0302-9743&volume=3379&spage=96>
 17. Fox, E., Suleman, H., Madalli, D., Cassel, L. Digital Libraries. Invited chapter 4 for "Practical Handbook of Internet Computing", in Munindar P. Singh ed., Chapman Hall & CRC Press, Baton Rouge, 2004, ISBN 1-584-88381-2
 18. Fox, E., McMillan, G., Suleman, H., Goncalves, M., and Luo, M., Networked Digital Library of Theses and Dissertations (NDLTD). In "Digital Libraries: Policy, Planning and Practice", eds. Judith Andrews and Derek Law, Hants, England: Ashgate Publishing, ISBN 0-7546-3448-5, 2004, Chapter 11, pp. 167-187
 19. Lee JAN, Impagliazzo J, Cassel L, Fox E, Giles L, Knox D, Perez-Quinones M. Enhancing distance learning using quality digital libraries and CITIDEL. In *Quality Education (at) a Distance*, eds. Davies G, Stacey E. Norwell, MA: Kluwer, pages 61-71, 2003. ISBN: 1-4020-7568-5. Working Conference on Quality Education (AT) a Distance, Geelong, AU, Feb. 3-6. Int Federat Informat Proc 131, TC3, WG3 6
 20. Edward A. Fox, Marcos Andre Goncalves, Ming Luo, Yuxin Chen, Aaron Krowne, Baoping Zhang, Kate McDevitt, Manuel A. Perez-Quinones, Ryan Richardson, Lillian N. Cassel: Harvesting: Broadening the Field of Distributed Information Retrieval. In *Distributed Multimedia Information Retrieval*, Springer-Verlag, SIGIR 2003 Workshop on Distributed Information Retrieval, Toronto, Canada, August 1, 2003, Revised Selected and Invited Papers; *Lecture Notes in Computer Science*, Vol. 2924; Callan, Jamie; Crestani, Fabio; Sanderson, Mark (Eds.), 2004, ISBN: 3-540-20875-5, pages 1-20, <http://www.springerlink.com/index/92W9V810P75U2H41>
 21. Edward A. Fox and Paul Mather. Scalable Storage for Digital Libraries. Chapter 12 in *Multimedia Information Retrieval and Management: Technological Fundamentals and Applications*, eds. D. Feng, W.C. Siu and H.J. Zhang, Berlin: Springer-Verlag, 2003, http://www.springer.de/cgi/svcat/search_book.pl?isbn=3-540-00244-8, pp. 265-288
 22. Edward A. Fox and Paul Mather. Object Repositories for Digital Libraries. Chapter 13 in *Multimedia Information Retrieval and Management*, eds. D. Feng, W.C. Siu and H.J. Zhang, Berlin: Springer-Verlag, 2003, http://www.springer.de/cgi/svcat/search_book.pl?isbn=3-540-00244-8, pp. 289-306
 23. Rao Shen, Jun Wang, and Edward A. Fox. A Lightweight Protocol between Digital Libraries and Visualization Systems. In *Proceedings of JCDL Workshop on Visual Interfaces to Digital Libraries*, July 18, 2002, Portland, eds. Katy Borner & Chaomei Chen, Springer Verlag, LNCS Series, Vol 2539, 2002, pp. 217-225, <http://portal.acm.org/citation.cfm?id=659274>
 24. Advancing Education through Digital Libraries: NSDL, CITIDEL, and NDLTD. In the *Proceedings of Digital Library: IT Opportunities and Challenges in the New Millennium*, ed. Sun Jiazheng, Beijing, China: Beijing Library Press, July 9-11, 2002, pp. 107-117.
 25. E. Fox. Forward, for *How to Build a Digital Library*, by Ian Witten and David Bainbridge, San Francisco: Morgan Kaufmann, 2002
 26. Edward A. Fox and Shalini R. Urs. Digital Libraries. *Annual Review of Information Science and Technology*, ed. Blaise Cronin, Vol. 36, Ch. 12, pp. 503-589, 2002.
 27. E. Fox. Overview of Digital Library Components and Developments. Chapter 4 in *Digital Libraries and Virtual Workplaces: Important initiatives for Latin America in the Information Age*, edited by Johann van Reenen, Washington: Organization of American States, 2002, ISBN 0-8270-4377-5, pp. 105-123.
 28. E. Fox. Overview of a Guide for Electronic Theses and Dissertations. Chapter 5 in *Digital Libraries and Virtual Workplaces: Important initiatives for Latin America in the Information Age*, edited by Johann van Reenen, Washington: Organization of American States, 2002, ISBN 0-8270-4377-5, pp. 125-156.
 29. Edward A. Fox, Marcos A. Goncalves and Neill A. Kipp. Digital Libraries. In *Handbook on Information Technologies for Education and Training*, in Springer series "International Handbook on Information Systems", ISBN 3-540-67803-4, eds. Heimo H. Adelsberger, Betty Collis, and Jan Pawlowski, 2002, Berlin, 623-641.
 30. E. Fox. Forward for *Readings in Multimedia Computing*, eds. Kevin Jeffay and Hong-Jiang Zhang, San

- Francisco: Morgan Kaufmann, 2001
31. Edward A. Fox and Ohm Sornil. Digital Libraries. Encyclopedia of Computer Science, 4th edition, edited by Anthony Ralston, Edwin D. Reilly, and David Hemmendinger, Nature Publishing Group, London, 2000, pages 576-581.
 32. Edward A. Fox. Update on the Networked Digital Library of Theses and Dissertations. In *Successes & Failures of Digital Libraries*, ed. Susan Harum and Michael Twidale, Urbana-Champaign: U. Illinois, ISBN 0-8745-107-2, 2000, pages 12-20
 33. Edward A. Fox and Ohm Sornil. Digital Libraries. Chapter 15 in *Modern Information Retrieval*, ACM Press / Addison-Wesley-Longman England, 1999: Ricardo Baeza-Yates and Berthier Ribeiro-Neto, eds., 415-432
 34. E. Fox, ed. (chair of Subcommittee on "Traditional" Undergraduates). Chapter 3: Traditional Undergraduate Learners. In *Transforming Virginia Tech For the Information Age, Reaffirmation of Accreditation Self-Study Report to the Commission on Colleges of the Southern Assoc. of Colleges and Schools*, Dec. 1997, Virginia Tech, Blacksburg, VA.
<http://www.vt.edu:10021/admin/provost/selfstudy/report/index.html>
 35. W. Wake, B. D. Wake, and E. Fox. Improving Responsiveness in Interactive Applications Using Queues. In *Part 8 of Pattern Languages of Program Design 2*, edited by Vlissides, Coplien, and Kerth, Reading, MA: Addison-Wesley, 1996, 563-573. (Previously published in *Proc. PLOP '95*.)
 36. E. Fox, J.T. Nutter, and M.W. Evens. A Lexicon Server using Lexical Relations for Information Retrieval. Ch. 11, *Machine-Tractable Dictionaries: Design and Construction*, Cheng-ming Guo, ed., Ablex Publishing Corp. (Norwood, NJ), 1995, 89-92.
 37. E. Fox. How to make intelligent digital libraries. In *Methodologies for Intelligent Systems, Proceedings of the 8th International Symposium, ISMIS'94*, Charlotte, NC, Oct. 1994. *Lecture Notes in Artificial Intelligence* 869, Springer-Verlag, Berlin, 27-38.
 38. E. Fox. *Advances in Interactive Digital Multimedia Systems*. Reprinted in *Readings in Groupware and Computer Supported Cooperative Work*, ed. Ron Baecker, Morgan Kaufmann, San Mateo, CA, 1993, 342-354. Also published as Chapter 1 of *Multimedia Computing: Preparing for the 21st Century*, ed. Sorel Reisman, Idea Group Publishing, Harrisburg, PA, 1994, 3-33. Originally in *IEEE Computer*, Oct. 1991, 24(10): 9-21.
 39. S. Patel, G. Abdulla, M. Abrams, and E. Fox. NMFS: Network Multimedia File System Protocol. In P. Venkat Rangan, Ed., *Network and Operating System Support for Digital Audio and Video, Lecture Notes in Computer Science* 712, Springer-Verlag, Berlin Heidelberg, 1993, ISBN 3-540-57183-3 and 0-387-57183-3, 328-333. Reprinted from conf. proceedings of Third International Workshop on Network and Operating System Support for Digital Audio and Video, Nov. 12-13, 1992, La Jolla, CA.
 40. D. Harman, E. Fox, R. Baeza-Yates, and W. Lee. Inverted Files. In *Information Retrieval: Data Structures & Algorithms*, editors W. Frakes & R. Baeza-Yates, Prentice-Hall, 1992, 28-43. Also on CD-ROM published by Dr. Dobb's Journal.
 41. S. Wartik, E. Fox, L. Heath, and Q. Chen. Hashing Algorithms. In *Information Retrieval: Data Structures & Algorithms*, eds. W. Frakes & R. Baeza-Yates, Prentice-Hall, 1992, 293-362. Also on CD-ROM published by Dr. Dobb's Journal.
 42. E. Fox, S. Betrabet, M. Koushik, and W. Lee. Extended Boolean Models. In *Information Retrieval: Data Structures & Algorithms*, eds. W. Frakes & R. Baeza-Yates, Prentice-Hall, 1992, 393-418. Also on CD-ROM published by Dr. Dobb's Journal.
 43. E. Fox, Q.-F. Chen, and R. K. France. Integrating Search and Retrieval with Hypertext. In *Hypertext/Hypermedia Handbook*, ed. E. Berk and J. Devlin, McGraw-Hill, New York, 1991, 329-355.
 44. E. Fox, B. Rous, and G. Marchionini. ACM's Hypertext and Hypermedia Publishing Projects. In *Hypertext/Hypermedia Handbook*, ed. E. Berk and J. Devlin, McGraw-Hill, New York, 1991, 465-467.
 45. E. Fox and M. Weaver. Highlights of CD-ROM Hardware. In *Practical Tips & Techniques for Using CD-ROM Systems*, 1990, 62-71.
 46. E. Fox, M. Weaver, and N. Herther. Optical/Laser Technology: A Glossary of Basic Terms. In *Practical Tips & Techniques for Using CD-ROM Systems*, 1990, 92-93.
 47. E. Fox. Improved Retrieval Using a Relational Thesaurus for Automatic Expansion of Boolean Logic Queries. In *Relational Models of the Lexicon: Representing Knowledge in Semantic Networks*, Martha Walton Evens (ed.), Cambridge Univ. Press, Cambridge, UK, 1988, 199-210.
 48. E. Fox. Optical Disks and CD-ROM: Publishing and Access. In *Annual Review of Information Science*

and Technology, Martha E. Williams (ed.), ASIS / Elsevier Science Publishers B.V., Amsterdam, 1988, Vol. 23, 85-124.

49. E. Fox. Information Retrieval: Research into New Capabilities. In CD-ROM: The New Papyrus, Steve Lambert and Suzanne Ropiequet (eds.), Microsoft Press, Redmond, WA, 1986, 143-174.

REFEREED CONFERENCE/WORKSHOP PAPERS:

1. Nathaniel Short, A. Lynn Abbott, Michael Hsiao, Edward Fox. Temporal Analysis of Fingerprint Impressions. In Proc. IEEE Fifth International Conference on Biometrics: Theory, Applications and Systems (BTAS 2012), Washington, DC, Sept. 23-26, 2012
2. Nathaniel Short, A. Lynn Abbott, Michael Hsiao, Edward Fox. Robust Feature Extraction in Fingerprint Images using Ridge Model Tracking. In Proc. IEEE Fifth International Conference on Biometrics: Theory, Applications and Systems (BTAS 2012), Washington, DC, Sept. 23-26, 2012, Runner-up for Honeywell Best Student Paper Award
3. Sung Hee Park, Roger W. Ehrich, Edward A. Fox. A Hybrid Two-Stage Approach for Discipline-Independent Canonical Representation Extraction from References. Proceedings of the 12th ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL 2012), Washington D.C., June 10-14, 2012, 285-294, <http://dx.doi.org/10.1145/2232817.2232871>
4. Monika Akbar, Clifford A. Shaffer, Edward A. Fox. Deduced Social Networks for an Educational Digital Library. Proceedings of the 12th ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL 2012), Washington D.C., June 10-14, 2012, 43-46, <http://dx.doi.org/10.1145/2232817.2232828>
5. Yinlin Chen, Paul Logasa Bogen II, Haowei Hsieh, Edward Fox, Lillian Cassel. Categorization of Computing Education Resources with Utilization of Crowdsourcing. Proceedings of the 12th ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL 2012), Washington D.C., June 10-14, 2012, 121-124, <http://dx.doi.org/10.1145/2232817.2232840>
6. Kavanaugh, A.L., Sheetz, S.D., Hassan, R., Yang, S., Elmongui, H.G., Fox, E.A., Magdy, M., Shoemaker, D. (2012). Between a Rock and a Cell Phone: Communication and Information Use During the Egyptian Uprising. In Proceedings of the 9th International Conference on Information Systems for Crisis Response and Management (ISCRAM 2012). Apr. 22-25. Vancouver, Canada, 10 pages
7. Jonathan P. Leidig, Edward A. Fox, and Madhav Marathe. Simulation Tools for Producing Metadata Description Sets Covering Simulation-Based Content Collections. International Conference on Modeling, Simulation, and Identification (MSI). Pittsburgh, PA, Nov 7-9, 2011.
8. Nathan Short, Lynn Abbott, Edward Fox, and Michael Hsiao. Latent Fingerprint Segmentation. Proc. 4th International Conference on Imaging for Crime Detection and Prevention (ICDP-11), 3-4 Nov. 2011, London
9. Kevin Hoyle, Nathan Short, Michael Hsiao, Lynn Abbott, and Edward Fox. Minutiae + Friction Ridges = Triplet-Based Features for Determining Sufficiency in Fingerprints. Proc. 4th International Conference on Imaging for Crime Detection and Prevention (ICDP-11), 3-4 Nov. 2011, London
10. Nathaniel J. Short, A. Lynn Abbott, Michael S. Hsiao, and Edward A. Fox. A Bayesian Approach to Fingerprint Minutia Localization and Quality Assessment using Adaptable Templates, IJCB 2011, Washington, D.C., Oct. 11-13, 2011, 7 pages
11. Nadia Kozievitch, Jurandy Almeida, Ricardo Torres, Neucimar Leite, Marcos Goncalves, Uma Murthy, and Edward Fox. Towards a Formal Theory for Complex Objects and Content-Based Image Retrieval. Full paper for SBBD 2011, 3-6 Oct. 2011, Florianopolis, Brazil, 16 pages
12. Lois Delcambre, David Archer, Susan Price, Scott Britell, Uma Murthy, Edward Fox, and Lillian Cassel. Superimposing a Strand Map Over Lectures and Textbook Content (In A Database Class). In Proc. CCSC-NW, Oct. 7-8, 2011, Richland, WA
13. Sung Hee Park, Jonathan P. Leidig, Lin Tzy Li, Edward A. Fox, Nathan J. Short, Kevin E. Hoyle, A. Lynn Abbott, and Michael S. Hsiao. Experiment and Analysis Services in a Fingerprint Digital Library for Collaborative Research. In S. Gradmann et al. (Eds.): TPDL 2011, Berlin, LNCS 6966, pp. 179-191. Springer, Heidelberg (Sept. 2011), acceptance rate 19%
14. Monika Akbar, Weiguo Fan, Clifford A. Shaffer, Yinlin Chen, Lillian Cassel, Lois Delcambre, Daniel D. Garcia, Gregory W. Hislop, Frank Shipman, Richard Furuta, B. Stephen Carpenter II, Haowei Hsieh, Bob Siegfried, and Edward A. Fox. Digital Library 2.0 for Educational Resources. In S. Gradmann et al. (Eds.): TPDL 2011, Berlin, LNCS 6966, pp. 89-100. Springer, Heidelberg (Sept. 2011), acceptance rate

19%

15. Sung Hee Park* and Edward A. Fox. Enriching the VT ETD-db System with References. In Proc. ETD 2011 - 14th International Symposium on Electronic Theses and Dissertations. Cape Town, South Africa, September 13-17, 2011. 8 pages
16. Sung Hee Park*, Paul Mather, Kimberli Weeks, Collin Brittle*, Edward A. Fox, Gail McMillan. VT ETD-db 2.0: Rewriting ETD-db System. In Proc. ETD 2011 - 14th International Symposium on Electronic Theses and Dissertations. Cape Town, South Africa. September 13-17, 2011. 8 pages
17. Srinivasan, Venkat, Magdy, Mohamed, and Fox, Edward. Enhanced Browsing System for Electronic Theses and Dissertations. In Proc. ETD 2011 - 14th International Symposium on Electronic Theses and Dissertations. Cape Town, South Africa. September 13-17, 2011.
18. Uma Murthy, Lin Tzy Li, Eric Hallerman, Edward A. Fox, Manuel A. Perez-Quinones, Lois M. Delcambre, and Ricardo da S. Torres. Use of Subimages in Fish Species Identification: A Qualitative Study. Proceedings of JCDL 2011, Ottawa, June 13-17, 185-194 (acceptance rate of 20-25%)
19. Leidig J, Fox E, Hall K, Marathe M, Mortviet H. SimDL: A Model Ontology Driven Digital Library for Simulation Systems. Short paper in Proceedings of JCDL 2011, Ottawa, June 13-17, 81-84, <http://dx.doi.org/10.1145/1998076.1998091>
20. Kavanaugh, A., Fox, E., Sheetz, S., Yang, S., Li, L.T., Whalen, T., Shoemaker, D., Natsev, A., Xie, L. Social Media Use by Government: From the routine to the critical. ACM 2011 Digital Government Research Conference (dg.o 2011), June 12-15, 2011 (College Park, MD). New York: ACM Press, 121-130.
21. Andrea Kavanaugh, Seungwon Yang, Steven D. Sheetz, and Edward A. Fox. Microblogging in crisis situations: Mass protests in Iran, Tunisia, Egypt. Paper for Workshop on Transnational HCI at CHI 2011, May 7-12, Vancouver, 6 pages
22. Wingyan Chung, Seungwon Yang, Edward A. Fox, and Steven D. Sheetz. Integrating Computational Thinking Into Information Systems and Other Curricula. In Proceedings AIS SIG-ED IAIM 2010 Conference, St. Louis, Missouri, Dec. 10-12, 8 pages
23. Peter Brusilovsky, Lillian Cassel, Lois Delcambre, Edward Fox, Richard Furuta, Daniel D. Garcia, Frank M. Shipman III, Paul Bogen and Michael Yudelton. Enhancing Digital Libraries with Social Navigation: The Case of Ensemble. In Research and Advanced Technology for Digital Libraries, Proc. 14th European Conference, ECDL2010, Glasgow, Sept. 6-10, 116-123
24. Nadia P. Kozievitch, Ricardo da Silva Torres, Sung Hee Park, Edward A. Fox, Nathan Short, Lynn Abbott, Supratik Misra, Michael Hsiao. Rethinking Fingerprint Evidence Through Integration of Very Large x Digital Libraries. VLDL Workshop at 14th European Conference on Research and Advanced Technology for Digital Libraries (ECDL2010), Glasgow, Sept. 6-10, 8 pages
25. Leidig J, Fox E, Marathe M, Mortveit H (2010) Epidemiology experiment and simulation management through schema-based digital libraries. In Proceedings of the 2nd DL.org workshop during the 14th European Conference on Digital Libraries. Glasgow, Scotland, September 6-10, 2010, 57-66
26. Edward A. Fox, Yinlin Chen, Monika Akbar, Clifford A. Shaffer, Stephen H. Edwards, Peter Brusilovsky, Daniel D. Garcia, Lois M.L. Delcambre, Felicia Decker, David W. Archer, Richard Furuta, Frank Shipman, Stephen Carpenter and Lillian Cassel. Ensemble PDP-8: Eight Principles for Distributed Portals. In Proc. JCDL/ICADL 2010, June 21-25, Gold Coast, Australia, 341-344. Acceptance rate 25%
27. Seungwon Yang, Haeyong Chung, Chris North, Edward A Fox. The Effect of Presenting Long Documents on a Large High-Resolution Display on Comprehension of Content and User Experience. Refereed paper for ETD 2010 - 13th International Symposium on Electronic Theses and Dissertations. Austin, TX. June 16-18, 2010
28. Sung Hee Park, Nicholas Lynberg, Jesse Racer, Phil McElmurray, Edward A. Fox. HTML5 ETDs. Refereed paper for ETD 2010 - 13th International Symposium on Electronic Theses and Dissertations. Austin, TX. June 16-18, 2010
29. Peter Brusilovsky, Lillian N. Cassel, Lois M. L. Delcambre, Edward A. Fox, Richard Furuta, Daniel D. Garcia, Frank M. Shipman III, Michael Yudelton: Social navigation for educational digital libraries. In Proc. International Conference on Computational Science, ICCS 2010, U. of Amsterdam, The Netherlands, May 31 - June 2, also in Elsevier's Procedia 1(1): 2889-289, May 2010
30. Uma Murthy, Edward Fox, Naren Ramakrishnan, Andrea Kavanaugh, Steven Sheetz, Donald Shoemaker, and Venkataraghavan Srinivasan. Building an Ontology for Crisis, Tragedy, and Recovery. NKOS Workshop, ECDL 2009, 1 Oct. 2009, Corfu, Greece, <http://fox.cs.vt.edu/talks/2009/20091001CTR->

NKOS.ppt

31. Uma Murthy, Edward Fox, Yinlin Chen, Eric Hallerman, Ricardo Torres, Evandro Ramos and Tiago Falcao. Superimposed Image Description and Retrieval for Fish, Proc. ECDL 2009, 29 Sept. 2009, Corfu, Greece, <http://fox.cs.vt.edu/talks/2009/20090929ECDL09SI.pdf> (acceptance rate 22%)
32. Wingyan Chung, Edward A. Fox. LIKES: Educating the Next Generation of Knowledge Society Builders, 15th Americas Conference on Information Systems, AMCIS 2009, Aug. 6-9, San Francisco, <http://www.amcis2009.org/>
33. Fox, E. A., Lee, S. J., Velasco, J., Marchionini, G., Yang, S., Murthy, U. Curatorial Work and Learning in Virtual Environments: A Virtual World Project to Support the NDIIPP Community First Workshop on Innovation in Digital Preservation, JCDL 2009, June 19, 2009
34. Venkat Srinivasan and Edward Fox. Topical Categorization of Large Collections of Electronic Theses and Dissertations, Proc. ETD 2009, Pittsburgh, PA, June 10-11, 2009, <http://fox.cs.vt.edu/talks/2009/20090611ETD2009ClassifyTalk.ppt>, <http://conferences.library.pitt.edu/ocs/viewabstract.php?id=736&cf=7>
35. David W. Archer, Lois M. L. Delcambre, Fabio Corubolo, Lillian N. Cassel, Susan Price, Uma Murthy, David Maier, Edward A. Fox, Sudarshan Murthy, John McCall, Kiran Kuchibhotla, Rahul Suryavanshi: Superimposed Information Architecture for Digital Libraries. ECDL 2008: 88-99, <http://www.springerlink.com/content/n0u7v25567814161/>
36. Seungwon Yang, Jean Levy, Kevin Miller, Jeffrey Pomerantz, Sanghee Oh, Barbara Wildemuth, Edward A. Fox. Two Approaches to Enhance the Education for ETDs: Developing Educational Modules and Migrating the ETD Guide into a Community Wiki, refereed abstract accepted, leading to full paper for ETD 2008, June 4-6, Aberdeen Scotland
37. Jesse M. Heines, Kenneth J. Goldman, Jim Jeffers, Edward A. Fox, and Robert Beck. Interdisciplinary Approaches to Revitalizing Undergraduate Computing Education. In Proc. Consortium for Computing Sciences in Colleges - Northeastern Region, CCSCNE 2008, April 11-12, Staten Island, NY, <http://localhost/~heines/academic/papers/2008ccsne/CCSCNE-2008-Panel.pdf>
38. Seungwon Yang, Barbara M. Wildemuth, Seonho Kim, Uma Murthy, Jeffrey P. Pomerantz, Sanghee Oh, and Edward A. Fox. Further Development of a Digital Library Curriculum: Evaluation Approaches and New Tools. Springer-Verlag Berlin Heidelberg, LNCS4822, pp. 434-443, Proceedings of the 10th International Conference on Asian Digital Libraries, ICADL 2007, Dec. 10-13, Hanoi Vietnam, DOI: 10.1007/978-3-540-77094-7_55
39. Xiaoyan Yu, Manas Tungare, Weiguo Fan, Manuel Perez-Quinones, Edward A. Fox, William Cameron and Lillian Cassel. Using Automatic Metadata Extraction to Build a Structured Syllabus Repository. Springer-Verlag Berlin Heidelberg, LNCS4822, pp. 337-346, Proceedings of the 10th International Conference on Asian Digital Libraries, ICADL 2007, Dec. 10-13, Hanoi Vietnam, DOI: 10.1007/978-3-540-77094-7_43
40. Maristella Agosti, Nicola Ferro, Marcos Andre Goncalves, Barbara Lagoeiro Moreira. Towards a Reference Quality Model for Digital Libraries. 1st Workshop on Digital Library Foundations, ACM IEEE Joint Conference on Digital Libraries, June 18-23, 2007 - Vancouver, British Columbia, Canada, <http://fox.cs.vt.edu/talks/2007/20070623JCDLdlfWkshpAgosti-Quality.ppt>
41. Yi Ma, Edward A. Fox, and Marcos A. Goncalves. Personal Digital Library: PIM upon 5S Framework. First PhD Workshop on CIKM07 (PIKM07). Nov. 2007, Lisbon, pp. 117-124
42. Uma Murthy, Douglas Gorton, Ricardo Torres, Marcos Goncalves, Edward Fox, and Lois Delcambre. Extending the 5S Digital Library (DL) Framework: From a Minimal DL towards a DL Reference Model. 1st Workshop on Digital Library Foundations, ACM IEEE Joint Conference on Digital Libraries, June 18-23, 2007 - Vancouver, British Columbia, Canada, <http://fox.cs.vt.edu/talks/2007/20070623JCDLdlfWkshpMurthy-5S.ppt>
43. Jeffrey Pomerantz, Sanghee Oh, Barbara M. Wildemuth, Seungwon Yang, and Edward A. Fox. Digital Library Education in Computer Science Programs. ACM IEEE Joint Conference on Digital Libraries, June 18-23, 2007 - Vancouver, British Columbia, Canada, 177 - 178, <http://doi.acm.org/10.1145/1255175.1255208>
44. Ryan Richardson, Edward A. Fox. Using Bilingual ETD Collections to Mine Phrase Translations. ACM IEEE Joint Conference on Digital Libraries, June 18-23, 2007 - Vancouver, British Columbia, Canada, 352 - 353, <http://doi.acm.org/10.1145/1255175.1255244>, <http://fox.cs.vt.edu/talks/2007/20070622JCDLpaperRichardsonFox.ppt>

45. Xiaoyan Yu, Manas Tungare, Weiguo Fan, Manuel Perez-Quinones, Edward A. Fox, William Cameron, GuoFang Teng, and Lillian Cassel. Automatic Syllabus Classification. ACM IEEE Joint Conference on Digital Libraries, June 18-23, 2007 - Vancouver, British Columbia, Canada, 440 - 441, <http://doi.acm.org/10.1145/1255175.1255265>, <http://fox.cs.vt.edu/talks/2007/20070622JCDLpaperYuSyllabi.ppt>
46. Seungwon Yang, Sanghee Oh, Jeffrey P. Pomerantz, Barbara M Wildemuth, and Edward A. Fox: Improving Education and Understanding of NDLTD. In Proc. ETD 2007, Uppsala, Sweden, June 13-16, 2007, <http://fox.cs.vt.edu/talks/2007/20070614ETDfoxYangDLcurric.ppt>
47. Ryan Richardson and Edward A. Fox: Using Concept Maps in NDLTD as a Cross-Language Summarization Tool for Computing-Related ETDs. In Proc. ETD 2007, Uppsala, Sweden, June 13-16, 2007, <http://fox.cs.vt.edu/talks/2007/20070613ETDfoxRichardsonCmaps.ppt>
48. Manas Tungare, Xiaoyan Yu, William Cameron, GuoFang Teng, Manuel Perez-Quinones, Lillian Cassel, Weiguo Fan, Edward Fox. Towards a Syllabus Repository for Computer Science Courses, in Proc. ACM SIGCSE 2007, March 7-10, 2007, Covington, KY, <http://doi.acm.org/10.1145/1227310.1227331>
49. Seungwon Yang, Edward A. Fox, Barbara M. Wildemuth, Jeffrey Pomerantz, and Sanghee Oh. Interdisciplinary Curriculum Development for Digital Library Education. In Proc. ICADL 2006, Nov., Kyoto, Japan, LNCS 4312, Springer-Verlag Berlin Heidelberg, pp. 61-70, 2006, http://dx.doi.org/10.1007/11931584_9
50. Seonho Kim, Subodh Lele, Sreeram Ramalingam, Edward A. Fox. Visualizing User Communities and Usage Trends of Digital Libraries Based on User Tracking Information. In Proc. ICADL 2006, Nov., Kyoto, Japan, LNCS 4312, Springer-Verlag Berlin Heidelberg, 2006, pp. 111-120, http://dx.doi.org/10.1007/11931584_14
51. Edward A. Fox and N. Srinivas Vemuri, "ETANA-DL: Leveraging DL Technologies to Support Archaeology", presentation in ETANA (Electronic Tools and Ancient Near Eastern Archives) Workshop I, Nov. 17; Edward A. Fox and Linda Cantara, co-chairs, ETANA Workshop II, Nov. 18, in ASOR 2006, Washington, DC (refereed workshop)
52. Manuel A. Perez-Quinones, Edward Fox, Lillian Cassel, and Weiguo Fan. "Work in Progress: Personalizing a Course Website Using the NSDL", in Proceedings of the 36th Annual Frontiers in Education Conference (FIE 2006), Oct. 28-31, 2006, San Diego, California, pp. M3F3-M3F4
53. Barbara Lagoeiro Moreira, Marcos Andre Goncalves, Alberto H.F. Laender, and Edward A. Fox. 5SQual - A Quality Assessment Tool for Digital Libraries, in Proc. WDL 2006, 20 Oct. 2006, Florianopolis, SC, Brasil, 10 pages
54. Rao Shen, Naga Srinivas Vemuri, Weiguo Fan, and Edward A. Fox. What is a Successful Digital Library? In Proc. ECDL 2006, Alicante, Spain, Sept. 17-21, 2006, Research and Advanced Technology for Digital Libraries, ISBN 978-3-540-44636-1, Lecture Notes in Computer Science, Volume 4172, ISSN 0302-9743, Springer Berlin / Heidelberg, 2006, pp. 208-219, http://dx.doi.org/10.1007/11863878_18, pp. 208-219, <http://fox.cs.vt.edu/talks/2006/20060918ECDLsuccess.ppt>
55. Uma Murthy, Ryan Richardson, Edward Fox, and Lois Delcambre. Enhancing Concept Mapping Tools Below and Above to Facilitate the Use of Superimposed Information. In Proc. CMC 2006, Costa Rica, Sept. 5-8, 2006.
56. Sudarshan Murthy, Uma Murthy, and Edward A. Fox. Using Superimposed and Context Information to Find and Re-find Sub-documents. Proc. Invitational Workshop on Personal Information Management, part of ACM SIGIR 2006, Aug. 10-11, 2006, Seattle, 4 pages
57. Deborah Duong, Ben Goertzel, Jim Venuto, Ryan Richardson, Edward Fox. Support Vector Machines to Weight Voters in a Voting System of Entity Extractors. In Proc. IEEE World Congress on Computational Intelligence (<http://wcci2006.org>), July 16-21, 2006, Vancouver, 4 pages
58. Lillian N. Cassel, Edward A. Fox. Sharing the wealth: publishing electronic resources. In Proceedings of the 11th annual conference on innovation and technology in computer science education (ITiCSE 2006), Bologna, Italy, June 26-28, 2006, p. 327, <http://doi.acm.org/10.1145/1140124.1140234>
59. Manas Tungare, Xiaoyan Yu, Manuel Perez-Quinones, Edward A. Fox, Weiguo Fan, and Lillian Cassel. Towards a Standardized Representation of Syllabi to Facilitate Sharing and Personalization of Digital Library Content. Full paper (10 pages) for Proc. of the 4th International Workshop on Applications of Semantic Web Technologies for E-Learning (SW-EL@AH'06, see <http://www.win.tue.nl/SW-EL/>), June 21-23, Dublin, Ireland
60. Rao Shen, Naga Srinivas Vemuri, Weiguo Fan, Ricardo da S. Torres, and Edward A. Fox. Exploring

- Digital Libraries: Integrating Browsing, Searching, and Visualization. In Proc. JCDL 2006, June 11-15, 2006, Chapel Hill, NC, 1-10, <http://doi.acm.org/10.1145/1141753.1141755>
61. Naga Srinivas Vemuri, Rao Shen, Sameer Tupe, Weiguo Fan, and Edward A. Fox. ETANA-ADD: An Interactive Tool for Integrating Archaeological DL Collections. In Proc. JCDL 2006, June 11-15, 2006, Chapel Hill, NC, 161-162, <http://doi.acm.org/10.1145/1141753.1141783>
 62. Jeffrey Pomerantz, Barbara M. Wildemuth, Seungwon Yang, and Edward A. Fox. Curriculum Development for Digital Libraries. In Proc. JCDL 2006, June 11-15, 2006, Chapel Hill, NC, 175-184, <http://doi.acm.org/10.1145/1141753.1141787>
 63. Edward A. Fox, Seungwon Yang, Barbara M. Wildemuth, and Jeffrey Pomerantz. Digital Library Curriculum Development: Enhancing Education and Comprehension of NDLTD. Paper accepted based on review of abstract, ETD 2006: Unlocking Access, 9th International Symposium on Electronic Theses and Dissertations, June 7-10, 2006, Quebec City, slides: http://www6.bibl.ulaval.ca:8080/etd2006/pages/papers/SP11_Ed_Fox.ppt
 64. Seonho Kim, Seungwon Yang, and Edward A. Fox. Supply and Demand Analysis in NDLTD Based on Patron Specialty Survey and Contents Statistics. Paper accepted based on review of abstract, ETD 2006: Unlocking Access, 9th International Symposium on Electronic Theses and Dissertations, June 7-10, 2006, Quebec City, http://www6.bibl.ulaval.ca:8080/etd2006/pages/papers/SP11_SeonhoKim.pdf, http://www6.bibl.ulaval.ca:8080/etd2006/pages/papers/SP11_SeonhoKim.ppt
 65. Kamini Santhanagopalan, Gail McMillan, and Edward A. Fox. Prototype for Preservation of International ETDs using LOCKSS and OAI-PMH. Paper accepted based on review of abstract, ETD 2006: Unlocking Access, 9th International Symposium on Electronic Theses and Dissertations, June 7-10, 2006, Quebec City
 66. Edward Fox, Rao Shen, Srinivas Vemuri, Weiguo Fan, Linda Cantara. Joanne Eustis, James Flanagan. ETANA-DL: Leveraging digital library technologies to support archaeology. In Proc. CAA2006, Computer Applications and Quantitative Methods in Archaeology Annual Conference, Fargo, ND, April 18-21, 2006, <http://www.caa2006.org/>
 67. Edward Fox and James W. Flanagan, "ETANA Digital Library: The Most Recent Developments and a Demonstration", Nov. 16-19, 2005, Philadelphia: talk on Thursday, plus running 9:00am - 4:00pm Saturday ETANA (Electronic Tools and Ancient Near Eastern Archives) Workshop
 68. Baoping Zhang, Yuxin Chen, Weiguo Fan, Edward A. Fox, Marcos Andre Goncalves, Marco Cristo, Pavel Calado. Intelligent GP Fusion from Multiple Sources for Text Classification. In Proceedings of the 14th Conference on Information and Knowledge Management, CIKM 2005, 31st October - 5th November, 2005 Bremen, Germany, 477-484
 69. Ricardo da Silva Torres, Alexandre X. Falcao, Baoping Zhang, Weiguo Fan, Edward A. Fox, Marcos Andre Goncalves, Pavel Calado. A new framework to combine descriptors for content-based image retrieval. In Proceedings of the 14th Conference on Information and Knowledge Management, CIKM 2005, 31st October - 5th November, 2005 Bremen, Germany, 335-336
 70. Fernando A. Das Neves, Edward A. Fox, Xiaoyan Yu. Connecting topics in document collections with stepping stones and pathways. In Proceedings of the 14th Conference on Information and Knowledge Management, CIKM 2005, 31st October - 5th November, 2005 Bremen, Germany, 91-98
 71. Vinod K. Lohani, Kumar Mallikarjunan, Mary Leigh Wolfe, Terry Wildman, Jeff Connor, John Muffo, Jenny Lo, Tamara W. Knott, G. V. Loganathan, Richard Goff, Mike Chang, John Cundiff, Greg Adel, Foster Agblevor, Mike Gregg, David Vaughan, Ed Fox, Hayden Griffin, Saied Mostaghimi. Work in Progress: Spiral Curriculum Approach to Reformulate Engineering Curriculum. In Proc. 35th ASEE/IEEE Frontiers in Education Conference. Indianapolis, IN, Oct. 19-22, 2005
 72. Ryan Richardson, Edward A. Fox, and John Woods. Evaluating concept maps as a cross-language knowledge discovery tool for NDLTD. In Proceedings ETD2005: evolution through discovery, 8th International Symposium on Electronic Theses and Dissertations, Sydney, Sept. 28-30, 2005, <http://fox.cs.vt.edu/talks/2005/20050927ETDevaluatingConceptMaps.ppt>
 73. Ananth Raghavan, Naga Srinivas Vemuri, Rao Shen, Marcos Andre Goncalves, Weiguo Fan, and Edward A. Fox. Incremental, Semi-automatic, Mapping-Based Integration of Heterogeneous Collections into Archaeological Digital Libraries: Megiddo Case Study. In Proceedings ECDL2005, Vienna, Sept. 18-23, 2005, 139-150, http://dx.doi.org/10.1007/11551362_13, <http://fox.cs.vt.edu/talks/2005/20050919ECDLmegiddo.ppt>
 74. Rao Shen, Marcos Andre Goncalves, Weiguo Fan, and Edward A. Fox. Requirements Gathering and

- Modeling of Domain-Specific Digital Libraries with the 5S Framework: An Archaeological Case Study with ETANA. In Proceedings ECDL2005, Vienna, Sept. 18-23, 2005, 1-12, http://dx.doi.org/10.1007/11551362_1, <http://fox.cs.vt.edu/talks/2005/20050919ECDLmodeling.ppt>
75. Seonho Kim, Uma Murthy, Kapil Ahuja, Sandi Vasile, and Edward A. Fox. Effectiveness of Implicit Rating Data on Characterizing Users in Complex Information Systems. Short paper in Proceedings ECDL2005, Springer LNCS, Vienna, Sept. 18-23, 2005, 186-194, http://dx.doi.org/10.1007/11551362_17, <http://fox.cs.vt.edu/talks/2005/20050920ECDLshk.ppt>
 76. Wensi Xi, Edward A. Fox, Weiguo Fan, Benyu Zhang, Zheng Chen, Jun Yan, Dong Zhuang. SimFusion: Measuring Similarity using Unified Relationship Matrix. In Proc. SIGIR 2005, 28th Annual International ACM SIGIR Conference, Salvador, Brazil, August 15-19, 2005, 130-137, <http://doi.acm.org/10.1145/1076034.1076059>
 77. Baoping Zhang, Yuxin Chen, Weiguo Fan, Edward A. Fox, Marcos Andre Goncalves, Marco Cristo, Pavel Calado. Intelligent fusion of structural and citation-based evidence for text classification. In Proc. SIGIR 2005, 28th Annual International ACM SIGIR Conference, Salvador, Brazil, August 15-19, 2005, 667-668 <http://doi.acm.org/10.1145/1076034.1076181>
 78. Ryan Richardson and Edward A. Fox. Using Concept Maps as a Cross-Language Resource Discovery Tool. Short paper in Proceedings of the Fifth ACM/IEEE Joint Conference on Digital Libraries (JCDL2005), June 7-11, 2005, Denver, 256-257
 79. Seonho Kim and Edward A. Fox. Interest-Based User Grouping Model for Collaborative Filtering in Digital Libraries. In Zhaoneng Chen, Hsinchun Chen, Qihao Miao, Yuxi Fu, Edward Fox, Ee-Peng Lim, eds. Digital Libraries: International Collaboration and Cross-Fertilization; Proceedings 7th International Conference on Asian Digital Libraries, ICADL 2004, Shanghai, Dec. 13-17, 2004. Springer-Verlag GmbH, Lecture Notes in Computer Science, vol. 3334, pp. 533-542, <http://www.springerlink.com/openurl.asp?genre=article&issn=0302-9743&volume=3334&spage=533>
 80. Baoping Zhang, Marcos Andre Goncalves, Weiguo Fan, Yuxin Chen, Edward A. Fox, Pavel Calado, and Marco Cristo. Combining Structural and Citation-Based Evidence for Text Classification. In: CIKM 2004, Washington D.C. Proc. of the 13th Conference on Information and Knowledge Management, Nov. 8-13, Washington, D.C. ACM Press, 2004, 162-163
 81. Odis Hayden Griffin, Edward A. Fox, Calvin J. Ribbens, Thomas D. Walker, Nathaniel J. Davis, Richard M. Goff, Jenny L. Lo, Vinod K. Lohani, Michael H. Gregg and Dwight Barnette. Work in Progress - A Freshman Course for Engineering and Computer Science Students. In Proc. Frontiers in Education 34th Annual Conf., FIE 2004, Savannah, GA, Oct. 20-23, 2004
 82. Unni Ravindranathan, Rao Shen, Marcos Andre Goncalves, Weiguo Fan, Edward A. Fox, and James W. Flanagan. Prototyping Digital Libraries Handling Heterogeneous Data Sources - The ETANA-DL Case Study. Full paper in Research and Advanced Technology for Digital Libraries: Proceedings 8th European Conference, ECDL 2004, Bath, UK, September 12-17, 2004, eds. Rachel Heery and Liz Lyon, Lecture Notes in Computer Science, vol. 3232, Springer-Verlag GmbH, Berlin, 186-197, <http://springerlink.metapress.com/openurl.asp?genre=article&issn=0302-9743&volume=3232&spage=186>
 83. Nithiwat Kampanya, Rao Shen, Seonho Kim, Chris North, and Edward A. Fox. Citiviz: A Visual User Interface to the CITIDEL System. Full paper in Research and Advanced Technology for Digital Libraries: Proceedings 8th European Conference, ECDL 2004, Bath, UK, September 12-17, 2004, eds. Rachel Heery and Liz Lyon, Lecture Notes in Computer Science, vol. 3232, Springer-Verlag GmbH, Berlin, 122-133, <http://www.springerlink.com/openurl.asp?genre=article&issn=0302-9743&volume=3232&spage=122>
 84. Fan, W., Luo, M., Wang, L., Xi, W., and Fox, E. A. Tuning before feedback: Combining ranking discovery and blind feedback for robust retrieval. SIGIR 2004, 27th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval, Sheffield, England, 25-29 July.
 85. M. A. Goncalves, L. T. Watson, and E. A. Fox. Towards a Digital Library Theory: A Formal Digital Library Ontology. In Mathematical Formal Methods workshop, SIGIR 2004, July 29, 2004, Sheffield, England; updated version of 31 pages
 86. S. Perugini, K. McDevitt, R. Richardson, M. Perez-Quinones, R. Shen, N. Ramakrishnan, C. Williams, and E. A. Fox. Enhancing Usability in CITIDEL: Multimodal, Multilingual, and Interactive Visualization Interfaces. In Proceedings of the Fourth ACM/IEEE Joint Conference on Digital Libraries: Global Reach and Diverse Impact, JCDL2004, Tucson, AZ, June 7-11, 2004, pp. 315-324.

87. M. A. Goncalves, E. A. Fox, A. Krowne, P. Calado, A. Laender, A. S. da Silva, and B. Ribeiro-Neto. The Effectiveness of Automatically Structured Queries in Digital Libraries. In *Proceedings of the Fourth ACM/IEEE Joint Conference on Digital Libraries: Global Reach and Diverse Impact, JCDL2004*, Tucson, AZ, June 7-11, 2004, pp. 98-107, winner of Best Student Paper award.
88. U. Ravindranathan, R. Shen, M. A. Goncalves, W. Fan, E. A. Fox, and J. W. Flanagan, ETANA-DL: A Digital Library For Integrated Handling Of Heterogeneous Archaeological Data. In *Proceedings of the Fourth ACM/IEEE Joint Conference on Digital Libraries: Global Reach and Diverse Impact, JCDL2004*, Tucson, AZ, June 7-11, 2004, pp. 76-77.
89. Luo, M. and E. A. Fox. ETD search services. *Proceedings of ETD 2004: Distributing knowledge worldwide through better scholarly communication*, June 3-5, 2004, Lexington, KY.
90. W. Xi, B. Zhang, Z. Chen, Y. Lu, S. Yan, W.Y. Ma, E.A. Fox. Link Fusion: A Unified Link Analysis Framework for Multi-type Inter-related Data Objects. In *Proceedings of the Thirteenth International World Wide Web Conference, WWW2004*, New York, U.S.A. 19-22 May 2004, 10 pages
91. Weiguo Fan; Gordon, M.D.; Pathak, P.; Wensi Xi; Fox, E.A.; Ranking function optimization for effective web search by genetic programming: an empirical study, in the *Proceedings of 37th Hawaii International Conference on System Sciences (HICSS)*, 5-8 Jan. 2004, 105 - 112
92. Aaron Krowne and Edward A. Fox. An Architecture for Multischeming in Digital Libraries. In: Tengku Mohd Tengku Sembok, Halimah Badioze Zaman, Hsinchun Chen, Shalini R. Urs, Sung Hyon Myaeng, eds. *Digital Libraries: Technology and Management of Indigenous Knowledge for Global Access; Proceedings 6th International Conference on Asian Digital Libraries, ICADL 2003*, Kuala Lumpur, Malaysia, Dec. 2003. Springer-Verlag GmbH, Lecture Notes in Computer Science, vol. 2911, 563-577, <http://www.springerlink.com/openurl.asp?genre=article&issn=0302-9743&volume=2911&spage=563>
93. Baoping Zhang, Marcos Andre Goncalves, and Edward A. Fox. An OAI-Based Filtering Service for CITIDEL from NDLTD. In: Tengku Mohd Tengku Sembok, Halimah Badioze Zaman, Hsinchun Chen, Shalini R. Urs, Sung Hyon Myaeng, eds. *Digital Libraries: Technology and Management of Indigenous Knowledge for Global Access; Proceedings 6th International Conference on Asian Digital Libraries, ICADL 2003*, Kuala Lumpur, Malaysia, Dec. 2003. Springer-Verlag GmbH, Lecture Notes in Computer Science, vol. 2911, 590-601, <http://www.springerlink.com/openurl.asp?genre=article&issn=0302-9743&volume=2911&spage=590>
94. Li Wang, Weiguo Fan, Rui Yang, Wensi Xi, Ming Luo, Ye Zhou, Edward A. Fox, Ranking Function Discovery by Genetic Programming for Robust Retrieval, *Text Retrieval Evaluation Conference-2003*, Nov 17-23, NIST, Washington DC, 9 pages
95. R. Yang, L. Wang, W. Fan, W. Xi, M. Luo, Y. Zhou, E.A. Fox. VT at TREC-2003: The Web Track Report. In *Proceedings of the Twelfth Text Retrieval Conference (TREC 2003)*. NIST Special Publication 500-252. Gaithersburg, Maryland, 18-21 November 2003, 3 pages.
96. Qinwei Zhu, Marcos Andre Goncalves, Rao Shen, Lillian Cassel, Edward A. Fox. Visual Semantic Modeling of Digital Libraries. *Proc. 7th European Conference on Digital Libraries (ECDL 2003)*, 17-22 August, Trondheim, Norway, Springer-Verlag GmbH, Lecture Notes in Computer Science, vol. 2769, 2004, 325-337, <http://www.springerlink.com/openurl.asp?genre=article&issn=0302-9743&volume=2769&spage=325>
97. Rohit Kelapure, Marcos Andre Goncalves, Edward A. Fox. Scenario-Based Generation of Digital Library Services. *Proc. 7th European Conference on Digital Libraries (ECDL 2003)*, 17-22 August, Trondheim, Norway, Springer-Verlag GmbH, Lecture Notes in Computer Science, vol. 2769, 2004, 263-275, <http://www.springerlink.com/openurl.asp?genre=article&issn=0302-9743&volume=2769&spage=263>
98. Hui Han, C. Lee Giles, Eren Manavoglu, Hongyuan Zha, Zhenyue Zhang, and Edward A. Fox. Automatic Document Metadata Extraction using Support Vector Machines. *Proc. JCDL'2003, Third Joint ACM / IEEE-CS Joint Conference on Digital Libraries*, May 27-31, 2003, Houston, 37-48.
99. Pavel P. Calado, Marcos Andre Goncalves, Edward A. Fox, Berthier Ribeiro-Neto, Alberto H. F. Laender, Altigran S. da Silva, David C. Reis, Pablo A. Roberto, Monique V. Vieira, and Juliano P. Lage. The Web-DL Environment for Building Digital Libraries from the Web. *Proc. JCDL'2003, Third Joint ACM / IEEE-CS Joint Conference on Digital Libraries*, May 27-31, 2003, Houston, 346 - 357
100. Byron Marshall, Yiwen Zhang, Hsinchun Chen, Ann Lally, Rao Shen, Edward A. Fox, and Lillian N. Cassel. Convergence of Knowledge Management and E-Learning: the GetSmart Experience. *Proc. JCDL'2003, Third Joint ACM / IEEE-CS Joint Conference on Digital Libraries*, May 27-31, 2003, Houston, 135-146.

101. Marcos Andre Goncalves, Ganesh Panchanathan, Unnikrishnan Ravindranathan, Aaron Krowne, Edward A. Fox, Filip Jagodzinski, and Lillian Cassel. The XML Log Standard for Digital Libraries: Analysis, Evolution, and Deployment. Proc. JCDL'2003, Third Joint ACM / IEEE-CS Joint Conference on Digital Libraries, May 27-31, 2003, Houston, 312 - 314
102. E. Hoffman and E. Fox. Building Policy, Building Community: An Example from the US National Science, Technology, Engineering, and Mathematics Education Library (NSDL). Short paper in: Ee-Peng Lim, Schubert Foo, Chris Khoo, Hsinchun Chen, Edward Fox, Shalini Urs, Thanos Constantino, eds. Digital Libraries: People, Knowledge, and Technology; Proceedings 5th International Conference on Asian Digital Libraries, ICADL 2002, Singapore, Dec. 2002, 299-300. Springer, Lecture Notes in Computer Science 2555.
103. Wensi Xi, Edward A. Fox, Roy P. Tan, Jiang Shu. Machine Learning Approach for Homepage Finding Task. In Proceedings of the 9th String Processing and Information Retrieval Symposium (SPIRE 2002). Lisbon, Portugal, September, 2002.
104. Marcos Andre Goncalves, Paul Mather, Jun Wang, Ye Zhou, Ming Luo, Ryan Richardson, Rao Shen, Liang Xu, and Edward A. Fox, Java MARIAN: From an OPAC to a Modern Digital Library System. In Proceedings of the 9th String Processing and Information Retrieval Symposium (SPIRE 2002). Lisbon, Portugal, September, 2002.
105. Hussein Suleman and Edward A. Fox. Designing Protocols in Support of Digital Library Componentization. In "Research and Advanced Technology for Digital Libraries, 6th European Conference, ECDL 2002, Rome, Italy, September 16-18, 2002, Proceedings", eds. Maristella Agosti and Constantino Thanos, LNCS 2458, Springer, pp. 568-582.
106. Wensi Xi, Ohm Sornil, Ming Luo, and Edward A. Fox. Hybrid Partition Inverted Files: Experimental Validation. In "Research and Advanced Technology for Digital Libraries, 6th European Conference, ECDL 2002, Rome, Italy, September 16-18, 2002, Proceedings", eds. Maristella Agosti and Constantino Thanos, LNCS 2458, Springer, pp. 422-431.
107. Marcos Andre Goncalves, Ming Luo, Rao Shen, Mir Farooq Ali, and Edward A. Fox. An XML Log Standard and Tool for Digital Library Logging Analysis. In "Research and Advanced Technology for Digital Libraries, 6th European Conference, ECDL 2002, Rome, Italy, September 16-18, 2002, Proceedings", eds. Maristella Agosti and Constantino Thanos, LNCS 2458, Springer, pp. 129-143.
108. Rao Shen, Jun Wang, Edward A. Fox. A Lightweight Protocol between Digital Libraries and Visualization Systems. JCDL Workshop on Visual Interfaces to Digital Libraries (p. 425 of Proc. JCDL 2002), July 18, 2002, Portland.
109. Ashwini Pande, Malini Kothapalli, Ryan Richardson, and Edward A. Fox. Mirroring an OAI archive on the I2-DSI channel. Short paper in Proc. JCDL'2002, Second Joint ACM / IEEE-CS Joint Conference on Digital Libraries, July 14-18, 2002, Portland, pp. 293-294.
110. H. Anan, X. Liu, K. Maly, M. Nelson, M. Zubair, J. French, E. Fox, P. Shivakumar. Preservation and Transition of NCSTRL Using an OAI-Based Architecture. Short paper in Proc. JCDL'2002, Second Joint ACM / IEEE-CS Joint Conference on Digital Libraries, July 14-18, 2002, Portland, pp. 181-182.
111. Marcos Andre Goncalves and Edward A. Fox. SSL - A Language for Declarative Specification and Generation of Digital Libraries. Long paper in Proc. JCDL'2002, Second Joint ACM / IEEE-CS Joint Conference on Digital Libraries, July 14-18, 2002, Portland, pp. 263-272.
112. Jun Wang, Abhishek Agrawal, Anil Bazaz, Supriya Angle, Edward A. Fox, and Chris North. Enhancing the ENVISION Interface for Digital Libraries. Short paper in Proc. JCDL'2002 Second Joint ACM / IEEE-CS Joint Conference on Digital Libraries, July 14-18, 2002, Portland, pp. 275-276.
113. Wensi Xi, Ohm Sornil, and Edward A. Fox. Hybrid Partition Inverted Files for Large-Scale Digital Libraries. Proc. Digital Library: IT Opportunities and Challenges in the New Millennium, July 9-11, 2002, Beijing Library Press, Beijing, China, 404-418
114. Hussein Suleman and Edward A. Fox. Towards Universal Accessibility of ETDs: Building the NDLTD Union Archive. In Proc. ETD'2002, BYU, Provo, Utah, May 30 - June 1, 2002, preprint at http://rocky.dlib.vt.edu/~hussein/etd_2002/etd_2002_paper_final.pdf
115. Marcos Andre Goncalves, Ye Zhou, and Edward A. Fox. Providing Extended Services and Resources to the NDLTD Community. In Proc. ETD'2002, BYU, Provo, Utah, May 30 - June 1, 2002
116. Ing-Ray Chen and Edward Fox. Design and Analysis of A Set-Top Box for Video Streaming Services. In Proc. IMMCN'2002, Second International Workshop on Intelligent Multimedia Computing and Networking, March 8-12, 2002, Durham, NC.

117. Ohm Sornil and Edward A. Fox. Hybrid Partitioned Inverted Indices for Large-Scale Digital Libraries. In Proc. International Conference on Asian Digital Libraries, ICADL'2001, Bangalore, India, Dec. 10-12, 2001
118. Marcos Andre Goncalves, Robert K. France, and Edward A. Fox, MARIAN: Flexible Interoperability for Federated Digital Libraries. In Proceedings 5th European Conference on Research and Advanced Technology for Digital Libraries, ECDL'2001, September 4-8, 2001, Darmstadt, Germany, Lecture Notes in Computer Science, Springer-Verlag GmbH, vol. 2163 / 2001, pp. 173-186, <http://www.springerlink.com/openurl.asp?genre=article&issn=0302-9743&volume=2163&spage=173>
119. Marcos Andre Goncalves, Ali Zafer, Naren Ramakrishnan, and Edward A. Fox, Modeling and Building Personalized Digital Libraries with PIPE and 5SL. In Proceedings of the Joint DELOS-NSF Workshop on Personalization and Recommender Systems in Digital Libraries, 18-20 June 2001, Dublin, Ireland.
120. Marcos Andre Goncalves, Robert K. France, Edward A. Fox, Eberhard R. Hilf, Michael Hohlfeld, Kerstin Zimmermann, and Thomas Severiens. Flexible Interoperability in a Federated Digital Library of Theses and Dissertations. In Proceedings of the 20th World Conference on Open Learning and Distance Education, "The Future of Learning - Learning for the Future: Shaping the Transition", ICDE2001, Duesseldorf, Germany, 01 - 05 April 2001
121. Marcos Andre Goncalves, Robert K. France, Edward A. Fox, and Tamas E. Doszkocs. MARIAN: Searching and Querying Across Heterogeneous Federated Digital Libraries. In Proc. of First DELOS Workshop on "Information Seeking, Searching and Querying in Digital Libraries", 11-12 December 2000, Zurich, Switzerland. Talk: <http://www.ndltd.org/talks/delosfox.ppt>, paper: http://www.ercim.org/publication/ws-proceedings/DelNoe01/11_Fox.pdf
122. Canos, J. H., Fox, E.A., Goncalves, M.A. and France, R.K., NDLTD: una biblioteca digital global de tesis doctorales y de licenciatura. Actas de las I Jornadas de Bibliotecas Digitales. Valladolid, noviembre de 2000. Translation: NDLTD: a global digital library of theses and dissertations. Proceedings of the First Spanish Workshop on Digital Libraries (6-7 October, 2000, Valladolid, Spain), ISBN: 84-8448-066-6
123. Hussein Suleman, Edward A. Fox, Marc Abrams. "Building Quality into a Digital Library", <http://purl.org/net/repository>, short paper in Proc. ACM Digital Libraries '2000, June 4-7, 2000, San Antonio.
124. Fernando Das Neves and Edward A. Fox. "A study of user behavior in an immersive Virtual Environment for digital libraries", in Proc. ACM Digital Libraries '2000, June 4-7, 2000, San Antonio.
125. Edward A. Fox, Rachelle S. Heller, Anna Long, and David Watkins. "CRIM: Curricular Resources in Interactive Multimedia", in Proceedings ACM Multimedia '99, Orlando, FL, Nov. 1-5, 1999.
126. Constantinos Phanouriou, Neill Kipp, Ohm Sornil, Paul Mather, and Edward A. Fox, "A Digital Library for Authors: Recent Progress of the Networked Digital Library of Theses and Dissertations", in Proceedings ACM Digital Libraries '99, Berkeley, CA, Aug. 11-14, 1999.
127. E.A. Fox, G. McMillan, J.L. Eaton, "The Evolving Genre of Electronic Theses and Dissertations", in Proceedings Digital Documents Track of HICSS-32, Thirty-second Annual Hawaii International Conference on Systems Sciences (HICSS), Maui, HI - January 5-8, 1999, 20 pages, <http://scholar.lib.vt.edu/theses/presentations/Hawaii/ETDgenreALL.pdf>
128. Osman Balci, Cengiz Ulusarac, Poorav Shah, and Edward A. Fox (1998), "A Library of Reusable Model Components for Visual Simulation of the NCSTRL System," In Proceedings of the 1998 Winter Simulation Conference (Washington, DC, Dec. 13-16). IEEE, Piscataway, NJ, vol. 2, 1451-1459
129. Ghaleb Abdulla, Binzhang Liu, and Edward A. Fox, "Searching the WWW: Implications from studying different user behavior", in Proc. WebNet98 Conference, Orlando, FL, November 7-12, 1998, <http://www.aace.org/conf/webnet>
130. Binzhang Liu, Ghaleb Abdulla, Tommy Johnson, and Edward A. Fox, "Web Response Time and Proxy Caching", in Proc. WebNet98 Conference, Orlando, FL, November 7-12, 1998, <http://www.aace.org/conf/webnet>, <http://memex.dlib.vt.edu/~liub/webnet.html>, recognized as a "top paper".
131. Md. Habib, G. Abdulla, and E. Fox. "Web Traffic Characterization with Time Zones: Seeking outside events that affect the traffic to a distance learning server", in Proc. International Symposium on Audio, Video, Image Processing and Intelligent Application (ISAVIA-98), Germany, 17-21 August 1998. http://www.cs.vt.edu/~chitra/docs/ISAVIA-98/final_i98.pdf
132. M. Bayraktar, C. Zhang, B. Vadapalli, N. Kipp, and E. Fox. "A Web Art Gallery", in Proc. Digital Libraries '98, The Third ACM Conf. on Digital Libraries, Pittsburgh, PA, June 23-26, 1998, 277-278.

133. G. Abdulla, E. A. Fox, M. Abrams, "Shared User Behavior on the World Wide Web", in Proc. WebNet97 Conference, Toronto, Canada Oct. 1997, <http://www.AACE.org/conf/webnet>
<http://www.cs.vt.edu/~chitra/docs/97webnet/>
134. M. Kirschenbaum, E. Fox. 1997. Electronic Theses and Dissertations in the Humanities. In Proc. Joint Annual Conf. of the Association for Computers and the Humanities and the Association for Literary and Linguistic Computing, ACH-ALLC'97, June 3-7, 1997, Queen's Univ., Kingston, Ontario.
135. L. Tinoco, E. Fox, N. D. Barnette. Online Evaluation in WWW-based Courseware. In SIGCSE '97, Proceedings of the 28th SIGCSE Technical Symp. on Computer Science Education, San Jose, 2/27-3/1/97, 194-198. <http://ei.cs.vt.edu/papers/sigcse97.pdf>
136. L. Tinoco, E. Fox, R. Ehrich, H. Fuks. 1996. QUIZIT: An interactive online quiz system for WWW-based instruction. In VII Proceedings of the Symposium of Educational Technology: Belo Horizonte, MG, Brazil, Nov 1996. <http://ei.cs.vt.edu/papers/QUIZIT9611.pdf>
137. S. Williams, M. Abrams, C. Standridge, G. Abdulla, E. Fox. Removal Policies in Network Caches for World-Wide Web Documents, in Proc. ACM SIGCOMM '96, Stanford U., Palo Alto, CA, Aug. 28-30, 1996, 293-305. See full paper and slides in various versions: <http://www.cs.vt.edu/~nrg/williams.html>
138. L. Nowell, R. France, D. Hix, L. Heath, and E. Fox. Visualizing Search Results: Some Alternatives to Query-document Similarity, in Proc. SIGIR'96, Zurich, Switzerland, Aug. 18-22, 1996, 67-75.
139. M. Abrams, C. R. Standridge, G. Abdulla, S. Williams and E. A. Fox. Caching Proxies: Limitations and Potentials, in Proc. 4th International World-Wide Web Conference, Boston, Dec. 1995, 119-133
<http://www.w3j.com/1/abrams.155/paper/155.html>
140. W. Wake and E. Fox. SortTables: A Browser for a Digital Library. In Proc. 4th Int. Conf. on Information and Knowledge Management, CIKM '95, Baltimore, MD, Nov. 28 - Dec. 2, 1995, 175-181.
141. M. Abrams, S. Williams, G. Abdulla, S. Patel, R. Ribler and E. Fox. Multimedia Traffic Analysis Using Chitra95. In Proc. 3rd Int. Multimedia Conf. and Exhibition, Multimedia '95, San Francisco, Nov. 5-9, 1995, 267-276. <http://www.cs.vt.edu/~chitra/docs/95multimediaAWAFPR/>
142. W. Wake, B. D. Wake, and E. Fox. Improving Responsiveness in Interactive Applications Using Queues. In Proc. Pattern Languages of Program Design 2, PLOP '95.
143. E. Fox and D. Barnette. Improving Education through a Computer Science Digital Library with Three Types of WWW Servers. In Proc. Second International WWW '94: Mosaic and the Web, WWW'94, Chicago, IL, Oct. 17-20, 1994.
144. K. Maly, J. French, A. Selman and E. Fox. The Wide Area Technical Report Service. In Proc. Second International WWW '94: Mosaic and the Web, WWW'94, Chicago, IL, Oct. 17-20, 1994, 523-533.
145. H. Gladney, E. Fox, Z. Ahmed, R. Ashany, N. Belkin, and M. Zemankova. Digital Library: Gross Structure and Requirements: Report from a March 1994 Workshop. Digital Libraries '94, June 19-21, 1994, College Station, TX, ed. J. Schnase, J. Leggett, R. Furuta, T. Metcalfe, 101-107.
146. E. Fox and G. Abdulla. Digital Video Delivery for a Digital Library in Computer Science. High-Speed Networking and Multimedia Computing Workshop, IS&T/SPIE Symposium on Electronic Imaging Science and Technology, Feb. 6-10, 1994, San Jose, CA, 7 pages.
147. F. Can, C.D. Snaveley, E.A. Fox, and R.K. France. Incremental Clustering for Very Large Document Databases: Initial MARIAN Experience, In Proceedings of the Eighth International Symposium on Computer and Information Sciences (ISCIS 8), eds. L. Gun, R. Onvural, and E. Gelenbe, Istanbul, 1-3 Nov. 1993. (8 pages)
148. Y. Qian, E. Fox, and W. Farley. An Object-Oriented Database for the Display Measurement and Analysis System Proc. CIKM 93, 2nd International Conference on Information and Knowledge Management, Nov. 1-5, 1993, Washington, D.C., ACM Press, 384-392.
149. E. Fox, R. France, E. Sahle, A. Daoud, and B. Cline. Development of a Modern OPAC: From REVTOLC to MARIAN. Proc. 16th Annual Intern'l ACM SIGIR Conf. on R & D in Information Retrieval, SIGIR '93, Pittsburgh, PA, June 27 - July 1, 1993, 248-259.
150. D. Brueni, B. Cross, E. Fox, L. Heath, D. Hix, L. Nowell, and W. Wake. What if there were desktop access to the Computer Science Literature?, Proc. 21st Annual Computer Science Conference, ACM CSC '93, Feb.16-18, 1993, Indianapolis, IN, 15-22.
151. S. Patel, G. Abdulla, M. Abrams, and E. Fox. NMFS: Network Multimedia File System Protocol, Third International Workshop on Network and Operating System Support for Digital Audio and Video, Nov. 12-13, 1992, La Jolla, CA. Printed in P. Venkat Rangan, Ed., Network and Operating System Support for Digital Audio and Video, Lecture Notes in Computer Science 712, Springer-Verlag, Berlin Heidelberg,

- 1993, ISBN 3-540-57183-3 and 0-387-57183-3, 328-333.
152. E. A. Fox, Qi Fan Chen, and L. S. Heath. A Faster Algorithm for Constructing Minimal Perfect Hash Functions. Proc. 15th Intern'l Conf. on R & D in Information Retrieval, SIGIR '92, June 21-24, 1992, Copenhagen, Denmark, 266-273.
153. E. Fox, R. France, M. Koushik, J.-L. Menezes, Q.-F. Chen, A. Daoud, and J. Nutter. CODER: A Retrieval and Hypertext System using SGML and a Lexicon. Proc. ACH/ ALLC '91, The Combined 11th Int'l Conf. on Computers and the Humanities and 18th Int'l Conf. of the ALLC, Mar. 17-21, 1991, Arizona State Univ., Tempe, AZ. 5 pages.
154. A. Narasimhan and E. Fox. Application of Multimedia in Simulation. Proc. The Twentieth Annual Virginia Computer Users Conference, Sept. 14- 16, 1990, VPI&SU, Blacksburg, VA, 166-180.
155. E. Fox, Q.-F. Chen, A.M. Daoud, and L.S. Heath. Order preserving minimal perfect hash functions and information retrieval. Proc. SIGIR 90, 13th Int'l Conf. on R & D in Information Retrieval, ed. Jean-Luc Vidick, Sept. 5-7, 1990, Brussels, Belgium, 279-311.
156. E. Fox. A Retrospective on CODER: A Testbed for Artificial Intelligence Methods in Information Retrieval. 1990 Spring Symp. Series, Symposium on Text-Based Intelligent Systems, March 27-29, 1990, Stanford Univ., Palo Alto, CA, 81-82.
157. R. France, E. Fox, J.T. Nutter, Q.F. Chen. Building A Relational Lexicon for Text Understanding and Retrieval. Proc. First Int'l Language Acquisition Workshop, Aug. 21, 1989, Detroit, MI. 6 pages.
158. Nutter, J.T., Fox, E.A., and Evens, M. Building a lexicon from machine-readable dictionaries for improved information retrieval. The Dynamic Text: 16th ALLC and 9th ICCH International Conferences, Toronto, Ontario, June 6-9, 1989. [No proceedings were published; this paper was selected for journal publication and appeared in: Literary and Linguistic Computing, 1990, 5(2): 129-138.]
159. E. Fox, Q. Chen, L. Heath, and S. Datta. A More Cost Effective Algorithm for Finding Perfect Hash Functions. Proc. ACM 1989 Computer Science Conference, February 21-23, 1989, Louisville, KY, 114-122.
160. E. Fox, G. Nunn, and W. Lee. Coefficients for Combining Concept Classes in a Collection. Proc. 11th Int'l Conf. on Research and Development in Information Retrieval, June 13-15, 1988, Grenoble, France, 291-307.
161. E. Fox, M. Weaver, Q. Chen, and R. France. Implementing a Distributed Expert-Based Information Retrieval System. Proc. RIAO (Recherche d'Informations Assistee par Ordinateur) 88: User-Oriented Text and Image Handling, March 21-24, 1988, Cambridge, MA, 708-726.
162. E. Fox, J. Nutter, T. Ahlswede, M. Evens, and J. Markowitz. Building a Large Thesaurus for Information Retrieval. Proceedings Second Conference on Applied Natural Language Processing, Feb. 9-12, 1988, Austin, Texas, 101-108.
163. E. Fox and S. Winett. Extending Expert System Techniques with Information Retrieval Methods to Select Foster Homes. Proc. Third Ann. Expert Systems in Gov. Conf., Oct. 19-23, 1987, Washington, D.C., 26-32.
164. E. Fox. An Intelligent Information System for Electronic Mail Digests. Proceedings of the 50th Annual Meeting of the American Society for Information Science, Oct. 4-8, 1987, Boston, MA, 24: 74-78.
165. S. Winett and E. Fox. FOster Care Expert System: A Model Project to Select Foster Care Homes for Children. Databases in the Humanities and Social Sciences 4, Proc. of the Int. Conf. on Databases in the Humanities and Social Sciences, Auburn University, Montgomery AL, July 11-13, 1987, ed. Lawrence J. McCrank, Learned Information, Inc., Medford, NJ.
166. E. Fox and Q. Chen. Text Analysis in the CODER System. Proceedings Fourth Annual USC Computer Science Symposium: Language and Data in Systems, April 8, 1987, Columbia, SC, 7-14.
167. R. France and E. Fox. Knowledge Structures for Information Retrieval: Representation in the CODER Project. Proc. IEEE Expert Systems in Government Symposium, Oct. 20-24, 1986, McLean, VA, 135-141.
168. E. Fox. Expert Retrieval for Users of Computer Based Message Systems. Proceedings 49th Annual Meeting American Society for Information Science, Sept. 28 - Oct. 2, 1986, Chicago, IL, 23: 88-95.
169. E. Fox and S. Birch. A UNIX Micro Requirement for Computer Science Majors. Proc. NECC '86: 7th National Educational Computing Conf., June 4-6, 1986, San Diego, CA, 157-160.
170. E. Fox and R. France. Architecture of a Distributed Expert System for Composite Document Entry, Analysis, Representation, and Retrieval. Proc. 3rd Ann. USC Computer Sci. Sym.; Knowledge-Based Systems: Theory and Applications, Mar. 31-Apr. 1, 1986, Columbia SC, 13 pg.

171. S. Winett and E. Fox. Using Information Retrieval Techniques in an Expert System. Proceedings Second Conference on Artificial Intelligence Applications: The Engineering of Knowledge-Based Systems, Dec. 11- 13, 1985, Miami Beach, FL, 230-235.
172. S. Winett and E. Fox. Information Retrieval Techniques in an Expert System for Foster Care. Proc. Expert Systems in Gov.Symp., Oct. 23-25, 1985, McLean, VA, 391-396.
173. E. Fox. Analysis and Retrieval of Composite Documents. ASIS '85, Proceedings of the 48th American Society for Information Science Annual Meeting, October 20-24, 1985, Las Vegas, Nevada, 22: 54-58.
174. E. Fox. Composite Document Extended Retrieval: An Overview. Proc. Research and Devel. in Information Retrieval, Eighth Annual International ACM SIGIR Conf., June 5-7, 1985, Montreal, 42-53.
175. E. Fox. Composite Document Search in a Networked Society. Telecommunications & Networking: supplying the missing link, Collected papers of the American Society for Information Science 14th Mid-Year Mtg., May 19-22, 1985, Fort Lauderdale, FL, Fiche 2, Paper 11, 12 pages.
176. E. Fox. Information Retrieval with Undergraduate Microcomputers. The Micro Revolution, Collected papers Amer. Soc. for Info. Sci.13th ASIS Mid-Year Mtg, May 20-23, 1984, Bloomington, IN, Fiche 5: 253-264.
177. E. Fox. Combining Information in an Extended Automatic Information Retrieval System for Agriculture. The Infrastructure of an Information Society (Proc. 1st Int'l Information Conf. Egypt, 13-16 Dec. 1982, Cairo), B. El-Hadidy & E.E. Horne (editors), North Holland, 1984, 449-466.
178. G. Salton, E. Fox, and H. Wu. An Automatic Environment for Boolean Information Retrieval. In Information Processing 83 (Proc. 1983 IFIP Paris Congress), R.E.A. Mason (ed.), North-Holland, 1983, 755-762.
179. E. Fox. Implementing SMART for Minicomputers Via Relational Processing with Abstract Data Types. Jt Proc. SIGSMALL Symp. on Small Systems and SIGMOD Workshop on Small Data Base Systems, Oct. 1981, Orlando, FL, ACM SIGSMALL Newsletter, 7(2): 119-129.

REFEREED POSTERS:

1. Sunshin Lee, Noha Elsherbiny, Edward A. Fox. A Digital Library for Water Main Break Identification and Visualization. Poster in Proceedings of the 12th ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL 2012), Washington D.C., June 10-14, 2012, 335-336, <http://dx.doi.org/10.1145/2232817.2232878>
2. Seungwon Yang, Kiran Chitturi, Gregory Wilson, Mohamed Magdy, and Edward A. Fox. A Study of Automation from Seed URL Generation to Focused Web Archive Development: The CTRnet Context. Poster in Proceedings of the 12th ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL 2012), Washington D.C., June 10-14, 2012, 341-342, <http://dx.doi.org/10.1145/2232817.2232881>
3. Scott Britell, Lois Delcambre, Lillian Cassel, Edward Fox, Richard Furuta. Exploiting canonical structures to transmit complex objects from a digital library to a portal. Poster in Proceedings of the 12th ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL 2012), Washington D.C., June 10-14, 2012, 377-378, <http://dx.doi.org/10.1145/2232817.2232899>
4. J. Leidig, S. Lee, E. Fox, "Teaching Advanced Content Using Formal Definitions", poster in 4th Annual Conference on Higher Education Pedagogy, Feb. 8-10, 2012, Virginia Tech, Blacksburg, VA
5. Donald J. Shoemaker, Edward A. Fox, and Steven D. Sheetz. CTRnet Digital Library for Disaster Information Services. Invited poster for Research Forum on Peace and Violence. Oct. 12, 2011, Virginia Tech
6. Monika Akbar, Weiguo Fan, Lillian Cassel, Lois Delcambre, Clifford A. Shaffer, Edward A. Fox, Yinlin Chen, "How Educators Find Educational Resources Online", ITiCSE 2011, June 27-29, Germany, 367
7. Prat Tanapaisankit, Min Song, and Edward A. Fox. Developing a Concept Extraction Technique with Ensemble Pathway. Refereed poster in Proceedings of JCDL 2011, Ottawa, June 13-17, 405-406
8. Jonathan Leidig, Edward A. Fox, Kevin Hall, Madhav Marathe, and Henning Mortveit. Improving Simulation Management Systems with Model Ontologies. Refereed poster in Proceedings of JCDL 2011, Ottawa, June 13-17, 435-436, <http://dx.doi.org/10.1145/1998076.1998172>
9. Seungwon Yang, Andrea Kavanaugh, Nadia P. Kozevitch, Lin Tzy Li, Venkat Srinivasan, Steven D. Sheetz, Travis Whalen, Donald Shoemaker, Ricardo da A. Torres, and Edward A. Fox. CTRnet DL for Disaster Information Services. Refereed poster in Proceedings of JCDL 2011, Ottawa, June 13-17, 437-438
10. Li, L.T., Yang, S., Kavanaugh, A., Fox, E., Sheetz, S., Shoemaker, D. Whalen, T., Srinivasan, V. Twitter

- Use During an Emergency Event: the Case of UT Austin Shooting. Refereed poster at ACM 2011 Digital Government Research Conference (dg.o 2011), June 12-15, 2011 (College Park, MD). New York: ACM Press, 335-336
11. Sheetz, Steve, Fox, Edward A., Fitzgerald, A., Palmer, S., Shoemaker, D., Kavanaugh, Andrea. Why Students Use Social Networking Sites After Crisis Situations. Refereed poster in Proceedings of the 8th International ISCRAM Conference, Lisbon, Portugal, May 8-11, 2011
 12. Yinlin Chen and Edward A. Fox. Aggregate Computing Educational Resources in Social Interactive Environments. Refereed poster for Graduate Student Assembly's (GSA) 27th Annual Research Symposium, March 23, 2011, Virginia Tech
 13. Monika Akbar, Peter Brusilovsky, Lillian Cassel, Steve Carpenter, Yinlin Chen, Lois Delcambre, Steve Edwards, Weiguo Fan, Edward Fox, Richard Furuta, Dan Garcia, Greg Hislop, Maggie Johnson, David Maier, Manuel Perez-Quinones, Steve Seidman, Frank Shipman, Chris Stephenson, Heikki Topi, Bryant York, "ENSEMBLE: Supporting the full range of computing education communities", NSDL Annual meeting 2010, Nov. 1-3, Washington, D.C.
 14. Uma Murthy, Nadia P. Kozievitch, Edward A. Fox, Ricardo Torres, and Eric Hallerman. SuperIDR: A Tablet PC Tool for Image Description and Retrieval. Refereed poster for Workshop on the Impact of Pen-Based Technology on Education, WIPTE 2010, Oct. 25-26, Virginia Tech
 15. Yinlin Chen and Edward A. Fox. IBM Cloud and Student Term Projects to Aid Computing Education. Poster for 3rd Annual Conference on Higher Education Pedagogy, Virginia Tech, October 7, 2010
 16. Spencer J. Lee, Kriti Sen Sharma, Edward A. Fox, Matthew Ruder, and Ge Wang. Micro-CT Scanner Training in a 3D Virtual World: Second Life Aided Training and Education (SLATE). Refereed poster at BMES 2010 Annual Meeting, Oct. 6-9, 2010, Austin, TX
 17. Frank M. Shipman, Lillian Cassel, Edward Fox, Richard Furuta, Lois Delcambre, Peter Brusilovsky, B. Stephen Carpenter II, Gregory Hislop, Stephen Edwards and Daniel D. Garcia. Ensemble: A Distributed Portal for the Distributed Community of Computing Education. Refereed poster in Research and Advanced Technology for Digital Libraries, Proc. 14th European Conference, ECDL2010, Glasgow, Sept. 6-10, 506-509
 18. Seungwon Yang, Tarek Kanan and Edward Fox. Digital Library Educational Module Development Strategies and Sustainable Enhancement by the Community. Refereed poster in Research and Advanced Technology for Digital Libraries, Proc. 14th European Conference, ECDL2010, Glasgow, Sept. 6-10, 514-517
 19. Nadia P. Kozievitch, Ricardo da Silva Torres, Felipe Andrade, Uma Murthy, Edward Fox, and Eric Hallerman. A Teaching Tool for Parasitology: Enhancing Learning with Annotation and Image Retrieval. Refereed poster in Research and Advanced Technology for Digital Libraries, Proc. 14th European Conference, ECDL2010, Glasgow, Sept. 6-10, 466-469
 20. G. Athanasopoulos, E. Fox, Y. Ioannidis, G. Kakaletiris, N. Manola, C. Meghini, A. Rauber, and D. Soergel. A Functionality Perspective on Digital Library Interoperability. Refereed poster in Research and Advanced Technology for Digital Libraries, Proc. 14th European Conference, ECDL2010, Glasgow, Sept. 6-10, 405-408
 21. Lillian N. Cassel, Edward A. Fox, Richard Furuta, and Lois M.L. Delcambre. Many-to-Many Information Connections in a Distributed Digital Library Portal, Poster, JCDL 2010, June 21-25, Gold Coast, Australia, 369-370
 22. Lillian (Boots) Cassel, Ed Fox, Frank Shipman, Peter Brusilovsky, Weiguo Fan, Dan Garcia, Greg Hislop, Richard Furuta, Lois Delcambre, Sridhara Potluri. Ensemble: enriching communities and collections to support education in computing: poster session. June 2010. Consortium for Computing Sciences in Colleges. *Journal of Computing Sciences in Colleges*, 25(6): 224-226
 23. Nathan Short, Lynn Abbott, Supratik Misra, Michael Hsiao, Nadia Kozievitch, Sung Hee Park, Edward Fox. Latent Fingerprint Matching. Poster for CESCA (Center for Embedded Systems for Critical Applications) Day, Virginia Tech, Blacksburg, VA, May 6, 2010
 24. Supratik Misra, Nathan Short, Michael Hsiao, Lynn Abbott, Edward Fox, Sung Hee Park, Nadia Kozievitch. Fingerprint Sufficiency. Poster for CESCA (Center for Embedded Systems for Critical Applications) Day, Virginia Tech, Blacksburg, VA, May 6, 2010
 25. Sung Hee Park, Nadia Kozievitch, Edward A. Fox, Michael Hsiao, Lynn Abott, Nathan Short, Supratik Misra. Model-based fingerprint image quality Analysis. Poster for CESCA (Center for Embedded Systems for Critical Applications) Day, Virginia Tech, Blacksburg, VA, May 6, 2010

26. Nadia Kozevitch, Sung Hee Park, Supratik Misra, Nathan Short, Michael Hsiao, Lynn Abott, Edward A. Fox. Database for Fingerprint Experiments. Poster for CESA (Center for Embedded Systems for Critical Applications) Day, Virginia Tech, Blacksburg, VA, May 6, 2010
27. Leidig J, Marathe M, Fox E. (2010) Scientific data management through digital libraries. Refereed poster presented at the NIH Models of Infectious Disease Agent Study (MIDAS) Network Meeting, Washington, DC, May 5-6, 2010.
28. Nadia P. Kozevitch, Ricardo da Silva Torres, Thiago Falcao, Evandro Ramos, Felipe Andrade, Silmara Marques Allegretti, Marlene Tiduko Ueta, Rubens Riscala Madi, Uma Murthy, Edward A. Fox, Yinlin Chen, and Eric Hallerman. A Geographic Annotation Service in SuperIDR. Poster at 2010 GIS and Remote Sensing Research Symposium, April 9, 2010, Virginia Tech
29. Monika Akbar, Edward A. Fox, Lillian N. Cassel, Yinlin Chen, Stephen Edwards, Peter L. Brusilovsky, Stephen Carpenter, Lois Delcambre, Weiguo Fan, Richard Furuta, Frank M. Shipman, Daniel Garcia, Greg Hislop, David Maier, Manuel Perez-Quinones, Christine Stephenson, Bryant York, Haowei Hsieh. ENSEMBLE: Supporting the Full Range of Computing Education Communities. Reviewed poster accepted for ACM SIGCSE 2010, March 12, Milwaukee
30. Seungwon Yang, Edward A. Fox, John Ewers, and Tarek Kanan. A Methodology for Digital Library Educational Module Development and Continuous Improvements by the Community. Reviewed poster at 2010 Conference on Higher Education Pedagogy, Inn at Virginia Tech, Feb. 18-19, 2010, p. 111, <http://www.cider.vt.edu/conference/2010/2010proceedings.pdf>
31. Edward A. Fox, Monika Akbar, Yinlin Chen, Michael Stewart, Clifford A. Shaffer, Stephen H. Edwards, Patrick Fan. Ensemble: Enriching Communities and Collections to Support Education in Computing. Reviewed poster at 2010 Conference on Higher Education Pedagogy, Inn at Virginia Tech, Feb. 18-19, 2010, p. 102, <http://www.cider.vt.edu/conference/2010/2010proceedings.pdf>
32. Sanghee Oh, Barbara Wildemuth, Pomerantz Jeffrey, Seungwon Yang, Edward Fox. Using a Wiki as a Platform for Formative Evaluation. Poster at ASIS&T 2009 Annual Meeting, Thriving on Diversity - Information Opportunities in a Pluralistic World, November 6-11, 2009, Vancouver, BC, Canada
33. Venkat Srinivasan, Bidisha Dewanjee, Edward A. Fox, Donald J. Shoemaker, Steven D. Sheetz, Andrea Kavanaugh, and Naren Ramakrishnan. "CTRnet: A Distributed Digital Library for Rescue and Recovery". Poster presented at International Outreach NOW conference at Virginia Tech, Blacksburg, Virginia, Sep 2009, winner of best poster in category award.
34. Barbara M. Wildemuth, Jeffery Pomerantz, Sanghee Oh, Seungwon Yang, Edward A. Fox. The Variety of Ways in which Instructors Implement a Modular Digital Library Curriculum. Poster at JCDL 2009
35. Yang, S; Fox, E; Wildemuth, B; Wildemuth, B; Oh, S; Pomerantz, J; Digital Library Educational Module Development and Field-Testing Results from Virginia Tech. Refereed poster 65 presented at Conference on Higher Education Pedagogy @ VT, February 18, 2009, Virginia Tech, <http://www.ceutonline.com/proposal/viewPoster1.cfm?pid=127>
36. Chen, Y; Fox, E; Steve, E; Shaffer, C; The National Science Digital Library resources to enhance learning: lessons from CITIDEL and the Ensemble pathways project. Refereed poster 66 presented at Conference on Higher Education Pedagogy @ VT, February 18, 2009, Virginia Tech, <http://www.ceutonline.com/proposal/viewPoster1.cfm?pid=128>
37. Chung, W; Yang, S; Fox, E; Sheetz, S; The Living In the KnowlEdge Society (LIKES) Community Building Project: Building Collaboration between Computing and Non-Computing Disciplines. Refereed poster 67 presented at Conference on Higher Education Pedagogy @ VT, February 18, 2009, Virginia Tech, <http://www.ceutonline.com/proposal/viewPoster1.cfm?pid=130>
38. Seungwon Yang, Edward A. Fox, Wingyan Chung. Living In the KnowlEdge Society (LIKES) Initiative and I-Schools' Focus on the Information. Poster 64 at 2009 iConference, Feb. 8-11, 2009, U. NC Chapel Hill
39. Barbara M. Wildemuth, Jeffrey Pomerantz, Sanghee Oh, Seungwon Yang, Edward A. Fox. i-Schools as a Natural Home for Digital Libraries Education. Poster 67 at 2009 iConference, Feb. 8-11, 2009, U. NC Chapel Hill
40. Jeffrey Pomerantz, Barbara M. Wildemuth, Sanghee Oh, Seungwon Yang, Edward A. Fox: Evaluation of a curriculum for digital libraries. In Proceedings of the 8th ACM/IEEE-CS Joint Conference on Digital Libraries (Pittsburgh PA, PA, USA, June 16 - 20, 2008). JCDL '08. ACM, New York, NY, p. 462. DOI= <http://doi.acm.org/10.1145/1378889.1379007>
41. Lois Delcambre, David Archer, Susan Price, Uma Murthy, Edward Fox, Lillian Cassel. Superimposing a

- Strand Map over a Database Lecture. Poster at 39th ACM Technical Symposium on Computer Science Education, SIGSCE 2008, March 12-15, 2008, Portland, Oregon
42. Barbara L. Moreira, Marcos A. Goncalves, Alberto H. F. Laender, and Edward A. Fox, Evaluating Digital Libraries with 5SQual. Research and Advanced Technology for Digital Libraries, ECDL 2007: pp. 466-470, Springer Berlin / Heidelberg, LNCS 4675, poster, http://dx.doi.org/10.1007/978-3-540-74851-9_44
 43. Christopher L. Barrett, Keith Bisset, Stephen Eubank, Edward A. Fox, Yi Ma, Madhav V. Marathe, and Xiaoyu Zhang: A Scalable Data Management Tool to Support Epidemiological Modeling of Large Urban Regions. Research and Advanced Technology for Digital Libraries, ECDL 2007: pp. 546-548, Springer Berlin / Heidelberg, LNCS 4675, poster, http://dx.doi.org/10.1007/978-3-540-74851-9_65
 44. Yi Ma, Edward A. Fox, Marcos A. Goncalves PIM through a 5S perspective. ACM IEEE Joint Conference on Digital Libraries, June 18-23, 2007 - Vancouver, British Columbia, Canada, poster, p. 491, <http://doi.acm.org/10.1145/1255175.1255290>
 45. Ryan Richardson, Ben Goertzel, Edward A. Fox, and Hugo Pinto. Automatic Creation and Translation of Concept Maps for Computer Science-Related Theses and Dissertations. Poster for Proc. CMC 2006, Costa Rica, Sept. 5-8, 2006.
 46. Michael Drutar, Charles Coleman, and Edward Fox. Creating a Multi Disciplinary Digital Library in the 5S Framework. Poster for JCDL 2006, June 11-16, Chapel Hill, NC, p. 351, <http://doi.acm.org/10.1145/1141753.1141846>
 47. Deborah Duong, Ben Goertzel, Jim Venuto, Ryan Richardson, Edward Fox. Support Vector Machines to Weight Voters in a Voting System of Entity Extractors. Poster for 2006 International Joint Conference on Neural Networks, IEEE World Congress on Computational Intelligence (<http://wcci2006.org>), July 16-21, 2006, Vancouver, 4 pages
 48. Michael Drutar, Charles Coleman, and Edward Fox, Creating a Multi Disciplinary Digital Library in the 5S Framework. In Proc. JCDL 2006, June 11-15, 2006, Chapel Hill, NC, poster, p. 351
 49. R. da S. Torres, C. B. Medeiros, R. Q. Dividino, M. A. Figueiredo, M. A. Goncalves, E. A. Fox, R. Richardson: Using Digital Library Components for Biodiversity Systems. In Proceedings of the Fourth ACM/IEEE Joint Conference on Digital Libraries: Global Reach and Diverse Impact, JCDL2004, Tucson, AZ, June 7-11, 2004, p. 408
 50. Edward A. Fox, Ryan Richardson, and Lillian Cassel. CITIDEL: Computing and Information Technology Interactive Digital Educational Library. Poster, ECDL'2003, 17-22 August, Trondheim, Norway
 51. Rao Shen, Ryan Richardson, Edward A. Fox. Concept maps as visual interfaces to digital libraries. Poster, ECDL'2003, 17-22 August, Trondheim, Norway
 52. Filip Jagodzinski, Lillian Cassel, Marcos A. Goncalves, and Edward A. Fox. Digital Library Analysis: Advantages of Using the XML Log Standard Versus the Apache Server Logs. Poster for JCDL'2003, May 27-31, 2003, Houston, TX
 53. Edward A. Fox, Reagan W. Moore, Ronald L. Larsen, Sung Hyon-Myaeng, and Kim Sung-Hyuk. US-Korea Collaboration on Digital Libraries: An Overview and Generalization for Pacific Rim Collaboration. Poster for 5th International Conference on Asian Digital Libraries, ICADL 2002, Singapore, Dec. 2002, p. 519.
 54. Posters at NSDL Launch Meeting, Washington, D.C., Dec. 2-4, 2002: for NSDL PC (with Ellen Hoffman), CITIDEL (with Lillian Cassel), DLbox (with SuShing Chen), and GetSmart (with Hsinchun Chen and Ann Lally)
 55. MARIAN - Next Generation Digital Library System Built on 5S, with M. Goncalves, W. Richardson, and M. Luo; Honorable Mention, with \$100 prize
 56. Pavel Calado (Universidade Federal de Minas Gerais, Brazil), Marcos Goncalves (Virginia Polytechnic Institute and State University), Berthier Ribeiro-Neto (Universidade Federal de Minas Gerais, Brazil), and Edward Fox (Virginia Polytechnic Institute and State University). Making Digital Libraries from the Web. 11th International Conference on Information and Knowledge Management (CIKM'02), Nov. 4-9, 2002, McLean, VA
 57. Deborah Knox, Lillian Cassel, John Impagliazzo, Edward Fox, JAN Lee, Manuel Perez, and C. Lee Giles. "Computing and Information Technology Interactive Digital Education Library (CITIDEL)". Poster at ACM SIGCSE Symposium 2002, <http://www.cs.wpi.edu/~cew/sigcse2002posters.html>, in Proc. of the 33rd SIGCSE Technical Symposium on Computer Science Education, Feb. 27 - March 3, 2002, Covington, KY, p. 427
 58. E. Fox, G. Abdulla, W. Heagy. Quantitative Analysis and Visualization Regarding Interactive Learning

with a Digital Library in Computer Science. ACM Digital Libraries'97, Philadelphia, PA, July 23-26, 1997

UNREFEREED INVITED CONFERENCE/WORKSHOP PAPERS:

1. Functionality and Interoperability with 5S. Presentation for Functionality Working Group Meeting, DL.Org (Digital Library Interoperability, Best Practices and Modeling Foundations), 29-30 June 2009, Athens, <http://fox.cs.vt.edu/talks/2009/20090629FoxDLorgFunWG.ppt>
2. Edward A. Fox. Introduction to NDLTD and Brief History of the ETD Movement. Invited presentation for Newcomers' Workshop, ETD 2009, Pittsburgh, PA, June 10, 2009, <http://fox.cs.vt.edu/talks/2009/20090610ETD2009RookiesFoxIntro.ppt>
3. Edward A. Fox and Gail McMillan. ETD-db: Workflow, the Short Story. Invited presentation for Newcomers' Workshop, ETD 2009, Pittsburgh, PA, June 10, 2009, <http://fox.cs.vt.edu/talks/2009/20090610ETD2009RookiesETDdb.ppt>
4. Edward A. Fox. It is easy for universities to support free culture with digital libraries: The NDLTD Example. Invited paper for Symposium on Free Culture & the Digital Library 2005, Emory University, Atlanta, 14 Oct., <http://metascholar.org/events/2005/freeculture/>, <http://fox.cs.vt.edu/talks/2005/20051014Emory.ppt>
5. Edward A. Fox. Toward a Science Extending Digital Libraries, with a Testbed of ETDs. Position paper for 15-17 June 2003 NSF-sponsored Workshop on Post-DL Research Directions, Chatham, MA, 6 pages
6. H. Suleman, E. Fox, and D. Madalli. Design and Implementation of Networked Digital Libraries: Best Practices. In Proc. DRTC Workshop on Digital Libraries: Theory and Practice, March 10-14, 2003, Indian Statistical Institute, Bangalore, India, 9 pages
7. Edward Fox, Hussein Suleman, and Ming Luo. Building Digital Libraries Made Easy: Toward Open Digital Libraries, pages 14-24 in: Ee-Peng Lim, Schubert Foo, Chris Khoo, Hsinchun Chen, Edward Fox, Shalini Urs, Thanos Constantino, eds. Digital Libraries: People, Knowledge, and Technology; Proceedings 5th International Conference on Asian Digital Libraries, ICADL 2002, Singapore, Dec. 2002. Springer, Lecture Notes in Computer Science 2555.
8. The OAI PMH (Open Archives Initiative Protocol for Metadata Harvesting). Invited presentation for MetaScholar Initiative All-Project Meeting, Atlanta, GA, June 18, 2002.
9. W. Xi and E. A. Fox. Machine Learning Approach for Homepage Finding Task. In Proceedings of the Tenth Text Retrieval Conference (TREC-2001). NIST Special Publication 500-250, entry 78, 2001. http://trec.nist.gov/pubs/trec10/t10_proceedings.html
10. E. Fox. "Future Funding and the NDLTD Vision." Invited closing plenary for Third International Symposium on Electronic Theses and Dissertations (ETDs), St. Petersburg, FL, March 18, 2000 <http://www.ndltd.org/talks/ETD3close.ppt>
11. E. Fox. "Future of Electronic Publishing." Invited seminar in Virginia Tech Symposium on Scholarship in the Electronic World, text and audio online, paper in published proceedings, Research and Graduate Studies, Blacksburg, VA, April 13, 1998 <http://www.rgs.vt.edu/resmag/seminars.html>
12. E. Fox. "Update on the Networked Digital Library of Theses and Dissertations (NDLTD)." In Proc. 35th Annual Clinic on Library Applications of Data Processing, GSLIS 98, DPC'98, U. Illinois Urbana-Champaign, March 22-24, 1998, ISSN 0069-4789
13. E. Fox. "Effects on Education, and a Proposal for Collection of Tools" Invitational Workshop on Information Retrieval Tools <http://www.sis.pitt.edu/~erasmus/workshop.html>, U. Pittsburgh, 3/19-21/98, <http://fox.cs.vt.edu/talks/IRtools.htm>
14. E. Fox. "A Scalable Digital Ecology for a Networked Digital Library of Theses and Dissertations (NDLTD)." Winter Workshop of the Human-Computer Interaction Consortium (HCIC), Fraser, Colorado, March 4-8, 1998
15. E. Fox. Networked Digital Library of Theses and Dissertations (NDLTD): A Worldwide Initiative to Advance Scholarship, invited presentation for session on Progress on Digital Dissertation Initiatives, Chair: Joan K. Lippincott, for Coalition for Networked Information Fall Meeting, Minneapolis, MN, Oct. 25-27, 1997 <http://www.ndltd.org/talks/CNIF97.pdf>
16. E. Fox. Digital Libraries and Virtual Universities, invited presentation for "Information research for designing and planning virtual universities" Seminar at Centro Universitario de Investigaciones Bibliotecolgicas Universidad Nacional Autnoma de Mexico Cd. Universitaria, Mexico, D.F. (Library and

- Information Research Center, National University of Mexico), Aug. 11-15, 1997, <http://fox.cs.vt.edu/talks/Mexico97.html>
17. J. Eaton, E. Fox, G. McMillan. Electronic Theses and Dissertations (ETDs) and Their Contribution to Graduate Education. Proc. 53rd Annual Meeting Midwestern Association of Graduate Schools, MAGS, 1997, 73-78
 18. E.A. Fox. Interactive Learning with a Digital Library in Computer Science. Invited paper for Proc. Frontiers in Education - FIE'96, Salt Lake City, Utah, Nov. 6-9, 1996, 415-419.
 19. E. Fox. Digital Libraries, WWW, and Educational Technology: Lessons Learned. Invited paper for Proc. ED-MEDIA 96, World Conference on Educational Multimedia and Hypermedia, Boston, MA, June 17-22, 1996, 246-251. See also <http://ei.cs.vt.edu/~fox/EDMEDIA96/>
 20. E. Fox. Digital Library Support for Education - A Case Study of Advanced Networked Information Systems, Invited presentation for Dagstuhl Workshop on Networked Information Systems - Discovery, Retrieval, Dissemination, Feb. 26 - March 1, 1996, Dagstuhl, Germany.
 21. J.M. Carroll, M.B. Rosson, E.A. Fox, A.M. Cohill, K.W. Schmidt & N.A.Kipp. Community Networks as Working Memory, Invited presentation for HCIC (HCIC Consortium), Feb. 1996.
 22. E. Fox, N. Barnette, C. Shaffer, L. Heath, W. Wake, L. Nowell, J. Lee, D. Hix, and H. Hartson. Progress in Interactive Learning with a Digital Library in Computer Science. Invited paper for Proc. ED-MEDIA 95, World Conference on Educational Multimedia and Hypermedia, Graz, Austria, June 17-21, 1995, pp. 7-12.
 23. J. Shaw and E. Fox. Combination of Multiple Searches. In The Third Text REtrieval Conference (TREC-3), National Institute of Standards and Technology Special Publication, 500-225, April 1995, ed. D. Harman.
 24. E. Fox. Seamless Multimedia Integration for Digital Libraries. Invited position paper for Dagstuhl Seminar on Fundamentals and Perspectives of Multimedia Systems, International Conf. and Research Center for Computer Science, Dagstuhl Castle, Germany, July 4-8, 1994, 118-123.
 25. E. Fox. A digital library connecting Envision, KMS, and Mosaic with interfaces, communications, and data interchange. Invited presentation for 1994 Workshop on Digital Libraries: Current Issues, sponsored by: Rutgers and Purdue Universities, AT&T and Bellcore, at Rutgers Univ., Newark, NJ, May 19-20, 1994. Abstract in SIGOIS Bulletin, Aug. 1994, 15(1): 6.
 26. E. Fox and O. Balci. MDDS Design Evaluation Environment. Massive Digital Data Systems Workshop, Feb. 1-2, 1994, Reston, VA, sponsored by Director of Central Intelligence, Community Management Staff, Advanced Technology Office, 1 page abstract, reviewed.
 27. E. Fox and J. Shaw. Combination of Multiple Searches. In Proc. of The Second Text REtrieval Conference (TREC-2) (Aug. 30 - Sept. 1, 1993, NIST, Gaithersburg, MD), NIST Special Publication 500-215, 1994, ed. D. K. Harman, 243-252
 28. E. Fox. A User-Centered Hypermedia Database from the Computer Science Literature. Invited presentation for Advances in Data Management for the Scientist and Engineer Session 2, AAAS '93, Feb. 11-16, 1993, Boston. Abstract in Proc. 159th National Meeting of the AAAS, AAAS'93: Science and Engineering for the Future, p. 145. Longer paper: E. Fox, L. Heath, and D. Hix, A User-Centered Database from the Computer Science Literature, in Proceedings of the NSF Scientific Database Projects, 1991-1993, eds. W. Chu, A. Cardenas, and R. Taira, Feb. 14-16, 1993, Boston, 70-75.
 29. E. Fox, M. Koushik, J. Shaw, R. Modlin, and D. Rao. Combining Evidence from Multiple Searches. In Proc. of The First Text REtrieval Conference (TREC-1) (Nov. 4-6, 1992, Rockville, MD), ed. D. K. Harman, NIST Special Publication 500-207, Washington: U.S. Government Printing Office, 1993, pp. 319-328.
 30. E. Fox. An Information Retrieval Viewpoint of Query Processing for VIMS. Invited position paper for NSF Workshop on Visual Information Management Systems, organized by U. of Michigan and IBM Almaden Research Center, Feb. 24-24, 1992, San Francisco, CA.
 31. E. Fox. Multimedia Update. Invited presentation appearing in ONLINE/ CD-ROM'91 Conference Proceedings, Nov. 11-13, 1991, San Francisco, CA, 65-69. In Support of Democratic Information Access. Invited presentation for "Emerging Technologies" panel at Future Directions in Text Analysis, Retrieval and Understanding workshop, sponsored by NSF, 11-12 Oct. 1991, Chicago IL, 7 pages.
 32. E. Fox. Background on Information Retrieval Research. Invited presentation for AAAI-91 Workshop on Natural Language Text Retrieval, July 15, 1991, Anaheim, CA, 4 pages.
 33. E. Fox, A. Daoud. CD-ROM Hardware: What's Real, What's Next. Invited presentation appearing in

- ONLINE/ CD-ROM '90 Conference Proceedings, Nov. 5-7, 1990, Washington Hilton and Towers, Washington, D.C., 63-67.
34. E. Fox. An Electronic Publishing / Information Storage and Retrieval Perspective on the Management of Scientific Databases. Invited presentation for National Science Foundation sponsored Workshop on Scientific Databases, March 12-13, 1990, Charlottesville, VA, 2 pages.
 35. E. Fox, Qi Fan Chen. Why and How We Should Have Hypertext/Hypermedia Standards: ACM's Need and the CODER/LEND Approach. Selected for workshop discussion at Hypertext Standardization Workshop, National Institute of Standards and Technology, Jan. 16-18, 1990, Gaithersburg, MD, 10 pages.
 36. E. Fox, A. Daoud. CD-ROM Hardware: An Update. Invited presentation for Online '89, November 7-9, 1989, Chicago, IL, 64-69.
 37. E. Fox. Advances in Text and Image Publishing for CD-ROM. Invited presentation for National Online Meeting, May 10, 1989, New York, 165-170.
 38. E. Fox. Building the CODER System: Working Toward a Comprehensive Testbed for AI in IR. Workshop on Distributed Expert-Based Information Systems, March 5-7, 1987, Rutgers Univ., New Brunswick, NJ, 9 pgs.
 39. E. Fox. Advanced Information Retrieval Methods. Workshop on "Strategies for Information Access" at Second International Conference on CD ROM. Making It Happen, March 2-5, 1987, Seattle, WA, 12 pages.
 40. E. Fox. A Design for Intelligent Retrieval: The CODER System. Proc. of the Second Conf. on Computer Interfaces and Intermediaries for Information Retrieval, May 28-31, 1986, Boston MA, Report DTIC / TR-86 / 5, 135-154.

HOSTING VISITS (selected):

- Hosting 1 year visit from UNICAMP, Brazil, by Ph.D. student Lin Tzy Li, August 2010 - July 2011
- Hosting 8 month visit from UNICAMP, Brazil, by Ph.D. student Nadia P. Kozievitch, Feb. 2010 - Sept. 2010
- Hosting visit by Ricardo daSilva Torres from UNICAMP, Brazil, July 31 - Aug. 4, 2008
- Hosting visit from Darmstadt U. of Technology by Prof. Dr. Rudi Schmiede, May 27-30, 2008
- Hosting 3 Fulbright Scholars visiting from India starting Aug. 2002: Buddhi Chauhan, Pradeep Cheemalavagupalli, Devika Madalli
- Hosting Sabbatical Visit by Lillian Cassel (Villanova U.), all of fall semester 2002 and part-time spring semester 2003
- Hosting Professor Byongsun (Sunny) Kim, Korean Studies Information Center, The Academy of Korean Studies, Seoul, visiting Dec. 14, 2000 - June 10, 2002
- Mann-Ho Lee, Chungnam National University (formerly here on sabattical), discussing with the Digital Library Research Laboratory MARIAN group and CITIDEL project team, Feb. 15, 2002. (He was part of delegation discussing a cooperative exchange program between Virginia Tech and Chungnam National University, with an MOU signed by respective university presidents.)
- Lillian Cassel and Deborah Knox, presenting to the CITIDEL project team, Feb. 15, 2002
- Russ Davis and Dennis Barnes, eNumerate, Inc., presenting to the Digital Library Research Laboratory, Feb. 6, 2002
- AOL team, Jan. 15, 2002
- Ann Lally, University of Arizona, co-PI on NSF grant, Dec. 5-6, 2001, giving Virginia Tech CS seminar on Dec. 5
- John Impagliazzo, Hofstra U., Nov. 29 - Dec. 1, 2001
- Bill Winter, of Internet TIC, Nov. 5, 2001
- UCL (Belgium) visit in conjunction with VTLS, July 23, 2002
- Professor Eberhard Hilf, April 11-13, 2001
- Professor Shalini R. Urs, Dept. Library and Information Science, U. Mysore (India), Fulbright Fellowship, 5 months: August 12, 2000 - Feb. 12, 2001
- Professor Mann-Ho Lee, Dept. of Computer Science, CNU (Chungnam National University) in Korea, visiting for 1 year starting Aug. 14, 2000

- Professor Pablo de la Fuente, Departamento de Informatica, University of Valladolid (Spain), visiting 4/27/2000 - 6/24/2000
- Dr. Ahira Maeda, Japan, postdoctoral fellow for Oct. 22, 2000 - March 21, 2001, after graduation from Nara Institute of Science and Technology (NAIST), Japan
- Professor Byongsun (Sunny) Kim, Korean Studies Information Center, The Academy of Korean Studies, Seoul, visiting for 1 year starting Dec. 14, 2000
- RAI-Channel Two News Group from Italy, hosted visit to Digital Library Research Laboratory and other parts of Torgersen Hall, Oct. 10, 2000
- ABD Fellow Denise Haskings, from The George Washington, Summer 1997
- Marian Bate, Univ. New South Wales, 7/18/97
- Jong-Min Bae, from Korea, Aug. 1997 - June 1998 (sabbatical)
- WVU team visit 11/6/97
- W&M team visit 11/18-19/97
- ISOGEN team 2/26/98
- Sugimoto Shigeo (Japan) 3/18-20/98 and 12/1-2/99
- Delegation from Korea National Open U., Aug. 21, 1998
- Dr. Peter Schirmbacher, Humboldt U., Berlin, Feb. 1999
- Eugene Evans, Infinite Ventures, Inc., Sep. 2, 1999 (speaker on "Alternative Teaching/Learning Strategies" - brown-bag lunch)
- Susanne Dobratz, Humboldt U., Berlin, Sep. 16, 1999 (speaker on "Dissertations Online" - for brown-bag lunch)
- Professor Shalini R. Urs, Dept. Library and Information Science, U. Mysore, India, Fulbright Fellowship, 2000-2001 (scheduled)
- Professor Mann-Ho Lee, Dept. of Computer Science, CNU (Chungnam National University) in Korea, visiting for year starting fall 2000
- Professor Pablo de la Fuente, Departamento de Informatica, University of Valladolid (Spain), visiting 2 months summer 2000

AWARDS SERVING AS PRINCIPAL INVESTIGATOR:

1. Villanova University (pass-through from NSF): Computing in Context; \$22,500 for 8/15/2012 - 7/31/2014; sole PI (with overall PI at Villanova: Robert Beck)
2. NSF DUE-0840719 supplement to: Collaborative Research: Ensemble: Enriching Communities and Collections to Support Education in Computing; additional \$84,895 to VT for 2 years starting 9/15/2012; VT PI Fox (50%), co-PIs Stephen H. Edward and Weiguo Fan
3. Qatar National Research Fund Project No. NPRP 4-029-1-007: Establishing a Qatari Arabic-English Library Institute, Lead PI Edward A. Fox, Co-Lead PI Mohammed Samaka (Qatar University), Co-PIs C. Lee Giles (Pennsylvania State University), John Impagliazzo, Richard Furuta (Texas A&M University), \$1,030,484.98 total (\$125,275.80 for Virginia Tech). Approved by NPRP, project launched April 2012 with funds to Qatar University, funds transfer to Virginia Tech expected in Fall 2012
4. VTX, Part of GlobalWeb Corp., Sao Paulo, Brazil: Organizing Crawled Web Data for Brazilian Customers, PI Edward A. Fox, investigators N. Ramakrishnan and H.R. Hartson, \$199,920 for 12/5/2011 - 5/15/2012.
5. NSF SDCI NMI New: From Desktops to Clouds - A Middleware for Next Generation Network Science, PI Madhav Marathe (17%), Co-PIs Keith Bisset (17%), Anil Vullikanti (17%), Henning Mortveit (17%), E. Fox (15%), Annette Feng (17%), \$1,350,000 for 8/1/2010-8/31/13
6. CCSR (partnership between Arlington Co., IBM Research, VT): Social Media for Cities, Counties, and Communities, \$15,000 (half to IBM and half to VT) for 6/21/2010 - 12/31/2010, VT PI: Andrea Kavanaugh, co-PIs: Edward Fox, Donald Shoemaker, Steven Sheetz; IBM PI: Apostol Natsev, co-PI: Lexing Xie
7. BAE Systems (with funds from DHS) Proposal 75000-02-13: Biometrics Training and Performance Initiative (BTPI), PI Randall S. Murch, co-PIs: A. Lynn Abbott, Edward Fox, Michael Hsiao, Kathleen A. Meehan, Eric Smith; initial letter award made Dec. 2009, rest confirmed March 2010: \$484,622, 11/3/2009-6/30/2012)

8. VT Advance: Department Climate Mini-Grant Program, \$2500 for Computer Science mentoring, 11/16/2009-6/30/2010, PI Edward A. Fox
9. National Institute of Justice: Establishing the Quantitative Basis for Sufficiency: Thresholds and Metrics for Friction Ridge Pattern Detail Quality and the Foundation for a Standard, \$854,907 for 10/1/2009-9/30/2011 followed by 6 month extension to 3/31/2012, PI Randall Murch, Co-PIs A. Lynn Abbott, Michael Hsiao, Bruce Budowle, and Edward A. Fox
10. NSF IIS-0916733: III:Small:Integrated Digital Library Support for Crisis, Tragedy, and Recovery, \$500,000, 8/1/2009 - 7/31/2012, PI Edward A. Fox. Co-PIs: Naren Ramakrishnan, Steven Sheetz, Andrea Kavanaugh, Donald Shoemaker
11. NSF IIS-0910183: Collaborative Research: Curatorial Work and Learning in Virtual Environments, \$75,000 + \$8,000 REU Supplement (followed by 6 month extension), 4/1/09-3/31/10, PI at VT, with overall PI Gary Marchionini at UNC-CH
12. VT Center for Excellence in Undergraduate Training (CEUT): Living In the KnowlEdge Society. Instructional grant: \$2100. PI: Edward A. Fox. Co-PIs: Weiguo Fan, Christopher Zobel, Carlos Evia, Steven Sheetz. November 14, 2008 (1 year)
13. NSF DUE-0840719: Collaborative Research: Ensemble: Enriching Communities and Collections to Support Education in Computing; \$425,002 total to VT, with overall total to all partners \$2M; VT PI Fox (50%), co-PIs Stephen H. Edward and Weiguo Fan
14. IBM: Extraction of Named Entities from Documents for Business Purposes; \$25,450; 2/2008 - 6/2008; GRA Yi Ma; sole PI
15. Google: Concept Maps for Discovering/Using Multilingual Electronic Theses and Dissertations, \$50,000, PI Edward A. Fox, award Sept. 2007
16. NSF IIS-0736055: SGER: DL-VT416: A Digital Library Testbed for Research Related to 4/16/2007 at Virginia Tech, \$199,993+REU Supplement, PI Edward A. Fox, Co-PIs: Christopher L. North, Donald J. Shoemaker, Naren Ramakrishnan, Weiguo Fan, August 15, 2007 - July 31, 2008
17. NSF CCF-0722259: Collaborative Research: CPATH CB: Living In the KnowlEdge Society (LIKES), \$289,999 + \$8,000 REU Supplement to VT, PI Edward A. Fox, Co-PIs: Carlos Evia, Christopher W. Zobel, Steven D. Sheetz, Weiguo Fan, in collaboration with 0722289 to co-PI Edward Carr, North Carolina A&T State University; 0722276 to Robert E. Beck, Villanova University; and 0722263 to Wingyan Chung, Santa Clara University (originally to University of Texas at El Paso), August 1, 2007 - July 31, 2010
18. Microsoft Research: Deployment and Assessment of an Image Annotation and Retrieval Tool, Including for Biodiversity, \$50,000, 5/16/2007 - 5/15/2008, PI: Edward A. Fox, Co-PIs: Eric Hallerman, Ricardo da Silva Torres.
19. Idaho National Laboratory: Storytelling in the National Nuclear Archive, \$10,866 in hand out of \$100K expected, 4/1/2007-3/31/2008, PI: Naren Ramakrishnan, Co-PI: Edward Fox (50-50).
20. NSF OCI-0636151: CI-TEAM Implementation Project: Collaborative Research - A National Engineering Dissection Cyber-Collaboratory, \$104,378.00, 1/1/2007 - 12/31/2008, PI Janis Terpenney, co-PIs: Lisa McNair, Richard Goff, Mary Kasarda, Edward Fox.
21. IBM Unstructured Information Management Architecture (UIMA) Faculty Innovation Award: Incorporating Superimposed Information into UIMA, and UIMA into Digital Library Curriculum Development, as a Prototype Tool for Resource Collection Building and Automatic Syllabus Generation in the Semantic Web; \$16,740; 7/1/2006-6/30/2007; sole PI
22. NSF IIS-0535057: Collaborative Research: Curriculum Development: Digital Libraries, \$272,187 + \$3,200 REU Supplement (all to VT), as well as \$262,407 to partners at UNC-CH under IIS-0535060 for 1/1/2006 - 12/31/2009, PI: Fox, co-PIs at UNC-CH: Barbara Wildemuth and Jeffrey P. Pomerantz.
23. Microsoft Research Digital Memories (Memex): Beyond Human Memory: SenseCam Use in Veterinary College and as Assistive Technology. \$49,894 plus 2 SenseCam devices & software, 1/2006 - 1/2007, PI: Perez-Quinones, co-PI: Fox
24. NSF DUE-0532825: Personalization of Content: Bridging the gap between NSDL and its users through the course website, \$449,912, 9/1/2005 - 8/31/2008, PI: Manuel A. Perez, co-PIs: Edward A. Fox, Lillian N. Cassel, and Weiguo Fan
25. IMLS: Study of User Quality Metrics for Metasearch Retrieval Ranking, \$65,592, for 10/1/2004 - 12/31/2006, subcontract from Emory U. on grant from IMLS, sole PI: Fox.
26. NSF DUE-0435059: Collaborative Project: Superimposed Tools for Active Arrangement and Elaboration

- of Educational Resources, \$397,914, 9/1/04-8/31/06, PI: Lois Delcambre and co-PI David Maier (Portland State U.) including subcontract of \$107,001 to VT with Fox as sole local PI; plus collaborative project at Villanova of \$101,593
27. NSF: Reformulating General Engineering and Biological Systems Engineering at Virginia Tech, \$996,238, 9/1/04 - 8/31/07, PI: Vinod Lohani, co-PIs: G.V. Loganathan, Greg Adel, and E. Fox (5%).
www.dlr.enge.vt.edu
 28. Argyll Foundation: Relief for Canine Hip Dysplasia Related Pain through Reiki, \$8,500, 8/1/04-7/31/05, PI: Marie Suthers-McCabe, co-PIs: Peter K. Shires and Edward A. Fox.
 29. NSF IIS-0307867: Extending retrieval with stepping stones and pathways, \$124,250, 9/1/03-8/31/05, sole PI: Fox.
 30. CWRU (subcontracting to VT for NSF IIS-0325579): Information Technology Research: Managing complex information applications: An archaeology digital library, Project PI: J. Flanagan (CWRU), VT PI: Fox, VT co-PI: Weiguo Fan; subcontract: \$189,500, 9/1/03-12/31/05.
 31. NSF DUE-0333531: Collaborative Project: The OCKHAM Library Network, Integrating the NSDL into Traditional Library Services, NSF, \$99,232, 9/1/03-8/31/06.
 32. National Institute of Aerospace: Development of New Innovative Digital Library, \$40,000, 12/1/03-5/31/05, sole PI: Fox.
 33. Indo-US S&T Forum: Open Digital Libraries and Interoperability Workshop, June 23-25, 2003, Holiday Inn at Ballston, Arlington, VA, \$50,826. Principal investigator. Co-chairs for the workshop: Shalini Urs, Mohammad Zubair, N. Balakrishnan.
 34. SUN: Equipment donation in support of Computing and Information Technology Interactive Digital Educational Library (CITIDEL), 6/30/2003, \$51,119
 35. SOLINET: AmericanSouth.org: A Collaborative Project to Improve Access to Digital Resources on Southern History and Culture: \$52,235 for 1/1/2002 - 2/28/2003. Project director: E. Fox (subcontract on Mellon award to SOLINET).
 36. NSF DUE-0121741 (414201): Intelligent Collection Services for and about Educators and Students: Logging, Spidering, Analysis and Visualization: \$425,000 for 9/10/2001-8/31/2003. PI: Hsinchun Chen (U. Arizona), Co-PI: Ann Lally (U. of Arizona), Co-PI: Edward Fox (VT) - with VT subcontract \$104,773.
 37. NSF DUE-0136690 (414214): A Technical Service Enhancing Interoperability of NSDL Collections and Services. \$450,000 for 9/15/2001-9/30/2003. PI: Su-Shing Chen (University of Florida), Co-PI: Joe Futrelle (NCSA, University of Illinois, Urbana-Champaign), Co-PI: Edward A. Fox (VT) - with VT subcontract \$142,501 for 1/1/2002 - 8/31/2003.
 38. NSF DUE-0121679 (427106): Computing and Information Technology Interactive Digital Educational Library (CITIDEL): \$800,000+35,000 for 9/1/2001 - 5/31/2005. Principal investigator Edward A. Fox. Co-PIs: John A. Lee, Manuel A. Perez, Lillian Cassel (Villanova), C. Lee Giles (Penn State), John Impagliazzo (Hofstra), Deborah Knox (College of New Jersey)
 39. e-Numerate Solutions Inc. (414156): Integrating Digital Library and e-Numerate Technologies: \$40,416 for 8/16/2001 - 8/15/2002. Project director: E. Fox
 40. NLM: SIS/Virginia Tech Advanced Digital Library for Toxicology and Environmental Health Databases, Research Collaboration Program: \$40,000+\$5,500 for 5/16/2001 - 5/15/2002. Project director: E. Fox. (Processed through ORISE, with part to Virginia Tech, and tuition and stipend directly to the graduate assistants.)
 41. NSF IIS-0122201 (427075): June 2001 Workshop for Digital Libraries Initiative Principal Investigators: \$37,948 for 5/1/2001-6/30/2002. Project director: E. Fox.
 42. Internet TIC (one of the awards related to account 437510): Extending Collaboration Between Internet TIC and Virginia Companies Regarding Digital Libraries, Information Retrieval, Networking, and Knowledge Management, \$19,000 for 5/16/2001 - 12/31/2001. Principal Investigator Edward Fox. (Also, \$10,000 for 8/10/2001 - 5/9/2002, as part of \$30K for ODU/UVA/VT on this effort. Also, \$10,000 for 3/15/2001 - 6/30/2002; \$26,000 for 10/15/2001-6/30/2002.)
 43. NSF IIS-0080748 (427043): High Performance Interoperable Digital Libraries in the Open Archives Initiative: \$99,999 for 3/1/2001-3/31/2003. Project director: E. Fox (with CONACyT co-PIs J.Alfredo Sanchez, Universidad de las Americas-Puebla --- UDLA, and David Garza-Salazar, Monterrey Technology Institute --- ITESM, both funded by CONACyT in Mexico)
 44. NSF IIS-0086227 (427042): Open Archives: Distributed services for physicists and graduate students

- (OAD): \$315,259 for 3/1/2001-2/28/2004 (continuing over 3 years with remaining portions of funds). Project director: E. Fox (w. Royce Zia, Physics, VT, and E. Hilf, U. Oldenburg, PI on matching German DFG project)
45. AOL (433837): AOL Fellowship in Information Retrieval: \$140,000 for 2001-2004. Project director: E. Fox
 46. UNESCO (433800): International Guide for the Creation of Electronic Theses and Dissertations: \$13,000 for 12/28/2000-3/31/2002. Project director: E. Fox.
 47. SOLINET: Networked Digital Library of Theses and Dissertations: \$1000 to establish Virginia Tech Foundation account 872037 for NDLTD, 2000. Project director: E. Fox.
 48. PCGI (433766): Internet Development at Public Consulting Group, Inc., \$7825 + \$15,425 for 10/1/2000 - 5/15/2001. Project director: E. Fox
 49. NSF IIS-0090153 (427963): US-Korea Joint Workshop on Digital Libraries: Removing Barriers to International Collaboration on Research and Education through Digital Libraries, \$24,472 for 8/1/2000-12/31/2001, extended to 9/30/2002. Project director: E. Fox (with co-PIs Ronald L. Larsen, U. Md. and Reagan W. Moore, San Diego Supercomputer Center).
 50. IBM (438220): IBM Faculty Partnership Award (UPP): \$20,000, 8/15/2000-2/28/2002. Project director: E. Fox (on superstorage systems and video servers).
 51. UNC Wilmington (434091): A Digital Library of Reusable Science and Math Resources for Undergraduate Education: \$78,374+\$10,000 for 5/1/2000 - 12/31/2002. Project director: E. Fox. (subcontract for IIS-0002935, originally CCRI proposal NSF 98-63 for \$1,143,282, DLI-2, Undergraduate Emphasis)
 52. NSF IIS-9986089 (SGER) (427905): Core Research for the Networked University Digital Library (NUDL): \$79,997 for 1/1/2000 - 4/30/2002. Project director: E. Fox.
 53. Advance Auto Parts: Internet Technology Innovation and Visioning with Advance Auto Parts: \$193,014 for 1/7/2000 - 12/29/2000. Project director: E. Fox. Co-investigators at VT: N. Ramakrishnan, J. Hicks, L. Matheson. Co-investigators at UVA: J. French, A. Weaver.
 54. NSF IIS-9905026: 1999 NSF Information and Data Management Workshop: Research Agenda for the 21st Century - IDM'99: \$105,782 for 3/1/99 - 1/31/01. Project director: Edward A. Fox.
 55. IBM: SUR Program Equipment Donation valued at approximately \$120K for various computers for digital library research, Fall 1998. Project director: E. Fox.
 56. CIT (437510): Internet Technology Innovation Center (ITIC): \$2M for 5 years starting on 10/1/98. Project director at Virginia Tech: Edward A. Fox, also serving as director of a new university center to handle this (ITIC@VT). Virginia Tech is one of 4 universities in this virtual center, with UVA administering the grant from the Virginia Center for Innovative Technology. See <http://www.internettic.org>
 57. NLM: Advanced Information Retrieval for Toxicology and Environmental Health Databases: \$25,000 for 5/16/98 - 5/15/99. Project director: Edward A. Fox (processed through ORISE, with \$7754 to Virginia Tech and tuition and stipend directly to the graduate assistant). Project period and funds are being extended into 2000.
 58. NSF DUE-9752408: Curriculum Resources in Interactive Multimedia (CRIM): \$87,000 for the DUE CCD program 97-29, 1/1/98 - 12/31/2000. Project director: Edward A. Fox.
 59. NSF DUE-9752190: A Digital Library Based Computer Science Teaching Center (CSTC): \$72,820 for 1/1/98-2/29/2000. Project director: Edward A. Fox. Subaward for proposal to NSF for the DUE CCD program 97-29 granted to D. Knox of The College of New Jersey
 60. NSF NCR-9616956: A High Performance Connection for Research and Education Institutions and Facilities in Virginia: \$350,000 for 1/1/97 - 12/31/98. Principal investigators: E. Blythe, E. Fox, J. Crowder.
 61. OCLC: SiteSearch software license: \$50,000 for 1997-1999 for electronic thesis and dissertation research. Project director: E. Fox.
 62. IBM: SUR Program Equipment Donation valued at approximately \$400K for various computers for digital library research, Dec. 1996. Project director: E. Fox.
 63. NSF NCR-9627922: World-Wide Web Traffic Characterization with Application to In-Network Caching and Prefetching: \$320,559 for 9/1/96 - 8/31/99. Principal investigators: M. Abrams, E. Fox, J. Pollard. REU supplement summer 1998: \$5000.
 64. U.S. Dept. of Education, FIPSE Program P116B61190: Improving Graduate Education with a National Digital Library of Theses and Dissertations: \$208,040 requested for 9/1/96-8/31/99

- (federal/nongovernmental percentages 53.3% / 46.7%. Principal investigators: E. Fox, J. Eaton, G. McMillan. In-kind cost sharing of \$30K promised by SURA, and supporting software donations promised from Microsoft (est. value \$107,820) and Adobe (est. value \$100K). See final report <http://www.ndltd.org/pubs/FIPSEfr.pdf>
65. HAL Computers: HALstation 330 (64 bit) donated as follow-up to earlier license of hashing technologies, 1996. Est. value \$10K. Principal investigators: E. Fox, L. Heath.
 66. IBM: Information Retrieval Systems Evaluation: \$11,002 for 5/22/96 - 3/15/97. Principal investigator: E. Fox.
 67. SURA: Development and Beta Testing of the Monticello Electronic Library Thesis and Dissertation Program: \$90,117 for 1/1/96 - 12/31/97. Principal investigators: E. Fox, J. Eaton, G. McMillan.
 68. NSF DGE-9553458: Graduate Research Traineeship in Human Interface Design for Access to Computers and Networked Information at Virginia Tech. \$562,500 for 9/5/95-8/31/2000. PIs: Carroll, J. (project director), Abrams, M., Ehrich, R., Rosson, M.B, Hix, D., Hartson, R., Shaffer, C., and Fox, E.A.
 69. NSF SUCCEED: Using Computers and Networked Information: Distance Learning with Networked Multimedia: \$35,432 for 5/15/95 - 8/15/97. Principal investigators: E. Fox, M. Abrams, N. D. Barnette.
 70. IBM: SUR Program Equipment Donation valued at approximately \$250K for 4-processor SMP machine for digital library research, Dec. 1995. Project director: E. Fox.
 71. NSF: Building a History of the Blacksburg Electronic Village: \$24,866 for 10/15/94 - 8/15/95. Principal investigators: J. Carroll, A. Cohill, G. Downey, E. Fox, and M.B. Rosson.
 72. PRC Inc.: Hypertext and Automatic Document Indexing: \$25,308 for 5/16/94-12/31/94. \$27,592 extension to 8/15/95. Principal investigator: E. Fox.
 73. NSF SUCCEED (Cooperative Agreement No. EID-9109853): Network Multimedia File System with HyTime: \$60,000 for 8/16/93 - 2/15/95. Principal investigators: E. Fox (proj. dir.), M. Abrams, and S. Newcomb (of Florida State Univ., receiving \$15K of the total).
 74. NSF CISE Institutional Infrastructure (Education) Grant CDA-9312611: Interactive Learning with a Digital Library in Computer Science: \$449,088 for 8/15/93 - 7/31/97. Principal investigators: E. Fox (project director), J. Lee, C. Shaffer, H. Hartson, D. Barnette. Supplement \$67,802 in 1997 for workshop, EI home page, digital library courseware.
 75. NSF Research Infrastructure CDA-9303152: Interactive Accessibility: Breaking Barriers to the Power of Computing: \$1,375,000 for 7/1/93 - 6/30/98. Principal investigators: R. Ehrich, E. Fox, H. Hartson, D. Hix, R. Williges. Director of Information Access Laboratory.
 76. NIST/DARPA, PRC Inc.: Text Retrieval Methodologies: \$6,000 from DARPA for 1 year starting 4/1/93. Additional support for project provided by PRC Inc.: \$11,489 for 1993. Principal, only investigator.
 77. National Science Foundation CISE Grant NSF-CDA-9308259: Wide Area Technical Report Server: \$22,736 for 1993. Principal investigators: K. Maly (ODU), E. Fox, J. French (UVA), and A. Selman (SUNY Buffalo). Awarded to Maly (ODU) with \$4200 subcontract to VPI&SU.
 78. Intel Corporation: Multimedia Research and Enhanced Surrogate Travel Simulations Using DVI Technology: \$5,845 in equipment, Oct. 1992. Prin. investigators: L. Carstensen, E. Fox.
 79. National Science Foundation CISE/CDA Grant: High Data Rate Network Research: \$46,000 for 6/1/92 - 5/31/95. Principal investigators: M. Abrams, J.A. Wiencko, S.F. Midkiff, N.J. Davis, and E.A. Fox.
 80. Dept. of Education (FIPSE): GeoSim: A GIS-Based Simulation Laboratory for Introductory Geography: \$149,571 for 9/9/92-5/15/95. Principal investigators: C. Shaffer; L. Carstensen, R. Morrill, and E. Fox.
 81. National Science Foundation Grant 9155943: GeoSim: A GIS-Based Simulation Laboratory for Introductory Geography: \$107,940 for 5/1/92 - 10/31/93. Principal investigators: C. Shaffer; L. Carstensen, R. Morrill, and E. Fox.
 82. NIST/DARPA, PRC Inc.: Advanced Routing and Retrieval from a Large Collection: \$10,000 from DARPA for 1 year starting 2/1/92. Additional support for project provided by PRC Inc.: \$28,571 for 2/1/92 - 12/30/92. Principal and only investigator.
 83. Intel Corporation: Multimedia Research and Enhanced Surrogate Travel Simulations Using DVI Technology: \$34,752 in equipment, November 1991. Principal investigators: L. Carstensen, E. Fox.
 84. National Science Foundation Grant IRI-9116991: A User-Centered Database from the Computer Science Literature: \$443,391 for 9/15/91 - 2/28/95, plus \$12,000 REU supplements, plus \$29,941 equipment supplement. Principal investigators: E. Fox, D. Hix and L. Heath.
 85. NCR Corporation: Usable Environments for Developing Interactive Multimedia Applications, \$20,000 for 5/15/91 - 12/31/91. PIs: E. Fox, D. Hix and E. Schwartz.

86. Virginia Center for Innovative Technology: Software for Large Multimedia Databases Including Facsimile Images: \$8,000 for 6/1/91 - 5/31/92. Principal and only investigator.
87. PRC Inc.: Software for Large Multimedia Databases Including Facsimile Images: \$20,000 for 6/1/91 - 5/31/92. Principal, only investigator.
88. NCR Corporation: Evaluation of Tools for Developing Interactive Multimedia Applications: \$20,000 for 3/1/91 - 9/30/91. Principal investigators: E. Fox, D. Hix, and E. Schwartz.
89. NCR Corporation: Prototyping with New Metaphors for Describing Interactive Multimedia Applications: \$20,000 for 1/1/91 - 6/30/91. Principal investigators: E. Fox, D. Hix, and E. Schwartz.
90. NCR Corporation: Extending the Integrator Component of an Interactive Multimedia Application Development Environment: \$7763 for 1/1/91 - 5/31/91. Principal investigators: E. Fox, D. Hix, and E. Schwartz.
91. Chemical Abstracts Service: An Evaluation of Access Approaches to the Chemical Literature: \$25,133 for 1/1/91 - 8/15/91. Principal investigators: E. Fox and J. Merola.
92. West Publishing Company: Advanced Retrieval Methods for Full Texts of Legal Documents: \$74,717 for 1/1/91 - 12/31/91. Principal and only investigator.
93. NCR Corporation: Developing Digital Multimedia Applications for the General Public. \$60,000 for 1/1/90 - 12/31/90. Principal investigators: E. Fox, D. Hix, and E. Schwartz.
94. Columbia University (subcontract under IAIMS grant from National Library of Medicine): Cardiology-CODER: \$20,000 for 12/1/89-5/15/91. Principal and only investigator.
95. Online Computer Library Center (OCLC) Inc.: Advanced Retrieval Methods for Online Catalogs: \$10,000 for 7/1/89-6/30/90. Principal and only investigator.
96. Naval Surface Warfare Center: Advanced Naval Message Analyzer: \$26,594 for 7/10/89 - 6/9/90. Principal and only investigator.
97. Virginia Center for Innovative Technology: A Prototype Geographic Information System for Personal Workstations: \$33,890 for 4/1/89- 3/31/90. Principal investigators: Clifford A. Shaffer, James B. Campbell, Laurence W. Carstensen, Jr., Edward A. Fox.
98. General Dynamics: A Prototype Geographic Information System for Personal Workstations: \$43,000 for 4/1/89-3/31/90. Principal investigators: Clifford A. Shaffer, James B. Campbell, Laurence W. Carstensen, Jr., and Edward A. Fox.
99. Virginia Center for Innovative Technology Grant INF-89-010: Interactive Digital Video Authoring and Prototyping. \$50,000 for 5/1/89-4/30/90. Principal investigators: Edward A. Fox, Deborah Hix, and E. Schwartz.
100. NCR Corporation: Interactive Digital Video Authoring and Prototyping. \$60,000 for 2/15/89-2/14/90. Principal investigators: Edward A. Fox, Deborah Hix, and E. Schwartz.
101. Council on Library Resources Grant CLR 4048-C: Comparison of Advanced Retrieval Approaches for Online Catalog Access. \$3000 for 1/1/89- 6/30/90. Principal investigators: Edward A. Fox and Linda Wilson (Reference Dept., Newman Library, VPI&SU).
102. NCR Corporation: Prototype Application of Advanced Methods for Information Storage and Retrieval. \$44,691 for 1/1-12/31/89. Principal and only investigator.
103. Nimbus Records, Inc. Grant: CD ROM Based Publishing and Access to Composite Document Databases. \$9000 from CIT plus \$10,000 from Nimbus (and \$5000 in-kind) for 6/1/88-10/1/88. Principal and only investigator.
104. National Agricultural Library and Extension Service - USDA: Joint Assessment of Alternative Approaches for Database Development and Distribution. \$41,400 for 1988-9. Principal investigators: Mary G. Miller, Michael T. Lambur, Thomas R. McAnge, and E. A. Fox.
105. National Science Foundation Grant IRI-8703580: Organizing Lexical Knowledge for Information Retrieval. \$149,900 plus \$8,284 REU Suppl. for 8/1/87-6/30/90. Prin. investigators: E. Fox and J.T. Nutter.
106. Council of Higher Education in Virginia Grant: Cooperative Library Services Program: The Virginia Disk: An Evaluation of Locally Produced CD ROM Products. \$21,735 for 6/15/87 - 9/15/88. Principal investigators: E. Fox and P. Gherman.
107. Virginia Center for Innovative Technology Grant INF-87-012: CD ROM Based Publishing and Access to Composite Document Databases. \$24,500 for 5/1/87-7/31/88. Renewal \$9,000 through 1/15/89. Principal and only investigator.
108. Nimbus Records, Inc. Grant: CD ROM Based Publishing and Access to Composite Document Databases.

- \$24,500 from CIT plus \$12,000 from Nimbus (and \$5000 in-kind from Highlighted Data, Inc.) for 5/1/87-7/31/88. Principal and only investigator.
109. AT&T Foundation Equipment Donation. \$711,090 for 1987. Prin. invest's: D. Kafura, E. Fox. Virginia Center for Innovative Technology Grant INF- 85-016: Improved Automatic Analysis, Indexing, Storage and Retrieval of Corporate Documentation and Network Information. \$82,500 (renewal) for 1/1/86-9/15/87. Principal and only investigator.
 110. National Science Foundation Grant IST-8418877: Effective Retrieval of Composite Documents. \$90,760, 2/15/85-7/31/87. Prin. investigator.
 111. AT&T Foundation Equipment Donation. \$7,580 in Dec. 1986. \$50,030 in Dec. 1985. Principal and only investigator.
 112. Virginia Center for Innovative Technology Grant INF-85-016: Improved Automatic Analysis, Indexing, Storage and Retrieval of Corporate Documentation and Network Information. \$51,001 (to VPI&SU and \$45,871 to George Mason Univ.) for 1/1/85-12/31/85. Principal investigators: M. Koll (GMU) and E. Fox (VPI&SU).
 113. Virginia Center for Innovative Technology Contract C-85-026: Development of Prototype Electronic Mail and Bulletin Board Distributed System to Facilitate CIT Operations. \$21,479 for 3/15/85-3/15/86. Principal and only investigator.
 114. VPI&SU College of Arts and Science Small Proj. Grant 1895820: Information Retrieval for Office Information Systems. \$1,600 for 12/1/83-11/30/85. Principal and only investigator.

SUMMARY:

>110 grants with funding from ARPA, AT&T, BAE Systems, CAS, Dept. of Educ., Google, IMLS, Intel, Natl. Ag. Lib., Microsoft, NCR, NIJ, NIST, NSF, OCLC, PRC Inc., Virginia CIT, ...

ALSO, CONSULTANT ON:

- Patent cases, addressing invalidity, non-infringement, etc.
- US Intelligence Community: Massive Parallel Object Store, 12/1/94 - 12/1/95, to Knowledge Systems Inc., Principal investigators: R. Akscyn, D. McCracken.
- National Archives and Records Administration: Access to Archival Databases (AAD), \$648,282.50 contract to SAIC for 1999-2000

KEYNOTE/BANQUET/INT'L INVITED/DISTINGUISHED SPEAKER PRESENTATIONS:

1. Edward A. Fox, Living In the KnowlEdge Society: the double duty of a librarian, invited speaker (by videoconference) at Linking Research and Education in Digital Libraries Workshop at TPDL 201, 28-29 Sept. 2011, Berlin
2. E. Fox. A formal approach to digital libraries - the 5S framework: Societies, Scenarios, Spaces, Structures, Streams. Invited talk for Seminar Series, Department of Computer Science at Georgetown University, Washington, D.C., April 29, 2011
3. E. Fox. Digital Library Support for 1) Graduate Education and 2) Computing-related Education. Keynote presentation at Digital Libraries in Higher Education: Scientific Experiences, Riyadh, Saudi Arabia, 30-31 October 2010, <http://fox.cs.vt.edu/talks/2010/20101030FoxRiyadhKeynote.pdf>.
4. E. Fox. Digital Libraries, Scholarship, and the Humanities. Keynote presentation (as Guest of Honor for the conference), Libraries in the Digital Age (LIDA) 2010, Zadar, Croatia, 24-28 May 2010, University of Zadar, Zadar, Croatia (<http://web.ffos.hr/lida/lida2010/>)
5. E. Fox. Opening and Expanding Digital Library Services. Invited keynote for Canadian ETD and Open Repositories Workshop, May 10-11, 2010, Carleton University, Ottawa
6. Digital Libraries: From Theory to CS/LIS Curricula, invited speaker for the Lazerow lectures, C.W. Post Campus, Long Island University, Brookville, New York, April 23, 2008
7. Digital Libraries: From Proposals to Projects to Systems to Theory to Curricula, invited keynote for DELOS Conference 2007, 14 Feb. 2007, Pisa, Italy,

- <http://fox.cs.vt.edu/talks/2007/20070214DELOSkeynotePisa.ppt>
8. Digital Libraries for Education: Lessons Learned and Promising Opportunities, invited keynote for LODL 2006, Workshop on "Learning Object Repositories as Digital Libraries: Current Challenges", ECDL 2006, Alicante Spain, 22 Sept 2006 (by videoconference)
 9. Improving Graduate Education with Digital Libraries, invited keynote for the Inauguration of the DFG Graduiertenkollegs 1223 "Quality improvement in e-Learning by feedback processes" (Eröffnung des DFG-Graduiertenkollegs 1223 Qualitätsverbesserung im E-Learning durch rückgekoppelte Prozesse), 14 Sept. 2006, Darmstadt, GE
 10. A 5S Perspective on Digital Libraries for E-Learning: With case studies from Archaeology, Computing, and Dissertations, invited keynote for DeLFI 2006 (Die 4. e-Learning Fachtagung Informatik), 14 Sept. 2006, Darmstadt, GE
 11. Digital Libraries: 1991-2006 and beyond, with electronic theses and dissertations. Invited videoconference (since delayed 1 day in travel) presentation to approximate 300, at several sites and at University of Sao Paulo (USP-Brazil), for event to commemorate 5 years of electronic theses and dissertations (www.teses.usp.br). Aug. 23, 2006
 12. Digital Library Curricula and Modules Informed by 5S, invited keynote for Workshop 6: Developing a Digital Libraries Education Program, JCDL 2006, June 11-15, 2006, Chapel Hill, NC
 13. 5S and the Reference Model, invited talk at DELOS Reference Model Workshop, Frascati-Rome, June 1-2, 2006
 14. From the WWW and Minimal Digital Libraries, to Powerful Digital Libraries: Why and How. Invited talk in Fox, E.A.; Neuhold, E.; Premismit, P.; Wuwongse, V. (Eds.) Digital Libraries: Implementing Strategies and Sharing Experiences; Proceedings 8th International Conference on Asian Digital Libraries, ICADL 2005, Bangkok, Thailand, December 12-15, 2005, Lecture Notes in Computer Science, Vol. 3815, XVII, 529 p., ISBN: 3-540-30850-4, p. 525, DOI: 10.1007/11599517_74, <http://fox.cs.vt.edu/talks/2005/20051213ICADLinvited.ppt>
 15. Digital Libraries: Archaeology, Automation, ETDs, and Enhancements. Invited talk. The International Advanced Digital Library Conference (IADLC), Nagoya University, Japan, August 25-26, 2005, <http://fox.cs.vt.edu/talks/2005/20050823Nagoya.ppt>
 16. Digital Libraries for Education: Case Studies. Invited talk. In Zhaoneng Chen, Hsinchun Chen, Qihao Miao, Yuxi Fu, Edward Fox, Ee-Peng Lim, eds. Digital Libraries: International Collaboration and Cross-Fertilization; Proceedings 7th International Conference on Asian Digital Libraries, ICADL 2004, Shanghai, Dec. 2004. Springer-Verlag GmbH, Lecture Notes in Computer Science, vol. 3334, pp. 51-60, <http://springerlink.metapress.com/openurl.asp?genre=article&issn=0302-9743&volume=3334&page=51>
 17. Towards a Digital Library Theory: A Formal Digital Library Ontology. Invited talk at University of Athens, Greece, Dec. 9, 2004.
 18. Towards a Quality Model for Digital Libraries. Invited talk for the DELOS workshop on digital library evaluation, Padova, Italy, October 4-5, 2004. Marcos Andre Goncalves, Edward A. Fox, Baoping Zhang, Layne T. Watson.
 19. Digital Libraries of the Future: Integration through the 5S Framework. Keynote talk for RCDL'2004, the Sixth National Russian Research Conference: Digital Libraries: Advanced Methods and Technologies, Digital Collections, Sep. 30, 2004, Pushchino, Russia
 20. Digital Libraries for Education: Foundations to Case Studies. Invited talk. Also, Chair of the conference for the morning of 7 September. In Proceedings Digital Library --- Advance the Efficiency of Knowledge Utilization, 2nd International Digital Library Conference, hosted by National Library of China, Beijing, September 6-8, 2004.
 21. Case Studies in the US National Science Digital Library: DL-in-a-Box, CITIDEL, and OCKHAM. Invited talk in: Tengku Mohd Tengku Sembok, Halimah Badioze Zaman, Hsinchun Chen, Shalini R. Urs, Sung Hyon Myaeng, eds. Digital Libraries: Technology and Management of Indigenous Knowledge for Global Access; Proceedings 6th International Conference on Asian Digital Libraries, ICADL 2003, Kuala Lumpur, Malaysia, Dec. 2003. Springer-Verlag GmbH, Lecture Notes in Computer Science, vol. 2911, 17-25, <http://www.springerlink.com/openurl.asp?genre=article&issn=0302-9743&volume=2911&page=17>
 22. Improving Graduate Education: Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation for International Conference on University Libraries: Electronic publishing and library services, Mexico City, Oct. 23, 2003, 82 slides

23. Research Challenges to Semi-Automatically Enhance Quality in Distributed Open Archives, invited presentation for SINNO3, Oldenburg, GE, 9/18/2003, 75 slides
24. Closing Keynote invited for ETD'2003 (The 6th Int'l Symp. on Electronic Theses and Dissertations), Humboldt U., Berlin, GE, May 23, 2003
25. The Future of Electronic Publishing, invited presentation for Symposium on The Library of the Future, Humboldt U., Berlin, GE, May 19, 2003 (at opening of new building)
26. Keynote on "Human Resources and the Information Professional in the Digital Age" for Madras Library Association (MALA) Platinum Jubilee Celebration, Chennai, India, Jan. 29, 2003 (videoconference presentation arranged by US State Dept.), <http://smp2.cc.vt.edu/~fox/tmp/Chennai20030129Fox.ppt>
27. ETD Digital Library, invited presentation for International Conference on Scientific Electronic Publishing in Developing Countries, Sept. 30 - Oct. 2., 2002, Valparaiso, Chile
28. From Electronic Theses and Dissertations to Supporting Teaching and Learning in Science, Technology, Engineering and Mathematics - The Benefits of Digital Libraries. Invited presentation for University of Chile, Sept. 30, 2002 (for ~200 librarians, etc. in region), Santiago, hosted by Gabriela Ortuzar
29. From Electronic Theses and Dissertations to Supporting Teaching and Learning in Science, Technology, Engineering and Mathematics - The Benefits of Digital Libraries, invited presentation for ISN Sommerfest, September 13, 2002, Oldenburg, Germany
30. Advancing Education through Digital Libraries: NSDL, CITIDEL, and NDLTD. Invited presentation, Proc. Digital Library: IT Opportunities and Challenges in the New Millennium, July 9-11, 2002, Beijing Library Press, Beijing, China, 107-117
31. ETD Roots: History of the ETD Initiative. Keynote invited for ETD'2002 (The Fifth Int'l Symp. on Electronic Theses and Dissertations: Pioneering on the Electronic Frontier: e-theses and Intellectual Solidarity), BYU, Provo, Utah, May 30 - June 1, 2002
32. Future of the ETD Initiative. Keynote invited for ETD'2002, BYU, Provo, Utah, May 30- June 1, 2002
33. Digital Library as Infrastructure for Knowledge Management in Academic and Research Institutions: Open Archives Initiative and Education Demonstrations (NDLTD, CITIDEL/NSDL), Construyendo una plataforma de tecnologia integrada para la administracion del conocimiento. Opening keynote for Amigos 2002 Conference, Comunicacion del conocimiento basada en la tecnologia de la informacion, The Mexican Network for Library Cooperation, <http://biblio.pue.udlap.mx/congress/>, Puebla, Mexico, Feb. 21, 2002. (7 page paper) (Also, panel moderator, with panel title "Construyendo una plataforma de tecnologia integrada para la administracion del conocimiento".)
34. Overview of Digital Libraries. Inaugural speaker in seminar series for the ASDC staff - Atmospheric Sciences Data Center (the former EOSDIS DAAC) - and related groups - full-day tutorial on digital libraries at NASA LaRC (NASA Langley), Hampton, VA, January 18, 2002, <http://ei.cs.vt.edu/~dlib/tut/NASA20020118.htm>
35. International Collaboration on Digital Libraries. Invited keynote presentation, International Conference on Asian Digital Libraries, ICADL'2001, Bangalore, India, Dec. 10-12, 2001.
36. Networked Digital Library of Theses and Dissertations: New Services, Standards, and Integration with the Open Archives Initiative. Invited keynote at the workshop Jornadas sobre Gestion de la Informacion en el siglo XXI, JOURNEYS ON INFORMATION MANAGEMENT ON XXI CENTURY, Montevideo, Uruguay, 12-14 November.2001 sponsored by UNESCO, ISTE, the University of Republica of Uruguay and the ORT University
37. Terabyte scale multilingual digital library services and harvesting from Open Archives. Invited plenary for NIT'2001, Beijing, China, May 29-31, 2001. In Global Digital Library Development in the New Millennium: Fertile Ground for Distributed Cross-Disciplinary Collaboration, ed. Ching-chih Chen, Tsinghua U. Press, pp. 59-70
38. Status Report on the NDLTD. Invited closing plenary for Fourth International Symposium on Electronic Theses and Dissertations (ETDs), Caltech, Pasadena, CA, March 22-24, 2001, <http://www.ndltd.org/talks/etd01key.ppt> (plus helped run standards meeting, chaired 2 sessions, hosted a "networking" table on NDLTD future directions, coordinated meeting of working group on the UNESCO International Guide for ETDs)
39. Digital Libraries: From Theory to Applications in Education and Business. Invited keynote presentation, 2000 Asian DL conference, ICADL'2000, Seoul, Korea, Dec. 6-8, 2000. <http://www.ndltd.org/talks/koreainv.ppt>
40. Digital Libraries: Extending and Applying Library and Information Science and Technology, invited

- keynote for ACM CIKM 2000, McLean, VA, Nov. 9, 2000. <http://www.ndltd.org/talks/cikm2000.ppt>
41. The Co-Evolution of Digital Libraries and the WWW. Invited keynote for WebNet '2000, San Antonio, Nov. 4, 2000. <http://www.ndltd.org/talks/webnet.ppt>
 42. Digital Libraries: Extending the Impact of Information Science, sole keynote for final DISSAnet Conference, Pretoria, South Africa, Oct. 26-27, 2000. DISSAnet is a project between the Royal School of Library and Information Science in Copenhagen and the Universities of Pretoria and the North in South Africa. It is funded by DANIDA. <http://www.ndltd.org/talks/prolissa.ppt>
 43. Digital libraries, universities, and scholarly communication, keynote for EUNIS'2000, Poznan, Poland, April 14, 2000. <http://www.ndltd.org/talks/poznan.ppt>
 44. Future Funding and the NDLTD Vision. Invited closing plenary for Third International Symposium on Electronic Theses and Dissertations (ETDs), St. Petersburg, FL, March 18, 2000 <http://www.ndltd.org/talks/ETD3close.ppt>
 45. The 5S Framework for Digital Libraries and Two Case Studies: NDLTD and CSTC, keynote for NIT99 (<http://artemis.simmons.edu/~cchen/nit/>), The 11th International Conf. on New Information Technology, Taipei, Taiwan, Aug. 18, 1999, Word: <http://www.ndltd.org/talks/nit99.ppt>
 46. Networked Digital Library of Theses and Dissertations. Sole keynote for 15th Workshop on Digital Library (DLW15), Nara Inst. for Sci. Tech. (NAIST), Japan, July 19, 1999. PowerPoint: <http://www.ndltd.org/talks/dlw15.ppt>, Word: <http://www.ndltd.org/pubs/dlw15.doc>
 47. From Theory to Practice in Digital Libraries: 5S and Educational Applications (NDLTD, CSTC), Keynote at NSF-CONACyT Workshop on Digital Libraries, Albuquerque NM, July 7-9, 1999, <http://ict.udlap.mx/dl/workshop99/>, Word: <http://www.ndltd.org/pubs/conacyt99.doc>
 48. Digital dissertations network worldwide, keynote presentation for joint session of Dissertation Online Workshop and IuK'99 - Dynamic Documents, University of Jena, Germany, March 24, 1999 <http://elfikom.physik.uni-oldenburg.de/IuK/IuK99>
 49. Networked Digital Library of Theses and Dissertations: A Framework for East-West Collaboration, keynote talk, paper in Proc. First Asian Digital Library Workshop, "East meets West," August 5-7, 1998, Hong Kong, hosted by University of Hong Kong. <http://www.ndltd.org/talks/Asia.htm>
 50. Digital Libraries: The Networked Digital Library of Theses and Dissertations (NDLTD) and the Computer Science Teaching Center (CSTC). Keynote for Computer Science Workshop, sponsored by CONACyT and NSF, Puebla, Mexico, June 10-12, 1998. <http://www.ndltd.org/talks/CONACyTNSF.pdf>
 51. Improving Education through the Networked Digital Library of Theses and Dissertations (NDLTD) and the Computer Science Teaching Center (CSTC), invited international presentation for the Russian-American DL Workshop, <http://www.risi.ru/radlw98/indexe.htm> Moscow, April 16-17, 1998.
 52. Digital Libraries: Their Educational Applications and Uses. Opening presentation, keynote session for Web Week and first talk in the Rice University Fondren Library and Information Technology 1997 Lecture Series "Rethinking Information Access in the Digital Age", March 17, 1997.
 53. Digital Libraries through Information Retrieval for Education. Presentation for Distinguished Lecture Series, Univ. Utah Dept. of Computer Science, March 7, 1996.
 54. Rethinking libraries in the information age: lessons learned with 5 digital library projects, Henderson Lecture, UNC Chapel Hill, Feb. 1, 1996.
 55. Images of Digital Libraries. Invited opening keynote address. INFO Conference: Digital transfer of images, Helsinki, Finland, Nov. 10-11, 1994, 2 pg. extended abstract for conference plus longer paper for proceedings.
 56. Multimedia in Education and Digital Libraries. Sole keynote speaker for Multimedia Systems: Technology and Applications, Oct. 12-13, 1994, Ottawa.
 57. How to make intelligent digital libraries. Invited plenary presentation for 8th Int'l Symp. on Methodologies for Intelligent Systems (ISMIS'94), Charlotte, NC, Oct. 16-19, 1994.
 58. Toward a Widely Used Hypermedia Digital Library in Computer Science. Invited plenary presentation for EG-MM '94, First Eurographics Symposium and Workshop on Multimedia: Multimedia/Hypermedia in Open Distributed Environments, June 6-9, 1994, Graz, Austria.
 59. Digital Libraries: Why People Use Tools, Not AI. Invited plenary presentation for Tenth IEEE Conf. on Artificial Intelligence for Applications (CAIA), San Antonio, March 1-4, 1994.
 60. From Information Retrieval to Networked Multimedia Information Access, keynote address. In G. Knorz, J. Krause, C. Womser-Hacker, eds., Information Retrieval '93, Proc. der 1. Tagung Information Retrieval

- '93, 13-15 September, 1993, University of Regensburg, Germany, Univ. of Konstanz Press, 116-124.
61. Multimedia Systems and Electronic Libraries, IBM/FAU Distinguished Lecture Series, April 8, 1993, Florida Atlantic Univ., Boca Raton, FL.
 62. Multimedia Standards and Systems. Banquet Presentation, Third International Workshop on Network and Operating System Support for Digital Audio and Video, Nov. 12-13, 1992, La Jolla, CA.
 63. Building a User-Centered Database from the ACM Literature. Invited plenary presentation for Symposium on Document Analysis and Information Retrieval, March 16-18, 1992, Tropicana Hotel, Las Vegas, Nevada, 235-246.
 64. Hypermedia: Flexible Access to Multimedia Information. Invited presentation at National Institute of Standards and Technology (NIST), Gaithersburg, MD, September 27, 1991. Initial lecture in series on Hypermedia.
 65. Electronic Publishing and Intelligent Information Retrieval. Invited presentation for OCLC (Online Computer Library Center, Inc.) Office of Research Distinguished Seminar Series, Feb. 10, 1989, Dublin, OH.
 66. The Role of CD ROM in Libraries of the Future. Academia Keynote, Compact Disks for Information Storage and Access, Cornell Univ. Libraries sponsored conf., April 27, 1987, Cornell Univ., Ithaca NY.

TUTORIALS:

(over 77 tutorials in over 28 countries - Argentina, Australia, Austria, Belgium, Brazil, Canada, China, Costa Rica, Croatia, Denmark, England, Germany, Hungary, India, Ireland, Italy, Malaysia, Portugal, Russia, Scotland, Singapore, S. Africa, S. Korea, Spain, Switzerland, Thailand, Uruguay, USA, Vietnam)

1. Edward Fox. A)Introduction to Digital Libraries; B)Guidelines and Resources for Teaching DLs. Proceedings of the 12th ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL 2012), Washington D.C., June 10-14, 2012, tutorial proposal (full-day, in 2 parts)
2. E. Fox. Introduction to Digital Libraries. Refereed 1/2 day tutorial for ACM/IEEE Joint Conf. on Digital Libraries, JCDL 2011, Ottawa, June 13-17
3. E. Fox. Guidelines and Resources for Teaching Digital Libraries. Refereed 1/2 day tutorial for ACM/IEEE Joint Conf. on Digital Libraries, JCDL 2011, Ottawa, June 13-17
4. Gregory W. Hislop, Lillian N. Cassel, Lois M.L. Delcambre, Edward A. Fox, Richard Furuta, Peter Brusilovsky, and Daniel D. Garcia. Sharing Your Instructional Materials via Ensemble. Tutorial for Proceedings Consortium for Computing Sciences in Colleges - Northeastern Region, CCSCNE 2011, Western New England College, Springfield, MA, April 15-16, 2011
5. Introduction to (Teaching / Learning about) Digital Libraries. Refereed 1/2 day tutorial for Research and Advanced Technology for Digital Libraries, Proc. 14th European Conference, ECDL2010, Glasgow, Sept. 6-10
6. Introduction to Digital Libraries. Refereed full-day tutorial for JCDL 2010, June 21-25, Gold Coast, Australia
7. Introduction to (Teaching / Learning about) Digital Libraries. Full-day tutorial, JCDL 2009, Austin, June 15, 2009
8. Introduction to (Teaching / Learning about) Digital Libraries. Half-day tutorial, JCDL 2008, Pittsburgh, June 19, 2008
9. Introduction to (Teaching / Learning about) Digital Libraries. Half-day tutorial, ICADL 2007, Dec. 10, 2007, Hanoi
10. Introduction to (Teaching / Learning about) Digital Libraries. Full-day tutorial (part 1, part 2), ECDL 2007, Sept. 16, 2007, Budapest
11. Introduction to (Teaching / Learning about) Digital Libraries. Half-day tutorial, ECDL 2006, Sept. 17, 2006, Alicante, Spain
12. Introduction to (Teaching / Learning about) Digital Libraries. Full-day tutorial with M.A. Goncalves, JCDL 2006, June 11-15, 2006, Chapel Hill, NC
13. Learning / Teaching Digital Libraries: An Overview. Half-day tutorial, ICADL 2005, Dec. 12-15, 2005, Bangkok, <http://fox.cs.vt.edu/talks/2005/20051212ICADLTutorial.ppt>
14. Digital Libraries: An Overview and Formal Framework. Full-day tutorial, ECDL 2005, Sep. 18-23, 2005,

- Vienna, <http://fox.cs.vt.edu/talks/2005/20050918ECDLtutorial.ppt>
15. Digital Libraries: An Overview and Formal Framework. Full-day tutorial with M.A. Goncalves, SIGIR 2005, Aug. 15-19, 2005, Salvador, Brazil, <http://fox.cs.vt.edu/talks/2005/20050815SIGIRtutorial.ppt>
 16. Introduction to (Teaching / Learning about) Digital Libraries. Full-day tutorial with M.A. Goncalves, JCDL 2005, June 7-11, 2005, Denver, p. 419
 17. How to Build Digital Libraries. 2 day tutorial (lecture in morning, lab session with M.A. Goncalves in afternoon) for First Latin-American Course on Building Digital Libraries, 21-25 February 2005, Fortaleza, Brazil, sponsored by UNESCO, CETREDE, IFLA-LAC, AUGM, CLEI, and UFC
 18. Digital Library: Overview and Framework. 1/2 day tutorial for Digital Libraries: International Collaboration and Cross-Fertilization; International Conference on Asian Digital Libraries, ICADL 2004, Shanghai, Dec. 2004.
 19. Digital Library Foundations. Half day tutorial for RCDL'2004, the Sixth National Russian Research Conference: Digital Libraries: Advanced Methods and Technologies, Digital Collections, Oct. 1, 2004, Pushchino, Russia
 20. Overview of Digital Libraries. Half day tutorial for ECDL'2004, Sept 2004, Bath, England
 21. Three days short course covering Digital Libraries, Information Retrieval, and Multimedia, NIDA, Bangkok, Thailand, June 21-23, 2004
 22. Overview of Digital Libraries. Half day tutorial for JCDL'2004, June 2004, Tucson, AZ
 23. Two days short course in Bahia Blanca, and one day short course in Buenos Aires, covering Digital Libraries, Semantic Web, Open Source. Argentina, May 17-19, 2004
 24. Overview of Digital Libraries. Half day tutorial for ICADL 2003, Dec. 2003, Kuala Lumpur, Malaysia
 25. Overview of Digital Libraries. Full day tutorial for JCDL'2003, May 27, Houston, TX
 26. Introduction to ETDs and NDLTD. Tutorial for ETD'2003 (The 6th Int'l Symp. on Electronic Theses and Dissertations), Humboldt U., Berlin, GE, May 24, 2003
 27. Practical Digital Libraries Overview. Two-hour tutorial at ICADL'2002, Singapore, Dec. 17-20, 2002, <http://www.cais.ntu.edu.sg:8000/icadl02>
 28. Overview of Digital Libraries. Half-day tutorial at JCDL'2002, Portland, July 14, 2002 (see p. 417 in Proc. JCDL 2002).
 29. Digital Libraries: from requirements to theory to systems to projects. 2 hour tutorial. In Tutorials/Panels, Digital Library: IT Opportunities and Challenges in the New Millennium, pp. 233-363, July 9, 2002, Beijing, China, <http://researchsmp2.cc.vt.edu/~fox/tmp/FoxDLOC2002.ppt>
 30. Practical Digital Libraries Overview. Two hour tutorial at ICADL'2001, December 10, 2001 (9-11am), Bangalore, India, <http://ei.cs.vt.edu/~dlib/tut/ICADL01.htm>
 31. Construyendo Bibliotecas Digitales Interoperables: Una Guia Practica para crear Archivos Abiertos (in English this is "Building Interoperable Digital Libraries: A Practical Guide to Creating Open Archives"). 1.5 hour tutorial (presented in Spanish, prepared with the assistance of Ryan Richardson and Hussein Suleman), as part on UNESCO- sponsored training course on electronic theses and dissertations, Montevideo, Uruguay, Nov. 12-14, 2001, hosted by UNESCO, ISTEAC, ...
 32. Practical Digital Libraries Overview. Half-day tutorial, Pre-conference for LITA National Forum, Milwaukee, WI, 10/12/2001
 33. Practical Digital Libraries Overview. Half-day tutorial, scheduled for ACM SIGIR'2001, New Orleans, LA, Sept. 7-12, 2001
 34. Overview of Digital Libraries. Half-day tutorial, for 5th European Conference on Research and Advanced Technology for Digital Libraries, ECDL'2001, September 4-8 2001, Darmstadt, Germany, <http://www.ecdl2001.org>
 35. DL Interoperability via Metadata Harvesting - Applying the Open Archives Initiative Protocol. Half-day tutorial by Carl Lagoze and Edward A. Fox, scheduled for 5th European Conference on Research and Advanced Technology for Digital Libraries, ECDL'2001, September 4-8 2001, Darmstadt, Germany, <http://www.ecdl2001.org>
 36. Practical Digital Libraries Overview. Full-day tutorial, JCDL'2001, Roanoke, VA, June 24, 2001
 37. Digital Libraries from Theory to Framework to Application: 5S Model, Open Archives Initiative, and Networked Digital Library of Theses and Dissertations, Dec. 6, 2000, Seoul, S. Korea, half-day tutorial for 2000 Asian DL conference, ICADL'2000 <http://www.ndltd.org/talks/foxtutkr.ppt>
 38. Practical Digital Libraries Overview. Half-day tutorial, ACM Multimedia 2000, Los Angeles, CA, Oct. 30 - Nov. 4, 2000, <http://ei.cs.vt.edu/~dlib/tut/MM00.htm>

39. Digital Libraries. One-and-a-half day (12 hour) tutorial for DISSAnet workshop, Pretoria, South Africa, Oct. 23-24, 2000, <http://ei.cs.vt.edu/~dlib/tut/SA.htm>
40. Practical Application of Digital Libraries. Full-day tutorial, RRTC Advanced Technology Seminar, Rosslyn, VA, October 13, 2000, <http://ei.cs.vt.edu/~dlib/tut/RRTC4.htm>
41. Digital Libraries: An Overview. Full-day tutorial, with ECDL'2000, European Conference on Digital Libraries, Lisbon, Portugal, Sept. 18, 2000, <http://ei.cs.vt.edu/~dlib/tut/ECDL2000.htm>
42. Digital Libraries: An Overview. Two half-day tutorials (intro., advanced), ACM Digital Libraries '2000, June 4-7, 2000, <http://www.ndltd.org/talks/DL2000i.ppt>, <http://ei.cs.vt.edu/~dlib/tut/indexi.htm>, <http://ei.cs.vt.edu/~dlib/tut/indexa.htm>
43. Principios basicos para desarrollar bibliotecas digitales (Fundamental principles to develop digital libraries). Half-day workshop tutorial for Primer Seminario-Taller Subregional Sobre Bibliotecas Digitales, Ciudad Universitaria Rodrigo Facio, San Jose, Costa Rica, Dec. 8-10, 1999. Sponsored by Universidad de Costa Rica, the Iberoamerican Science and Technology Education Consortium (ISTEC), Executive Secretariat for Integral Development, the Organization of American States (OAS), and the American Embassy in Costa Rica (<http://www.istec.org/jerome/costarica/engsemucr.html>)
44. Practical Digital Libraries Overview Part 2. Half-day tutorial for ACM Digital Libraries '99, Berkeley, CA, August 11-14, 1999.
45. Digital Libraries. Full-day tutorial for CoLIS 3, Dubrovnik, May 23, 1999.
46. Digital Libraries. Full-day tutorial for ACM Multimedia'98, Bristol, UK, Sept. 12-16, 1998.
47. Digital Libraries. Full-day tutorial for SICON'98, Singapore, July 1, 1998.
48. Fundamentals of Digital Libraries. Half-day tutorial (with Rob Akscyn), ACM Digital Libraries '98, June 23, 1998, Pittsburgh, PA.
49. Multimedia Information and Systems. Half-day tutorial selected by ACM SIGIR'97, July 27-31, 1997, Philadelphia.
50. Building and Applying Digital Libraries. Full-day tutorial for ICMCS'97, IEEE International Conference on Multimedia Computing and Systems, June 3, 1997, Ottawa, Canada.
51. Digital Libraries for Computer Science Education. Half-day workshop (tutorial) presentation for ACM SIGCSE '97, San Jose, 3/1/97.
52. Building and Applying Digital Libraries: Part 1, Introduction and Part 2, Research. Two half-day tutorials for ACM Multimedia'96, Boston, MA, Nov. 18, 1996, with Robert M. Akscyn.
53. Building and Applying Digital Libraries. Half-day tutorial for SIGIR'96, Zurich, Switzerland, Aug. 18, 1996, by E. Fox.
54. Information Retrieval and Hypertext. Half-day tutorial for ACM DL'96, Bethesda, MD, March 20, 1996, by E. Fox and R. Akscyn.
55. Digital Libraries. Half-day tutorial for CIKM'95, Baltimore, MD, Nov. 28, 1995, by E. Fox.
56. Research Issues and Design Issues for Digital Libraries. Half-day tutorial for ACM Multimedia'95, San Francisco, Nov. 6, 1995, by E. Fox and R. Akscyn.
57. Background for Digital Libraries: Information Retrieval and Hypertext. Half-day tutorial for ACM Multimedia'95, San Francisco, Nov. 6, 1995, by E. Fox and R. Akscyn.
58. Design and Use of Digital Libraries. Half day tutorial for ACM SIGIR '94, International Conference on R&D in Information Retrieval, July 3-6, 1994, Dublin, Ireland, by R. Akscyn and E. Fox.
59. Introduction to Information Retrieval. Afternoon tutorial for ACM Workshop on Information Retrieval and Genomics, sponsored by ACM SIGIR and SIGBIO, Lister Hill National Center for Biomedical Communications, National Library of Medicine, Bethesda, MD, May 2-4, 1994
60. Multimedia Technology. Afternoon tutorial for 1994 Custom Integrated Circuits Conf. Educational Session, May 1, 1994, San Diego.
61. Introduction to Information Retrieval. Half day tutorial for CIKM'93, 2nd International Conference on Information and Knowledge Management, Nov. 1-5, 1993, Arlington, VA.
62. Multimedia Information Systems, Knowledge Based Information Retrieval, Electronic Libraries and other presentations (total: 15 hours of lectures). Invited visit to People's Republic of China, Nov. 20-29, 1992, Beijing, sponsored by Beijing Information Technology Inst., plus 1/2 day visit (including presentation on Digital Video Technology) to Tsinghua Univ.
63. Multimedia Information Systems. Half day tutorial for CIKM-92, First International Conference on Information and Knowledge Management, Nov. 8-11, 1992, Baltimore, MD.
64. Introduction to Multimedia. Half day tutorial for SCAMC (16th Annual Symposium on Computer

- Applications in Medical Care), Nov. 8- 11,1992, Baltimore.
65. Multimedia Information Systems. Half day tutorial for Philips Laboratories, Oct. 23, 1992, Briarcliff, NY.
 66. Multimedia: Applications and Practice. One day course for Eurographics '92, 7-11 Sept. 1992, Cambridge, England.
 67. Knowledge-Based Information Retrieval. Half day tutorial for SIGIR '92, 15th Intern'l Conf. on R & D in Information Retrieval, June 21-24, 1992, Copenhagen, Denmark.
 68. CD-ROM and Multimedia Technologies. Four day UCLA Extension course with E. Fox doing 1 day session on multimedia, Jan. 21-24, 1991, Los Angeles, CA.
 69. Multimedia Information Systems. Half day tutorial for SIGIR '91, 14th Int'l Conf. on R&D in Information Retrieval, Oct. 13-16, 1991, Chicago, IL.
 70. Interactive Technologies. Three day short course, conference presentation, sponsored by Sistema Nacional de Informacao Geografica, June 11-14, 1991, Lisbon, Portugal.
 71. Multimedia/Hypermedia Computing and Applications. Half-day educational session for International Conference on Consumer Electronics (ICCE, 10th Anniversary), June 4, 1991, Chicago, IL.
 72. Knowledge Based Information Retrieval. Half day tutorial for SIGIR '90, 13th Int'l Conf. on R&D in Information Retrieval, Sept. 5-7, 1990, Brussels, Belgium.
 73. Interactive Digital Video Technologies. Three day short course, sponsored by Sistema Nacional de Informacao Geografica, July 16-18, 1990, Lisbon, Portugal.
 74. Knowledge Based Techniques. Half day course for European Summer School in Information Retrieval, organized by A.I.C.A. Special Interest Group in Information Retrieval, Sezione A.I.C.A. delle Tre Venezie, 9-12 July, 1990, Bressanone, Italy.
 75. CD-ROM Publishing and Access. Full day Professional Development Seminar for the Washington, D.C. Chapter of the ACM, Nov. 9, 1989, U. Maryland, College Park, MD.
 76. Knowledge Based Information Retrieval. Half day tutorial for SIGIR '89, 12th Int'l Conf. on R&D in Information Retrieval, June 25-28,1989, Cambridge MA.
 77. CD-ROM Interfaces -- From Authoring to Access. Half day workshop for American Society for Information Sci. Mid-Year Meeting, May 21-24, 1989, San Diego, CA.
 78. CD-ROM Interfaces: from authoring to access. Half day tutorial for CHI '89, ACM Conf. on Human Factors in Computing Systems, April 30- May 4,1989, Austin TX.
 79. CD-ROM Publishing and Access. Half day tutorial, demonstration of the Virginia Disc Series of CD-ROMs, for ACM Conf. on Document Processing Systems, Dec. 5-9, 1988, Santa Fe, NM.

DEMONSTRATIONS:

1. Rizmari Versfeld, Spencer Lee, Edward Fox, Hussein Suleman and Kyle Williams. Digital Library in a 3D Virtual World: The Digital Bleek and Lloyd Collection in Second Life. Refereed demo in Research and Advanced Technology for Digital Libraries, Proc. 14th European Conference, ECDL2010, Glasgow, Sept. 6-10, 550-553
2. Spencer Lee, Bradley Willis, Joseph S. Bourne Jr., Edward A. Fox. Entertainment History Museums in Virtual worlds: Video Game and Music Preservation in Second Life, Demonstration, JCDL 2010, June 21-25, Gold Coast, Australia, 403-404
3. B. Stephen Carpenter II, Richard Furuta, Frank Shipman, Allison Huie, Daniel Pogue, Edward A. Fox, Spencer J. Lee, Peter Brusilovsky, Lillian N. Cassel, and Lois M.L. Delcambre, Multiple Sources with Multiple Portals: A Demonstration of The Ensemble Computing Portal in Second Life, Demonstration, JCDL 2010, June 21-25, Gold Coast, Australia, 397-398
4. Gregory W. Hislop, Lillian N. Cassel, Richard Furuta, Lois M. L. Delcambre, Peter Brusilovsky, Edward A. Fox, Daniel D. Garcia. Ensemble - the online community center for computing educators: demonstration. June 2010. Consortium for Computing Sciences in Colleges. Journal of Computing Sciences in Colleges, 25(6): 74-75
5. Spencer Lee, Edward Fox, Gary Marchionini, Javier Velasco, Goncalo Antunes and Jose Borbinha. Virtual DL Poster Sessions in Second Life. Refereed demo at JCDL 2009
6. Spencer Lee, Seungwon Yang, Javier Velasco, Edward Fox. Second Life Demo for U. Texas Austin, April 3, 2009
7. Spencer Lee, Seungwon Yang, Larry Taylor, Edward Fox. Second Life Demo for VT CSRC, Feb. 17,

2009

8. Murthy, U., Torres, R., Fox, E.A., Yang, S., Venkatachalam, L., and Goncalves, M. From Concepts to Implementation and Visualization: Tools from a Team-Based Approach to IR. Demo D7 at SIGIR 2008 (Singapore, July 20-24, 2008). ACM, New York, NY, p. 889. DOI=<http://doi.acm.org/10.1145/1390334.1390563>
9. Douglas Gorton, Weiguo Fan and Edward A. Fox: Specification and Generation of Digital Libraries into DSpace Using the 5S Framework. Research and Advanced Technology for Digital Libraries, ECDL 2007: pp. 567-569, Springer Berlin / Heidelberg, LNCS 4675, demo, http://dx.doi.org/10.1007/978-3-540-74851-9_71
10. Barbara Lagoeiro Moreira, Marcos Andre Goncalves, Alberto Henrique Frade Laender, Edward A. Fox. 5SQual: a quality assessment tool for digital libraries. ACM IEEE Joint Conference on Digital Libraries, June 18-23, 2007, Vancouver, British Columbia, Canada, demonstration, p. 513, <http://doi.acm.org/10.1145/1255175.1255313>
11. Naga Srinivas Vemuri, Ricardo da S. Torres, Rao Shen, Weiguo Fan, and Edward A. Fox. A Content-Based Image Retrieval Service for Archaeology Collections, demonstration for ECDL 2006, Alicante, Spain, Sept. 17-21, 2006, Research and Advanced Technology for Digital Libraries, ISBN 978-3-540-44636-1, Lecture Notes in Computer Science, Volume 4172, ISSN 0302-9743, Springer Berlin / Heidelberg, 2006, http://dx.doi.org/10.1007/11863878_37, pp. 438-440
12. Johnny L. Sam-Rajkumar, Rao Shen, Naga Srinivas Vemuri, Weiguo Fan, and Edward A. Fox. EtanaCMV: A Visual Browsing Interface for ETANA-DL Based on Coordinated Multiple Views, demonstration for ECDL 2006, Alicante, Spain, Sept. 17-21, 2006, Research and Advanced Technology for Digital Libraries, ISBN 978-3-540-44636-1, Lecture Notes in Computer Science, Volume 4172, ISSN 0302-9743, Springer Berlin / Heidelberg, 2006, http://dx.doi.org/10.1007/11863878_51, pp. 492-494
13. Uma Murthy, Ricardo da S. Torres and Edward A. Fox. SIERRA - A Superimposed Application for Enhanced Image Description and Retrieval, demonstration for ECDL 2006, Alicante, Spain, Sept. 17-21, 2006, Research and Advanced Technology for Digital Libraries, ISBN 978-3-540-44636-1, Lecture Notes in Computer Science, Volume 4172, ISSN 0302-9743, Springer Berlin / Heidelberg, 2006, http://dx.doi.org/10.1007/11863878_63, pp. 540-543
14. Seungwon Yang, Ben Congleton, George Luc, Manuel A. Perez-Quinones, and Edward A. Fox. Demonstrating the Use of SenseCam in Two Domains. In Proc. JCDL 2006, June 11-15, 2006, Chapel Hill, NC, demonstration, p. 376, <http://doi.acm.org/10.1145/1141753.1141872>
15. Uma Murthy, Kapil Ahuja, Sudarshan Murthy, and Edward A. Fox. SIMPEL: A Superimposed Multimedia Presentation Editor and Player. In Proc. JCDL 2006, June 11-15, 2006, Chapel Hill, NC, demonstration, p. 377, <http://doi.acm.org/10.1145/1141753.1141873>
16. Douglas Gorton, Rao Shen, Naga Srinivas Vemuri, Weiguo Fan, and Edward A. Fox. ETANA-GIS: GIS for Archaeological Digital Libraries. In Proc. JCDL 2006, June 11-15, 2006, Chapel Hill, NC, demonstration, p. 379, <http://doi.acm.org/10.1145/1141753.1141875>
17. Ryan Richardson and Edward A. Fox. Using Concept Maps as a Cross-Language Resource Discovery Tool. In Proceedings of the Fifth ACM/IEEE Joint Conference on Digital Libraries (JCDL2005), June 7-11, 2005, Denver, p. 415
18. Ananth Raghavan, Divya Rangarajan, Rao Shen, Marcos Andre Goncalves, Naga Srinivas Vemuri, Weiguo Fan, and Edward A. Fox. Schema Mapper: A Visualization Tool for DL Integration. In Proceedings of the Fifth ACM/IEEE Joint Conference on Digital Libraries (JCDL2005), June 7-11, 2005, Denver, p. 414
19. U. Ravindranathan, R. Shen, M. A. Goncalves, W. Fan, E. A. Fox, and J.W. Flanagan. ETANA-DL: Managing Complex Information Applications - An Archaeology Digital Library. In Proceedings of the Fourth ACM/IEEE Joint Conference on Digital Libraries: Global Reach and Diverse Impact, JCDL2004, Tucson, AZ, June 7-11, 2004, p. 414
20. R. da S. Torres, C. B. Medeiros, M. A. Goncalves, and E. A. Fox. An OAI Compliant Content-Based Image Search Component. In Proceedings of the Fourth ACM/IEEE Joint Conference on Digital Libraries: Global Reach and Diverse Impact, JCDL2004, Tucson, AZ, June 7-11, 2004, p. 418
21. Qinwei Zhu, M.A. Goncalves, E.A. Fox. 5SGraph Demo: A Graphical Modeling Tool for Digital Libraries. JCDL'2003, May 27-31, 2003, Houston, TX, p. 385
22. P. Calado, M. Goncalves, E. Fox, B. Ribeiro-Neto, A. Laender, A. da Silva, D. Reis, P. Roberto, M. Vieira, J. Lage. The Web-DL Environment for Building Digital Libraries from the Web. JCDL'2003, May

- 27-31, 2003, Houston, TX
23. CITIDEL, by Edward A. Fox and Lillian Cassel. Poster and demonstration, at PI meeting of the National SMETE (science, mathematics, engineering, and technology education) Digital Library initiative, Washington, D.C., Dec. 2-3, 2001
 24. Building Interoperable Digital Library Services: MARIAN, Open Archives, and NDLTD, by Fox, E. A., France, R. K., Goncalves, M. A., and Suleman, H. In Proceedings of the 24th Annual International SIGIR Conference on Research and Development in Information Retrieval, New Orleans, USA, Sept. 9-14, 2001
 25. Computer Science Teaching Center (CSTC, www.cstc.org), IDM'2001, Dallas, TX, April 30, 2001
 26. Building a Unified Library for Theses and Dissertations, by Fox, E. A., France, R. K., Goncalves, M. A., Suleman, H., and Lee, M. H. In Proceedings of the 3rd International Conference of Asian Digital Library, Seoul, December 6-8, 2000
 27. XXDL and CSTC and Virginia Tech, demonstration for NSF-sponsored NSDL workshop, September 22-24, 2000, NSF, Arlington, VA, <http://www.ndltd.org/talks/nsdlcstc.ppt>
 28. Computer Science Teaching Center, demonstration at NSF IDM'2000, Chicago, March 5-7, 2000, <http://boston.cwru.edu/idm00/>
 29. NDLTD and CSTC/CRIM, demonstrations for ACM DL'99, with Neill Kipp, Aug. 12, 1999
 30. Networked Digital Library of Theses and Dissertations. Demonstration for CoLIS 3, Dubrovnik, May 25, 1999.
 31. Improving Post-Secondary Education through the Networked Digital Library of Theses and Dissertations. Poster and demonstration for FIPSE PI Meeting, Washington, D.C., Oct. 23-25, 1998
 32. Networked Digital Library of Theses and Dissertations. Demonstration for ACM SIGIR'97, July 28, 1997, Philadelphia.
 33. Visualizing Search Results with Envision. Demonstration by Lucy T. Nowell, Robert K. France, and Edward A. Fox for ACM SIGIR'96, Zurich, Switzerland, Aug. 19, 1996.
 34. Automatic Building of Hypertext Links in Digital Libraries. Demonstration for ACM SIGIR'95, Seattle, WA, July 10, 1995, by Robert B. Kellogg, Madhan Subhas and Edward A. Fox.
 35. Envision: Information Visualization in a Digital Library. Demonstration for ACM SIGIR'95, Seattle, WA, July 10, 1995, by Lucy T. Nowell and Edward A. Fox.
 36. NSF Education Infrastructure Project. Hour demonstration for Multimedia Expo, Virginia Tech, March 24, 1995.
 37. MARIAN and Envision System Demonstrations, for 16th Intern'l Conf. on R & D in Information Retrieval, SIGIR '93, Pittsburgh, PA, June 27 - July 1, 1993.
 38. MARIAN System Demonstration, at Software Fair, ACH-ALLC93, Joint International Conference of the Association for Computers and the Humanities and the Association for Literary and Linguistic Computing, June 16-19, 1993, Georgetown Univ., Washington, D.C.

SOFTWARE AND DATABASE PRODUCTS:

1. Co-inventor on US patent no. 7346621, filed May 14, 2004, issued March 18, 2008, Method and System for Ranking Objects Based on Intra-type and Inter-type Relationships (Benyu Zhang, Hua-Jun-Zeng, Wei-Ying Ma, Wensi Xi, Zheng Chen, and Edward A. Fox)
2. SMART: Proposed, designed, and led implementation effort of a new version of the SMART system, 1980-2, written in the C language under UNIX. From 1986, extended this for use at Virginia Tech. The version of SMART developed at Cornell by others since 1983 is used around the world for information retrieval research. The databases called "CACM" and "ISI" developed 1980-2 for dissertation research with SMART have been used in scores of published studies, as benchmark test sets.
3. CED lexicon: Proposed and supervised preparation of a database form of the "Collins English Dictionary" that has been distributed from the Oxford Text Archive since 1988.
4. CODER: Proposed and supervised development of the COmposite Document Expert/extended/effective Retrieval System, 1985-92, which was used as a testbed for the study of artificial intelligence concepts in the field of information retrieval, and applied to electronic mail digests, navy messages, and literature (and thesaurus data) on cardiology.
5. LEND: Proposed and supervised development of the Large External object-oriented Network Database system, an object-oriented database management system, which was distributed starting in 1992 by

- Virginia Tech Intellectual Properties, and was used with both the CODER and MARIAN systems.
6. MARIAN: Proposed and supervised development starting in 1991 of the MARIAN system, an alternative to searching on the VTLS system for library catalog data. The campus production service version of this ran on a collection of PC and NeXTstep machines in the Computing Center and was designed to support scores of simultaneous users. It was built upon data and code from the CED lexicon and CODER (both developed here in the 1980s). With support from NLM, and new support from NSF, was revamped in Java to become a key part of our research on digital libraries. URL:
<http://www.dlib.vt.edu/products/marian.html>
 7. ENVISION: Proposed and supervised development 1991-93, 1995 of Project Envision, developing a large hypermedia database (digital library) from the ACM publications, along with a retrieval system and various user interfaces to support access to the computer science literature.
 8. TULIP: Technical coordinator for Virginia Tech's efforts to make about 40 journals in material science and engineering from Elsevier available for campus use, working with OCLC software
 9. EI: Proposed and supervised development of Computer Science courseware and related digital library content, 1993-98, which has led to most CS courses at Virginia Tech having online materials, and some functioning essentially paperless, with up to 150K accesses/wk from local and world-wide users. URL:
<http://ei.cs.vt.edu>
 10. QUIZIT: Supervised development of an automated WWW-based quiz system to use with CS4624 and CS5604 as well as other courses like CS1604. This has led to several publications and is available for use. See the online papers and software under <http://ei.cs.vt.edu>
 11. Boy Scout Computers Merit Badge web site used with local group
 12. ETD: Supervised development of electronic thesis and dissertation related software and systems in connection with building the Networked Digital Library of Theses and Dissertations (NDLTD). This includes extensive online information at <http://www.ndltd.org>, and earlier info at <http://etd.vt.edu>, with documentation, automated submission software, multimedia tutorials, SGML/XML document type definitions, conversion tools (to SGML/XML, from SGML/XML to HTML), services (searching, browsing, submission, and conversion from PostScript to PDF), and adaptation of Open Archives Initiative. Collaboration on these efforts includes staff on multiple grants, personnel in Graduate School, Library, Computing Center, and other universities. The Library now maintains the <http://etd.vt.edu> site, while I am responsible for domains ndltd.org and theses.org (also known as dissertations.org) and related listservs. As Executive Director of NDLTD, I coordinate efforts of its members; in March 2000 roughly 225 people attended our 3rd International Symposium, and similar numbers have continued in subsequent years. According to Don Fischer, Program Officer at FIPSE (US Dept. of Education), in email dated 2/14/2000 "Your work is outstanding. Your outreach efforts are incredibly extensive."
 13. NRG: The Web Characterization Repository developed for the WWW Consortium (W3C), helped catalog papers, tools, and trace files related to Web traffic characterization. It was used by researchers and practitioners worldwide.
 14. CSTC: The Computer Science Teaching Center (www.cstc.org) was hosted at Virginia Tech where I served as an editor and was responsible for the software, server, and repository. This supported teachers and learners interested in computing. This led to CITIDEL - see below.
 15. Open Archives Initiative: This international digital library initiative involves specifications, protocols, and other standards (www.openarchives.org). I was one of the founding members and served on the Steering Committee. Virginia Tech students developed a range of widely used software to support development, testing, and operation. I proposed and ran 2 workshops for OAI in 2000 and one in 2001, attended the public launch meeting 1/23/2001, and had several grants related that yielded new tools.
 16. CITIDEL: Computing and Information Technology Interactive Digital Educational Library, www.citidel.org, collection effort that is part of NSDL (www.nsd.org), supporting English and Spanish access to resources to help with teaching and learning about computing and IT, for various ages and types of users, incorporating CSTC, ACM JERIC, NCSTRL, ResearchIndex, and other content. Collaborative project funded by NSF for 2001-2003, with College of NJ, Hofstra, Penn State, and Villanova. This led to Ensemble - see below.
 17. Crawls: In collaboration with Charlie Clarke at U. of Waterloo, crawls of large parts of WWW to allow research with large text collections. One collection of 1 Tbyte was collected in 2001. Another collection, focused on government content, was collected and was adapted to yield a new TREC test collection for 2002.

18. PlanetMath and PlanetPhysics: www.planetmath.org and www.planetphysics.org are online community-based encyclopedia initiatives, covering mathematics (and a little computer science) and physics. Software used was developed by Aaron Krowne, whose MS thesis on this I supervised. Mr. Krowne continues to run the sites, which Virginia Tech hosted under my supervision.
19. ETANA: <http://www.etana.org/>; developed at Virginia Tech, then ported to Vanderbilt Library that agreed to sustain this effort to provide coordinated access to archaeological information.
20. Ensemble Portal: <http://www.computingportal.org>, with Virginia Tech leading work on the distributed portal, with PI Boots Cassel managing the overall Ensemble effort involving 6 universities as well as other partners - the Computing Portal in NSF's NSDL (National Science Digital Library)
21. Crisis, Tragedy, and Recovery Network (CTRnet): <http://www.ctrnet.net>; developed at Virginia Tech with NSF funding, and partnering with the Internet Archive; digital library and archiving support related to communities, supporters, and scholars working with disasters and emergencies
22. Digital library curricular guidelines and modules available on our web site (<http://curric.dlib.vt.edu/>), through Wikiversity (http://en.wikiversity.org/wiki/Curriculum_on_Digital_Libraries), and as a collection in Ensemble (see on <http://www.computingportal.org/collections>) that also is available through the National Science Digital Library (NSDL)

DIGITAL LIBRARY RESEARCH LABORATORY (DLRL, www.dlib.vt.edu) (earlier: INFORMATION ACCESS LABORATORY):

- Fox was director of the NSF supported Information Access Laboratory in Computer Science. His offices at the Computing Center were moved to 840 Pointe West Commons (PWC), Suite 8, allowing merger with the IAL, and the new complex is now the DLRL, located at 2030 Torgersen Hall. We are responsible for domains including: citidel.org, nudl.org, cstc.org, dissertations.org, theses.org, ndltd.org, and dlib.vt.edu.
- Facilities dating back to the early 1990s have included (in addition to upgrades/replacements/additions):
 - VT-PetaPlex-1, with 2.5 terabytes of disk storage, over 100 processors, developed by Knowledge Systems Incorporated, a very early cluster focused on storage
 - Roughly \$770K of hardware donated by IBM for digital library research, located in Computing Center, PWC, or engaged in logging in locations around campus
 - A wide variety of PC-based workstations purchased 2001-2002
 - Older servers of various types, including DEC Alpha, Sun Ultra, Gateway, Mac, IBM
 - Multimedia peripherals: camcorders and cameras, VTRs (digital, Betacam, Hi-8, SVHS, U-matic), audio units (CD-DA, DAT, cassette), laserdisk player, preamp, amplifier, mixer, CD-ROM drives, professional microphones, headphones, speakers, monitors - many donated to VT's New Media Center in return for access by classes and research groups
 - CD-ROM production (Kodak PCD Writer 225) for DOS/Mac/UNIX
- Current facilities include servers (in the Computing Center) for the Ensemble and CTRnet projects, as well as a full lab of units at DLRL.

ORAL PRESENTATIONS:

1. Many talks related to electronic theses and dissertations, including a number from years ago, including:
 - E. Fox. MIT 6/18/96; Georgia Tech 10/4/96; U. Ill. Urbana-Champaign 10/29/96; Univ. Utah 11/8/96; MIT 11/20/96; Stanford U. 12/16/96; ... Ohio State U. 5/29/98, U. Pitt. 6/23/98, Singapore 6/30/98, U. Arizona 7/30/98, U. Southampton 9/11/98, ...
 - E. Fox with other members of project team: NC State 7/9/96 and 10/9/96, ...
 - Posters: Networked Digital Library of Theses and Dissertations, FIPSE PI Meeting, Nov. 1, 1997, Arlington, VA
2. Invited attendee and panelist (on 3 panels), NSF workshop on Interdisciplinary Computing, Washington, D.C., Nov. 3-5, 2011
3. Edward A. Fox, "Living In the KnowlEdge Society: the double duty of a librarian", invited speaker (by

- videoconference) at "Linking Research and Education in Digital Libraries" Workshop at TPD L 201, 28-29 Sept. 2011, Berlin
4. Edward A. Fox. Introduction to NDLTD and Brief History of the ETD Movement. Invited 30 minute plenary opening talk for day long ETDs for Rookies - Newcomer's Pre-Conference Tutorial. 14th International Symposium on Electronic Theses and Dissertations, ETD 2011, Cape Town, S. Africa, Sept. 13-17, 2011
 5. Edward A. Fox. Other ETD Systems: ETD-db, the Short Story. Invited 40 minute plenary talk for day long ETDs for Rookies - Newcomer's Pre-Conference Tutorial. 14th International Symposium on Electronic Theses and Dissertations, ETD 2011, Cape Town, S. Africa, Sept. 13-17, 2011
 6. Edward A. Fox. Welcome, invited 5 minute opening for 14th International Symposium on Electronic Theses and Dissertations, ETD 2011, Cape Town, S. Africa, Sept. 13-17, 2011
 7. Edward A. Fox. Moderator and speaker at Panel on NDLTD Union Catalog. 14th International Symposium on Electronic Theses and Dissertations, ETD 2011, Cape Town, S. Africa, Sept. 13-17, 2011
 8. Edward A. Fox. Some Reflections on Students' Roles. Invited presentation for Workshop on Data Curation. 14th International Symposium on Electronic Theses and Dissertations, ETD 2011, Cape Town, S. Africa, Sept. 13-17, 2011
 9. Kavanaugh, A., Fox, E., Sheetz, S., Yang, S., Si, L.T., Shoemaker, D., Natsev, A., Xie, L. Social Media for Cities, Counties and Communities. Invited presentation, Inaugural conference on 'Communicating Disaster,' Bielefeld, Germany, January 12-15, 2011.
 10. E. Fox. Invited presentation for panel "When Universities Put Dissertations on the Internet: New Practice; New Problem?", at American Historical Association 125th Annual Meeting, Jan. 6-9, 2011, Boston
 11. M. S. Hsiao, A. L. Abbott, E. A. Fox, R. Murch, B. Budowle, N. J. Short, S. Misra, N. P. Kozievitch, and S. H. Park, "Toward a Quantitative Basis for Sufficiency of Friction Ridge Pattern Detail," Presentation at Impression and Pattern Evidence Symposium, Clearwater Beach, FL, Aug. 2010.
 12. A. L. Abbott, M. S. Hsiao, E. A. Fox, R. Murch, B. Budowle, N. J. Short, S. Misra, N. P. Kozievitch, and S. H. Park, "Toward a Quantitative Basis for Sufficiency of Friction Ridge Pattern Detail," Presentation at 95th International Educational Conference, International Association for Identification, Spokane, WA, July 2010.
 13. E. Fox. Invited presentation for panel on Innovation vs. Preservation: Does it Have to be One or the Other? Panelists Ed Fox, Geneva Henry; moderators Jill Kleister, Billie Peterson-Lugo; for Texas ETD Association Annual Meeting, a pre-conference workshop for ETD 2010 - 13th International Symposium on Electronic Theses and Dissertations. Austin, TX. June 16-18, 2010
 14. E. Fox. Basic Principles for ETD programs. Invited presentation for preconference workshop "Advice from NDLTD Leaders", ETD 2010 Conference, Austin, TX, June 16-18
 15. E. Fox. Introduction to NDLTD and Brief History of the ETD Movement. Invited presentation for "ETDs for Rookies" - Newcomer's Workshop, at ETD 2010 - 13th International Symposium on Electronic Theses and Dissertations. Austin, TX. June 16-18, 2010
 16. E. Fox. ETD-db, the Short Story. Invited presentation for "ETDs for Rookies" - Newcomer's Workshop, at ETD 2010 - 13th International Symposium on Electronic Theses and Dissertations. Austin, TX. June 16-18, 2010
 17. E. Fox. NDLTD Welcome and Introduction. Invited presentation for Opening Session at ETD 2010 - 13th International Symposium on Electronic Theses and Dissertations. Austin, TX. June 16-18, 2010
 18. E. Fox. Invited presentation for Plenary Panel: ETD Veterans. Panelists John Hagen (West Virginia University), Ed Fox (Virginia Tech), Thomas Dowling (OhioLink), Terry Kahn (UT Austin), Gail McMillan (Virginia Tech). At ETD 2010 - 13th International Symposium on Electronic Theses and Dissertations. Austin, TX. June 16-18, 2010
 19. E. Fox. NDLTD Wrapup. Invited presentation for Closing Session at ETD 2010 - 13th International Symposium on Electronic Theses and Dissertations. Austin, TX. June 16-18, 2010
 20. A. L. Abbott, M. S. Hsiao, E. A. Fox, R. Murch, B. Budowle, N. J. Short, S. Misra, N. P. Kozievitch, and S. H. Park, "Development of a Quantitative Basis for Sufficiency in Friction Ridge Pattern Detail," Presentation for NIJ Panel on Impression Evidence, NIJ Conference 2010, National Institute of Justice, Arlington, VA, June 14, 2010.
 21. E. Fox. NDLTD: Past, Present, and Future. Invited presentation for Canadian ETD and Open Repositories Workshop, May 10-11, 2010, Carleton University, Ottawa
 22. Edward A. Fox. Mentoring in Computer Science. Panel presentation on How to be a Successful Mentor,

- 7th Annual Advancing Diversity at Virginia Tech Workshop, Jan. 11, 2010, Inn and Skelton Conference Center, Virginia Tech, <http://fox.cs.vt.edu/talks/2010/20100111Mentoring.ppt>
23. Edward A. Fox. CTR. Presentation (with same title as session since it was about our project) as part of panel for session "Crisis, Tragedy, and Recovery Network (CTRnet)" at the Coalition for Networked Information Fall Meeting, Dec. 15-16, 2009, Washington, D.C.
 24. Edward A. Fox. Digital Libraries. Graduate seminar presentation for Virginia Tech Dept. of Computer Science, Nov. 20, 2009, Blacksburg, VA
 25. Ensemble Project Overview. Presentation as panelist at NSDL Annual Meeting, Nov. 18, 2009, Washington, D.C.
 26. Electronic Theses and Dissertations (ETDs) - A worldwide initiative. University of Iowa, Oct. 29, 2009, <http://fox.cs.vt.edu/talks/2009/20091029IowaETD.pptx>
 27. CTRnet (Crisis, Tragedy, & Recovery Network) (www.ctrnet.net): A global human network and distributed digital library. University of Iowa, Oct. 29, 2009, <http://fox.cs.vt.edu/talks/2009/20091029IowaCTRnet.pptx>
 28. CTRnet: A Crisis, Tragedy, & Recovery Network) (www.ctrnet.net). Virginia College of Osteopathic Research Day, Oct. 16, 2009, <http://fox.cs.vt.edu/talks/2009/20091016CTR-VCOM.ppt>
 29. Donald J. Shoemaker, Steven D. Sheetz, and Edward A. Fox. Initiatives to Assemble a Record. Presentation for the conference Aftermath Dynamics and Management: Through the Lens of the Virginia Tech Incident, July 22, 2009, The Inn, Blacksburg, VA
 30. E. Fox. Reiki. Presentation for the Natural Healthcare Series at the Blacksburg Library, July 16, 2009, <http://fox.cs.vt.edu/talks/2009/20090716FoxReiki.pdf>, http://www.mfrl.org/view_entry.php?id=1812&date=20090716
 31. Daphne Rainey and Edward A. Fox. Cyber-Learning & Digital Libraries: are traditional classrooms going the way of the horse and buggy? Cafe Scientifique, Blacksburg, VA, May 26, 2009
 32. Molly Bragg, Edward A. Fox, Margaret Hedstrom, and Christopher A. Lee. Moving Web Archiving into the Classroom. Panel at DigCCurr2009: Digital Curation Practice, Promise and Prospects. April 1-3, 2009, Chapel Hill, NC, pp. 112-113 in proceedings: http://www.lulu.com/items/volume_64/6482000/6482253/5/print/DigCCurr2009Proceedings_032609.pdf
 33. Jeffrey Pomerantz, Sanghee Oh, Barbara Wildemuth, Carolyn Hank, Helen Tibbo, Edward Fox, and Seungwon Yang. Comparing Curricula for Digital Library and Digital Curation Education. Panel at DigCCurr2009: Digital Curation Practice, Promise and Prospects. April 1-3, 2009, Chapel Hill, NC, pp. 2-3 in proceedings: http://www.lulu.com/items/volume_64/6482000/6482253/5/print/DigCCurr2009Proceedings_032609.pdf
 34. Uma Murthy, Edward A. Fox, Yinlin Chen, Eric Hallerman, Ricardo Torres, Evandro J. Ramos, and Tiago R. C. Falco. Image Description and Retrieval for Fish Species Identification. Oral presentation by Uma Murthy at 25th Annual GSA Research Symposium, March 25, 2009, VT, Blacksburg, VA, <http://filebox.vt.edu/users/techy/public/RS/>
 35. Joseph E. Urban, Jesse M. Heines, Edward A. Fox, Harriet G. Taylor: Panel on revitalized undergraduate computing education. In Proceedings of the 40th ACM Technical Symposium on Computer Science Education (Chattanooga, TN, USA, March 04 - 07, 2009). SIGCSE '09. ACM, New York, NY, 69-70. DOI= <http://doi.acm.org/10.1145/1508865.1508893>, refereed
 36. Edward Fox, "Living In the KnowlEdge Society (LIKES)" (CPATH). Invited presentation for NSF CCLI/CPATH Showcase of the 40th ACM Technical Symposium on Computer Science Education (Chattanooga, TN, USA, March 04 - 07, 2009). SIGCSE '09.
 37. Edward A. Fox, presentation as part of Panel 3 - Computational Thinking Everywhere (Part II). Computational Thinking for Everyone Workshop I, The National Academies, 2/19-2/20/2009, Washington, DC
 38. Edward A. Fox, "CNI Podcast: An Interview with Edward Fox on Digital Scholarship", Podcast: 28 min., 19.24MB, Editor Gerry Bayne, In CNI Podcasts by EDUCAUSE <http://www.educause.edu/blog/gbayne/CNIPodcastAnInterviewwithEdwar/16809>, posted on February 3, 2009
 39. Kristine Hanna, Edward A. Fox, Jamaica Jones, and Padmini Srinivasan. Capturing Crisis: A Digital Library to Study Tragedy and Recovery from Around the World. Panel at CNI Fall Meeting, Washington, DC, Dec. 9, 2008, <http://www.cni.org/tfms/2008b.fall/Abstracts/PB-digital-hanna.html>, http://www.cni.org/tfms/2008b.fall/Abstracts/handouts/cni_digital_hanna.pdf

40. Edward A. Fox, Carlos Evia, Weiguo Fan, Steve Sheetz, Chris Zobel, and Seungwon Yang. Sakai LIKES Initiative. Panel at the Sakai Regional Conference, Virginia Tech, Nov. 11-12, 2008
41. NDLTD Welcome and Introduction, invited opening presentation, ETD 2008, June 4-6, Aberdeen Scotland
42. Introduction to NDLTD and Brief History of the ETD Movement, invited opening presentation for ETD Rookies Workshop, ETD 2008, June 4-6, Aberdeen Scotland
43. ETD-db, the Short Story, invited presentation for ETD Rookies Workshop, ETD 2008, June 4-6, Aberdeen Scotland
44. Closing Session, invited closing presentation, ETD 2008, June 4-6, Aberdeen Scotland
45. Manuel A. Perez-Quinones, Stephen Edwards, Manas Tungare, Edward A. Fox, and Lillian Cassel. Using Web 2.0 Technologies in your Computer Science Classes. Workshop #16 at 39th ACM Technical Symposium on Computer Science Education, SIGSCE 2008, March 12-15, 2008, Portland, Oregon
46. Invited visit and presentation at World Bank, Nov. 20, 2007, Washington, D.C.
47. Internet 2 - Digital Library community of Mexico Virtual Day on Digital Theses, 25 min. videoconference presentation, Oct. 5, 2007
48. From information retrieval to digital libraries to computer science education, Sep. 21, 2007, Vienna University of Technology
49. Living In the KnowlEdge Society, July 30, 2007, Univ. Arizona, Tucson
50. Enhancing Computing Education through LIKES, NSDL, and NDLTD. Invited presentation for Google Education Summit 2007 (part of Google Faculty Summit), July 27, 2007, Mountain View, CA
51. 5S Perspective. Invited presentation for 1st Workshop on Digital Library Foundations, ACM IEEE Joint Conference on Digital Libraries, June 18-23, 2007 - Vancouver, British Columbia, Canada, <http://fox.cs.vt.edu/talks/2007/20070623JCDLdlfWkshpFox-5S.ppt>
52. Quality Modeling. Invited presentation for 1st Workshop on Digital Library Foundations, ACM IEEE Joint Conference on Digital Libraries, June 18-23, 2007 - Vancouver, British Columbia, Canada, <http://fox.cs.vt.edu/talks/2007/20070623JCDLdlfWkshpFox-Quality.ppt>
53. Core DL Curriculum. Invited presentation (with co-authors Seungwon Yang, Barbara M. Wildemuth, Jeffrey Pomerantz, Sanghee Oh) for JCDL 2007 Workshop 1: Developing a Digital Libraries Education Program, with 2007 Joint Conference on Digital Libraries, June 18, 2007, Vancouver, <http://fox.cs.vt.edu/talks/2007/20070617JCDLeducWkshpFox-Core.ppt>
54. NDLTD: Past, Present, and Future. ETD 2007: 10th Int. Symp. on ETDs, Uppsala, Sweden, <http://fox.cs.vt.edu/talks/2007/20070613ETDfoxOpening.ppt>
55. Two presentations, Overview of VT/NDLTD Plans: Resources & Projects; Update on Digital Library Technology Trends: From Proposals to Projects to Systems to Theory to Curricula. Invited talks to Scirus and Scopus groups, Elsevier, Amsterdam, 18 March 2007
56. Edward Fox, Uma Murthy, and Ricardo Torres. Automation and Quality in Image Digital Libraries with Annotations, invited presentation for University of Florence, Florence, Italy, 17 Feb. 2007, <http://fox.cs.vt.edu/talks/2007/20070216Florence.ppt>
57. Reiki at Virginia Tech, invited talk for Companion Animal Club, VA-MD Regional College of Veterinary Medicine, Blacksburg, VA, 26 Jan. 2007, <http://fox.cs.vt.edu/talks/2007/20070126ReikiLecture.ppt>
58. Indexing and searching heterogeneous information, invited presentation at Lawrence Livermore National Laboratory, Livermore, CA, Nov. 3, 2006
59. "NDLTD Resources & Projects", invited hour-long plenary presentation for ETD 2006 U.S. Regional Conference: Revealing the Potential of ETDs, October 27-28, 2006, J.C. Penney Conf. Center, University of Missouri-St. Louis
60. Invited presentations for SIMPOSIO DE ACESSO LIVRE A INFORMACAO (Symposium on Open Access to Information, <http://si.ibict.br>), Aug 24-25, 2006, at Hotel Nacional, SHS (Setor Hoteleiro Sul), Quadra 01, Brasilia, DF, Brasil 70322-900; speaker on 2 panels:
 1. "Digital Libraries, Electronic Theses and Dissertations (ETDs), and NDLTD" for 5 hour panel on August 24, 2006, "Open Access para Repositorio Institucionais" (Open Access for Institutional Repository)
 2. "NDLTD: From Local to National to Global", for 3.5 hour panel on August 25, 2006, "BDTD: Biblioteca Digital de Teses e Dissertacoes" (Digital Library of Theses and Dissertations)
61. "Introductory words", opening talk (30 minutes) for ETD 2006, Quebec City, June 6-10, 2006
62. Digital libraries, computer science, and education: 10 projects. Invited seminar at Fraunhofer IPSI,

- Darmstadt, GE, Dec. 9, 2005 <http://fox.cs.vt.edu/talks/2005/20050929ETDclose.ppt>
63. NDLTD Update: Past, Present, Future, and the Expanding ETD Community. Closing plenary invited presentation for ETD2005: evolution through discovery, 8th International Symposium on Electronic Theses and Dissertations, Sydney, Sept. 28-30, 2005, <http://fox.cs.vt.edu/talks/2005/20050929ETDclose.ppt>
 64. ADT and the Future of NDLTD. Invited presentation for ADT Program Workshop, Sydney, Australia, Sept. 26, 2005, <http://fox.cs.vt.edu/talks/2005/20050926ADT.ppt>
 65. Networked Digital Library of Theses and Dissertations (NDLTD, www.ndltd.org). Invited presentation for Oregon State U., 20 July 2005, <http://fox.cs.vt.edu/talks/2005/20050720OregonSt.ppt>
 66. The Global Reach of Electronic Theses and Dissertations (ETDs). Edward Fox, Joan K. Lippincott, Eva Muller, Susan Copeland. Project Briefing: Spring 2005 Task Force Meeting. CNI, April 4-5, 2005, Washington, DC. <http://www.cni.org/tfms/2005a.spring/abstracts/PB-fox-global.html>
 67. Electronic Tools and Near Eastern Archives Digital Library (ETANA-DL). Presentation by Edward A. Fox, with co-presenter ill (James W. Flanagan). Session on "Long-Term Digital Preservation and Archiving Strategies for Archaeological Data" at 106th Annual Meeting of the Archaeological Institute of America, AIA 2005, Boston, January 6-9, 2005
 68. Digital Libraries Settling the Score: 10 Years Hence and 10 Before. Moderator for closing plenary panel of the conference. In Proceedings of the Fourth ACM/IEEE Joint Conference on Digital Libraries: Global Reach and Diverse Impact, JCDL2004, Tucson, AZ, June 7-11, 2004, p. 374
 69. J. W. Flanagan, E. A. Fox, D. R. Clark, W. Fan, Ravindranathan, R. Shen, M. A. Goncalves, "Jordanian Archaeology and ETANA: Developing a Digital Library for Near Eastern Archaeology", History and Archaeology of Jordan Conference, Petra, Jordan. May 23-27, 2004
 70. Improving Graduate Education: Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at Villanova University, hosted by graduate school, Jan. 15, 2004, 69 slides
 71. Networked Digital Library of Theses and Dissertations (NDLTD), La Red de Bibliotecas Digitales de Tesis y Disertaciones, invited presentation using videoconferencing for Dia Virtual de Bibliotecas Digitales, Nov. 25, 2003, hosted by UDLA, Puebla, Mexico, 41 slides
 72. Edward A. Fox and James W. Flanagan. ETANA-DL: Managing complex information applications: An archaeology digital library. 2 hr session (ETANA Workshop: Integrated Technology-Enabled Archaeology), followed by 1 day workshop, at American Schools of Oriental Research (ASOR) Annual Meeting, Atlanta, GA, Nov. 19-22, 2003, 68 slides
 73. Research Overview Related to NSDL, invited presentation, Library, UDLA, Puebla, Mexico, Oct. 24, 2003, 86 slides
 74. Edward A. Fox and Lillian Cassel. Computing and Information Technology Interactive Digital Educational Library (CITIDEL). Poster at NSDL Annual Meeting, Oct. 12-15, 2003, Washington, DC
 75. CITIDEL, in Session: Sustainability II: NSDL (2-3:30pm, Tue). At NSDL Annual Meeting, Oct. 12-15, 2003 Washington, DC
 76. Edward A. Fox and Martin Halbert. Needs Addressed by the OCKHAM Project, in Session: NSDL Service Interoperability and Web Services (9-10:30am, Wed). At NSDL Annual Meeting, Oct. 12-15, Washington, DC
 77. Distributed vs. Centralized Systems: Funding and Maintenance of International Services. Panel presentation for SINNO3, 9/19/2003, Oldenburg, GE
 78. Extending Retrieval with Stepping Stones and Pathways. Brief research overview at NSF IDM PI workshop, Sept. 14-16, 2003, Seattle, Washington, 4 slides
 79. Integration of regular and static OAI repositories. Presentation for OAI Metadata Harvesting Workshop, JCDL 2003, Houston, TX, 31 May 2003, <http://www.cs.cornell.edu/people/simeon/workshops/JCDL2003/>
 80. Digital Libraries Support for Education: Two Case Studies - CITIDEL and NDLTD. Invited presentation, Dept. of Computer Science, Rice University, Houston, TX, May 28, 2003
 81. Panel member, Special Session: Report on the NSF major funding initiative for a National Science, Technology, Engineering, and Mathematics Education Digital Library (NSDL) with special emphasis on the Computing Education Component, ACM SIGCSE'2003, Reno, Nevada, March 16, 2003
 82. National Science Digital Library Work in CS at Virginia Tech, AI Seminar, U. of Arizona, Tucson, AZ, March 7, 2003
 83. Digital libraries for e-rulemaking: integrating the information fields (hypertext, information retrieval,

- multimedia, etc.), presentation as part of serving as invited participant in NSF-funded research workshop on "E-Rulemaking: New Directions for Technology and Regulation", Jan. 21-22, 2003, John F. Kennedy School of Government, Harvard, Cambridge, MA
84. OCKHAM, 5S, and ODL. Invited presentation for OCKHAM Initiative Meeting, Emory U., Atlanta, GA, Jan. 8, 2003
 85. Edward Fox, Hussein Suleman, and Ming Luo. Building Digital Libraries Made Easy: Toward Open Digital Libraries, invited paper, pages 14-24 in: Ee-Peng Lim, Schubert Foo, Chris Khoo, Hsinchun Chen, Edward Fox, Shalini Urs, Thanos Constantino, eds. Digital Libraries: People, Knowledge, and Technology; Proceedings 5th International Conference on Asian Digital Libraries, ICADL 2002, Singapore, Dec. 2002. Springer, Lecture Notes in Computer Science 2555.
 86. Trends on e-learning from the corporate and academic perspective, and NSDL Governance, invited presentations for IDA (Infocomm Development Authority) Visiting Professor Programme, Dec. 13, 2002, Singapore
 87. Open Digital Libraries, reviewed presentation for AOL-CIT Finding Common Ground University Research Day, Nov. 6, Herndon, VA. First Prize Winner for Track 3, with \$1500 prize, based on doctoral work of Hussein Suleman
 88. Edward A. Fox and Ellen Hoffman, Comments from NSDL PC Chair and Vice Chair, in NSDL New Projects Welcome, repeated Oct. 30 and Nov. 4, 2002, teleconference, <http://nsdl.comm.nsdl.org/community/?pager=61>
 89. NDLTD and the ETD Initiative: Enhancing Graduate Education, Ohio State University/Virginia Tech Videoconference, Oct. 24, 2002, presented by Edward A. Fox, Gail McMillan, and David Pluska, <http://researchsmp2.cc.vt.edu/~fox/tmp/ETDs4OSU20021024.ppt>
 90. History of ETDs and Practice at Virginia Tech, invited presentation for Howard U. ETD Workshop, Washington, D.C., Oct. 4, 2002
 91. Hybrid Partitioned Inverted Files for Large-Scale Digital Libraries, for Dept. of Computer Science Seminar, University of Chile, Sept. 30, 2002, Santiago (hosted by Ricardo Baeza-Yates)
 92. Foundations of, and Experiences with, Componentized Digital Libraries. Presentation as part of OCKHAM panel, ECDL'2002, Rome, Sep. 16-18, 2002
 93. Invited presentations in 3 cities in Brazil (Rio de Janeiro - visiting PUC Rio, Belo Horizonte - visiting Federal University of Minas Gerais, and Curitiba - visiting Catholic University of Parana), as part of week long visit arranged by the American Embassy in Brasilia and the American Consulate in Rio de Janeiro, Brazil, July 20-28, 2002 (discussing NDLTD, NSDL, and related matters)
 94. Panel member and proposer of panel "NSDL (National SMETE Digital Library): From Prototype to Production to Transformational National Resource" at JCDL'2002, Portland, July 14-18, 2002 (p. 368 of JCDL 2002 Proceedings)
 95. Mirroring an OAI archive with an I2-DSI channel, invited presentation for session on Distributed Storage for Digital Libraries, Spring 2002 Internet2 Members Meeting in Washington, DC, May 7, 2002 (by videoconference), http://www.internet2.edu/activities/html/spring_02.html
 96. Invited presentation as well as speaker on at least one panel, for symposium "What Scholars Need to Know to Publish Today: Digital Writing and Access for Readers", April 8, 2002, University at Albany, Albany, NY
 97. Digital Library Support of Education. Invited presentation for mini-conference on ETDs, Southern Illinois University, Carbondale, IL, March 22, 2002.
 98. Digital Library Support of Learning: Open Archives Initiative and Educational Demonstrations (NDLTD, CITIDEL/NSDL). Invited presentation at University of Arizona, March 8, 2002 (145 slides)
 99. GWU and NDLTD: Technical Issues. Invited presentation at GWU, Washington, D.C., Feb. 13, 2002
 100. GWU and NDLTD: General Issues. Invited presentation at GWU, Washington, D.C., Feb. 13, 2002
 101. Virginia Tech Perspective on AmericanSouth.org. Presentation for meeting of the project team for AmericanSouth.org: A Collaborative Project to Improve Access to Digital Resources on Southern History and Culture Funded by The Andrew W. Mellon Foundation. Emory University, Atlanta, GA, Feb. 1, 2002.
 102. Digital Library Support of Teaching and Learning. Invited presentation for colloquium series of talks in the area of digital libraries (SIS Colloquium Series on Digital Libraries) at School of Information Sciences; and additional talk "Networked Digital Library of Theses and Dissertations" for ETD Working Group, U. of Pittsburgh, Jan. 25, 2002.

103. Networked Digital Library of Theses and Dissertations: New Services, Standards, and Integration with the Open Archives Initiative. Invited presentation for Jornadas ISTEAC, Montevideo 2001, "Jornadas sobre Gestion de la Informacion en el siglo XXI", Montevideo, Uruguay, Nov. 12-14, 2001, hosted by UNESCO, ISTEAC, ... <http://www.ndltd.org/talks/Montevideo2001.ppt>
104. From Information Retrieval to Digital Libraries: Scenarios, Software, Systems, Services, Simulations. Presentation for Virginia Tech Dept. of CS Seminar, Blacksburg, VA, Oct. 31, 2001
105. Invited panel (Arts and Humanities Discussion: Non-traditional Theses) presentation for Fall Internet2 Conference "Virtual Internet2 Member Meeting", 4 October 2001, by telephone
106. Invited presentation for panel "Digital Library Programs: Current Status and Future Plans", ECDL'2001, Darmstadt, GE, Sept. 4-8, 2001
107. International Interdisciplinary Open Archives and ETDs. Invited presentation for Workshop, International Interdisciplinary Open Archives and Subject Specific Services in Mathematics and Physics, Duisburg, Germany, 9/3/2001
108. Panel moderator for IDM'2001, Dallas, TX, April 30, 2001
109. Internet Technology Innovation Center at VT. Invited presentation at Fall Centers Director Luncheon, "Interdisciplinary Frontiers 2001: Science and Technology in Service to Society", Virginia Tech, Blacksburg, VA, April 18, 2001
110. Parts 1 and 6, statement for panel 1: Developing the UNESCO International Guide for ETDs: A Multilingual Training Resource of Best Practices, for Fourth International Symposium on Electronic Theses and Dissertations (ETDs), Caltech, Pasadena, CA, March 22-24, 2001, <http://www.ndltd.org/talks/etd01p1.ppt>
111. Collaboration on Digital Libraries. Invited presentation at NEC RI, Princeton, NJ, Dec. 27, 2000. <http://www.ndltd.org/talks/nec2000.ppt>
112. Collaboration on Digital Libraries. Invited presentation at Hofstra U., Hempstead, NY, Dec. 22, 2000. <http://www.ndltd.org/talks/hofstra2.ppt>
113. Digital Libraries: Starting with Authors/Creators. Invited presentation for Digital Strategies 2000, National Archives, College Park, MD, Nov. 16-17, 2000. <http://www.ndltd.org/talks/nara.ppt>
114. Plenary panel 1 slides for ACM Multimedia '2000: Curricula and Resources for Courses about Multimedia, Oct. 30 - Nov. 4, 2000, Marina del Rey, CA, <http://www.ndltd.org/talks/mm00pan1.ppt>
115. Digital Libraries, OAI, ETDs, and NDLTD. Invited presentation for SEALS ETD Meeting, Oct. 25, 2000, Port Elizabeth, S. Africa. <http://www.ndltd.org/talks/seals.ppt>
116. Extending Interoperability of Digital Libraries: Building on the Open Archives Initiative, OAI Workshop at ECDL'2000, Lisbon, September 21, 2000, <http://www.ndltd.org/talks/oaiecdl.ppt>
117. Networked Digital Library of Theses and Dissertations (www.ndltd.org). Invited presentation for ECDL 2000 Panel 3 "Digital Libraries Programs and International Cooperation", September 20, 2000, Lisbon. <http://www.ndltd.org/talks/ecdlpnl.ppt>
118. Open Archives initiative and the Networked Digital Library of Theses and Dissertations. Invited presentation for seminar at UCSD, Geisel Library, Seuss Room, Aug. 9, 2000 <http://www.ndltd.org/talks/UCSD20000809.ppt>
119. Virginia Tech's Digital Library Research Laboratory: From Hardware to Software to Projects to Theory, invited seminar talk at IBM T. J. Watson Research Center, July 26, 2000. <http://www.ndltd.org/talks/ibm20000726public.ppt>
120. Digital Libraries, invited presentation requested by Virginia Center for Innovative Technology for AOL - University Research Day: Finding Common Ground, Reston, VA, July 14, 2000 (and separate breakout session for those desiring further info.)
121. Digital Libraries and the Open Archives Initiative, invited presentation for Louisiana State U., June 30, 2000. <http://www.ndltd.org/talks/lsuoai.ppt>
122. Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation for Louisiana State U., June 30, 2000. <http://www.ndltd.org/talks/lsundltd.ppt>
123. OAI, Electronic Theses, and Scholarly Communication: The Way to the Virtual University, Sonder-Kolloquium Einladung, Carl von Ossietzky Universitat Oldenburg, June 19, 2000 <http://www.ndltd.org/talks/oldnbrg.ppt>
124. Virtual Universities: Myth or Reality? Invited panel presentation at EUNIS 2000, Poznan, Poland, April 13-14, 2000. <http://www.ndltd.org/talks/poznanPanel.ppt>
125. Electronic Theses and Dissertations (ETDs): Improving Graduate Education through the Networked

- Digital Library of Theses and Dissertations (NDLTD), invited campus-wide presentation at Johns Hopkins U., April 7, 2000. <http://www.ndltd.org/talks/jhundltd.ppt>
126. E-Commerce Business Laboratory, presentations to stimulate e-commerce in Virginia, coordinated by Global Opportunities, Inc. of Blacksburg, VA and the Internet TIC of Virginia: March 21, 2000 at New River Community College, Dublin and March 30, 2000 at Southwest Virginia Higher Education Center, Abingdon, using notes including <http://fox.cs.vt.edu/talks/VTITIC.html>
 127. Digital Libraries: An Aid to Education through Interoperable Open Archives of Resources, invited campus-wide presentation at Johns Hopkins U., April 7, 2000. <http://www.ndltd.org/talks/jhuoai.ppt>
 128. The Open Archives initiative (OAi) and Electronic Theses and Dissertations (ETDs), invited presentation for the Spring 2000 Meeting of the Association of Information and Dissemination Centers (ASIDIC), Orlando, FL, March 27, 2000, <http://www.ndltd.org/talks/asidic.ppt>
 129. Electronic Theses and Dissertations (ETDs): Improving Graduate Education through the Networked Digital Library of Theses and Dissertations (NDLTD), invited campus-wide presentation at U. Kentucky, Lexington, Feb. 24, 2000.
 130. Digital Libraries: An Aid to Education through Interoperable Open Archives of Resources, invited campus-wide presentation at U. Kentucky, Lexington, Feb. 24, 2000.
 131. Involving New Scholars in Digital Libraries through the Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at Telcordia, Morristown, NJ, Dec. 30, 1999.
 132. Involving New Scholars in Digital Libraries through the Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at NEC Research Institute, Princeton, NJ, Dec. 21, 1999.
 133. Case study of Information Technologies in Action: Virginia Tech and Digital Libraries, invited presentation for State of the Art (SOTA), "Technology: The Next Revolution", Special Libraries Association (SLA) Nov. Forum, Washington, D.C., Nov. 19, 1999, <http://www.sla.org/professional/sota/index.shtml>
 134. Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at Virginia Commonwealth U., Richmond, VA, Nov. 17, 1999
 135. From NDLTD to NUDL to a NODL Framework, invited presentation for Universal Preprint Service Workshop, Santa Fe, NM, Oct. 21-22, 1999.
 136. Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation for U. New Mexico, Albuquerque, NM, Oct. 20, 1999
 137. Digital Libraries: A Pictorial View, invited presentation for Bioinformatics '99, Virginia Tech, Oct. 7-8, 1999.
 138. Networked Digital Library of Theses and Dissertations (NDLTD); ETD Needs, Possibilities, Action; invited presentations for Workshop on an international project of electronic dissemination of theses and dissertations, <http://www.unesco.org/webworld/etd>, UNESCO, Paris, September 27-28, 1999: <http://www.unesco.org/webworld/etd/contributions/fox.rtf>
 139. From NDLTD to Technology for Digital Libraries: Progress and Challenges, part of DL'99 tutorial, Aug. 11, 1999
 140. From NDLTD to Technology for Digital Libraries: Progress and Challenges, invited presentation for Ricoh, Tokyo, Japan, July 28, 1999
 141. Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation for NACSIS, Japan, July 28, 1999
 142. From NDLTD to Technology for Digital Libraries: Progress and Challenges, invited presentation for IBM Tokyo Research Lab, July 27, 1999
 143. From NDLTD to Technology for Digital Libraries: Progress and Challenges, invited presentation for NEC Human Media Research Lab, July 27, 1999
 144. Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation for Tokyo Institute of Technology, Japan, July 26, 1999
 145. Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation for ULIS, Japan, July 23, 1999
 146. How to Build Digital Libraries: A Methodology and Examples (NDLTD, CSTC), invited presentation for Kyoto U., Japan, July 22, 1999
 147. Digital Libraries to Support Graduate and Undergraduate Education (NDLTD, CSTC), invited presentation at Kobe U., Japan, July 22, 1999.
 148. Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at Arizona State

- U., July 6, 1999
149. Digital Libraries and their Support of Education, invited presentation at U. of Arizona, Tucson, AZ, July 1, 1999
 150. Every University Should Have Its Own Digital Library, invited presentation at IBM Almaden Research Laboratory, June 7, 1999
 151. Theses and Dissertations in the Digital Library, invited presentation in Split, Croatia, May 28, 1999.
 152. Continuing Evolution of the NDLTD, invited presentation for the ETD Workshop (2nd in series of national/international meetings), Virginia Tech, Blacksburg, VA, May 18, 1999
 153. Technology in the Classroom. Presentation for Virginia Tech Multimedia Users Group (VTMMUG, <http://www.nmc.vt.edu/vtmmug/>) meeting, Litton Reaves 1670, Virginia Tech, April 23, 1999
 154. Theses and Dissertations in the Digital Library. Presentation for Spring 1999 CNI Meeting, Renaissance Washington D.C. Hotel, April 16, 1999
 155. Networked Digital Library of Theses and Dissertations, invited multimedia presentation sent for launch of ETD initiative at Nanyang Technological Institute (NTU), Singapore, April 8, 1999 (Powerpoint, audio, video)
 156. A Computer Science Perspective on Bioinformatics. Presentation by L. Heath, C. Ribbens, and E. Fox, Biochemistry seminar, Virginia Tech, March 29, 1999
 157. Enhancing Learning through Digital Libraries and Inter-University Cooperation, invited presentation at Valencia Tech, Valencia, Spain, March 26, 1999 (delivered electronically followed by visit and discussion after plane delays)
 158. Digital Libraries, Electronic Publishing, CRIM, NDLTD, and Collaboration, invited presentation for Multimedia-Discussion Group (MUME), Humboldt U., Berlin, Germany, March 25, 1999
 159. Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation for campus community, Caltech, Pasadena, CA, March 12, 1999
 160. Current and Future Technical Structure of the NDLTD, invited library presentation, Caltech, Pasadena, CA, March 12, 1999
 161. The Networked Digital Library of Theses and Dissertations, invited presentation for CS201 Seminar Series, UCLA Computer Science Department, Los Angeles, March 11, 1999
<http://www.cs.ucla.edu/classes/cs201/winter99/calendar.html#Fox>
 162. Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation for Dept. of Information Studies, UCLA, Los Angeles, March 11, 1999
 163. Developing a University-Based Federated Digital Library of Worldwide Graduate Research (NDLTD), Computer Science Colloquium Series, USC, Los Angeles, March 10, 1999
 164. Networked Digital Library of Theses and Dissertations: A Vehicle for University Collaboration, seminar hosted by University of North Carolina, Chapel Hill, October 16, 1998.
 165. Improving Graduate Education through the Networked Digital Library of Theses and Dissertations (NDLTD), seminar hosted by University of Southampton, England, September 11, 1998
 166. The Worldwide Electronic Thesis and Dissertation Initiative: Joining the Networked Digital Library of Theses and Dissertations seminar hosted by University of Arizona, Tucson, AZ, July 30, 1998,
<http://www.ndltd.org/talks/ndltd980713.ppt>
 167. The Worldwide Electronic Thesis and Dissertation (ETD) Initiative: Joining the Networked Digital Library of Theses and Dissertations (NDLTD), seminar hosted by National Univ. of Singapore, June 30, 1998. <http://www.ndltd.org/talks/ndltd980630.ppt>
 168. The Worldwide Electronic Thesis and Dissertation Initiative: Joining the Networked Digital Library of Theses and Dissertations seminar hosted by University of Pittsburgh, Pittsburgh, PA, June 23, 1998,
<http://www.ndltd.org/talks/ndltd980623.ppt>
 169. DL Metrics: Web Characterization and 4S, presented by Edward A. Fox, written with Ghaleb Abdulla and Neill Kipp, DL'98 Metrics Workshop, June 27, 1998, Pittsburgh, PA
<http://www.canis.uiuc.edu/workshop/presentations.html>
 170. Position paper (<http://ks.com/icdl/254.html>) for 1st Summit on International Cooperation on Digital Libraries, 27-28 June 1998, Marriott City Center, Pittsburgh, PA [following Digital Libraries '98]
<http://www.ks.com/icdl/>
 171. The Worldwide Electronic Thesis and Dissertation Initiative: Joining the Networked Digital Library of Theses and Dissertations seminar hosted by Ohio State University, Columbus, Ohio, May 29, 1998.
 172. Context for DL Collaboration Between VTLS and Virginia Tech, invited presentation, VTLS Inc.,

- Blacksburg, VA, May 12, 1998 <http://fox.cs.vt.edu/talks/VTLS.htm>
173. Digital Libraries to Enhance Learning: Case Studies in Computer Science and Graduate Education. Invited presentation at Pacific Northwest National Laboratory, Pasco, WA, April 20, 1998.
 174. Update on Digital Dissertations. Presentation for Spring 1998 CNI Meeting, Crystal Gateway Marriott, Arlington, April 14, 1998 <http://fox.cs.vt.edu/~fox/test/CNIS98.pdf>
 175. Helping Learners through Digital Libraries: The Networked Digital Library of Theses and Dissertations (NDLTD) and the Computer Science Teaching Center (CSTC), invited seminar for Dept. of Computer Science, Univ. of Mass., Amherst, March 12, 1998. Seminar series page is <http://www.cs.umass.edu/csinfo/colloquia/DEPT/Seminars1997-98.html>
 176. The Worldwide Electronic Thesis and Dissertation Initiative: Joining the Networked Digital Library of Theses and Dissertations seminar hosted by University Denver for all neighboring universities, Denver, CO, March 9, 1998
 177. Progress on the National Digital Library of Theses and Dissertations (NDLTD), invited presentation for Computers in Libraries '98, Hyatt Regency, Crystal City, Arlington, VA, March 2, 1998
 178. Digital Libraries: Preparing the Next Generation of Scholars in session "Driving Influences: An Update on Issues, Trends and Current Developments that will Affect Secondary Publishers", NFAIS'98, Four Seasons, Philadelphia, PA, Feb. 24, 1998 <http://www.pa.utulsa.edu/nfais.html>
 179. The Networked Digital Library of Theses and Dissertations: Improving Graduate Education, invited seminar for Drexel U. College of Information Science and Technology, Phil. PA, Feb. 23, 1998
 180. Proposing a Partnership for Education Innovation: NSF, Virginia Tech, and SCT. Invited presentation, Malvern, PA, Feb. 23, 1998
 181. The Worldwide Electronic Thesis and Dissertation Initiative: Building the Networked Digital Library of Theses and Dissertations, presentation with John Eaton for National Agricultural Library, MD, Feb. 20, 1998
 182. The Worldwide Electronic Thesis and Dissertation Initiative: Joining the Networked Digital Library of Theses and Dissertations presentation with John Eaton, James Madison U., Harrisonburg, VA, Feb. 19, 1998
 183. Digital Libraries, presentation arranged by Assistant Professor of IS, Youngjin Yoo, Weatherhead School of Management, Case Western Reserve U., through videoconference for MIDS411: Advances in Information Technology, Feb. 5, 1998, 6-8pm
 184. The Worldwide Electronic Thesis and Dissertation Initiative: Joining the Networked Digital Library of Theses and Dissertations, invited videoconference presentation, Florida International U., 1pm Jan. 27, 1998, hosted by Jackie Zelman, Director, UCS
 185. The Worldwide Electronic Thesis and Dissertation Initiative: Joining the Networked Digital Library of Theses and Dissertations, invited presentation, VCU, Richmond, VA, Jan. 12, 1998
 186. The Networked Digital Library of Theses and Dissertations, invited presentation for Seminar on Information Access, School of Information Management & Systems, University of California, Berkeley, CA, Jan. 6, 1998
 187. Transfer Conference presentations, on changes in Computer Science instructional offerings utilizing instructional technology, Donaldson Brown Hotel and Conference Center, Blacksburg, Dec. 8, 1997. <http://fox.cs.vt.edu/talks/Transfer98.htm>
 188. Distributed Learner Spaces with Digital Libraries: Future digital library technologies across high-speed distributed systems. Presentation for signing of Memorandum of Understanding between VPI&SU and the Institute of Systems Science of Singapore, as part of the ceremony launching the SINGAREN-vBNS connection, Washington, D.C., Nov. 7, 1997. <http://www.ndltd.org/talks/singapore>
 189. Implications of the Electronic Thesis and Dissertation (ETD) Initiative, invited presentation for Electronic Publishing session of DTIC's Annual Users Conference, November 5, 1997, Arlington, VA
 190. Improved Education with a Digital Library: the NDLTD Case Study, invited session and presentation (with Gail McMillan) for FIPSE PI meeting, Nov. 2, 1997, Arlington, VA
 191. The Worldwide Electronic Thesis and Dissertation Initiative: Joining the Networked Digital Library of Theses and Dissertations, invited presentation at Fall CNI Meeting, Minneapolis, MN 10/26-27/97 <http://www.ndltd.org/talks/CNIF97.pdf>
 192. The Worldwide ETD Initiative: Joining the Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at U. Michigan, Oct. 8, 1997
 193. The Worldwide ETD Initiative: Joining the Networked Digital Library of Theses and Dissertations

- (NDLTD), invited presentation at Tech. Univ. of Lisbon, Oct. 2, 1997
194. The Worldwide ETD Initiative: Joining the Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at U. Illinois Urbana-Champaign, Sept. 26, 1997
 195. The Worldwide ETD Initiative: Joining the Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at U. Virginia, Aug. 29, 1997
 196. The Worldwide ETD Initiative: Joining the Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at Florida Inst. of Tech, Aug. 21, 1997
 197. The Worldwide ETD Initiative: Joining the Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at University N. Florida, Aug. 18, 1997
 198. The Worldwide ETD Initiative: Joining the Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at U. Pennsylvania, July 29, 1997
 199. Panel discussion "NCSTRL: Experience with a Global Digital Library" on Networked CS Technical Report Library, D-Lib Panel on Interoperability I, ACM DL'97, July 24, 1997, Philadelphia, PA
 200. Renaissance Consortium Report on the Worldwide ETD Initiative / Networked Digital Library of Theses and Dissertations (NDLTD), IBM Almaden Lab, San Jose, CA, July 11, 1997.
 201. The Worldwide ETD Initiative: Joining the Networked Digital Library of Theses and Dissertations (NDLTD), informal presentation at Stanford U., July 11, 1997
 202. The Worldwide ETD Initiative: Joining the Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at Naval Postgraduate School, July 9, 1997
 203. The Worldwide ETD Initiative: Joining the Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at U. Ca. Berkeley, July 8, 1997
 204. The Worldwide ETD Initiative: Joining the Networked Digital Library of Theses and Dissertations (NDLTD), informal presentation at U. Ca. Santa Barbara, July 7, 1997
 205. Information Retrieval, Digital Libraries, Education Innovation, Theses and Dissertations, and WWW Traffic Analysis/Modeling: Related Work at Virginia Tech. Presentation July 3, 1997, ISS, Singapore.
 206. The Worldwide ETD Initiative: Joining the Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at National U. Singapore, July 1-3, 1997
 207. Powerful Interactivity in a Networked World. Presentation to the Computer Society of Singapore, July 1, 1997, Singapore.
 208. The Digital Era: Implications for Librarians, Information Providers and Users. Presentation for National Computer Board Digital Libraries Cluster. June 30, 1997, ISS Auditorium, Singapore.
 209. The Worldwide Electronic Thesis and Dissertation Initiative: Joining the Networked Digital Library of Theses and Dissertations seminar in conjunction with NSF DLI briefing, Carnegie-Mellon U., June 3, 1997
 210. Networked Digital Library of Theses and Dissertations, or, the ETD Initiative, presentation at Univ. Waterloo, June 2, 1997, <http://www.lib.uwaterloo.ca/~uw-etpt/Flyer.html>
 211. E. Fox, J. Eaton, G. McMillan. National Digital Library of Theses and Dissertations, invited session for CAUSE/CNI regional conference, Univ. of Del., May 22, 1997.
 212. Networked Digital Library of Theses and Dissertations, presentation at NYU, NYC, May 20, 1997.
 213. Networked Digital Library of Theses and Dissertations, presentation for the AAP PSP Executive Council, AAP, NY, May 20, 1997.
 214. Networked Digital Library of Theses and Dissertations. Invited videoconference presentation at Univ. S. Florida, April 11, 1997 (w. J. Eaton, G. McMillan, N. Kipp)
 215. Publishers and Electronic Theses, project briefing at Coalition for Networked Information Spring Meeting, Crystal City, VA, April 1-2, 1997.
 216. The Worldwide ETD Initiative: Joining the Networked Digital Library of Theses and Dissertations (NDLTD), invited presentation at Rutgers, The State University, New Brunswick, NJ, March 6, 1997
 217. Networked Digital Library of Theses and Dissertations. Invited presentation at Clemson U., March 5, 1997 (w. J. Eaton)
 218. Networked Digital Library of Theses and Dissertations. Invited presentation at U. Georgia, Athens, March 5, 1997 (w. J. Eaton)
 219. Networked Digital Library of Theses and Dissertations. Invited presentation at U. Alabama, Tuscaloosa, March 4, 1997 (w. J. Eaton)
 220. Networked Digital Library of Theses and Dissertations. Invited presentation at U. Alabama, Birmingham, March 4, 1997 (w. J. Eaton)

221. Networked Digital Library of Theses and Dissertations. Invited presentation at U. Tennessee, Knoxville, March 3, 1997 (w. J. Eaton)
222. Networked Digital Library of Theses and Dissertations. Informal presentation at San Jose State U., Feb. 28, 1997
223. Multimedia, Hypertext and Information Access. Panel presentation in session on "Defining Multimedia Courses within a Computer Science Education", ACM SIGCSE'97, San Jose, 2/27 - 3/1/97.
224. Digital Libraries: Theory, Educational Applications, and Use. Invited colloquium series talk for Dept. of Computer & Information Science, Ohio State Univ., Feb. 11, 1997.
225. Networked Digital Library of Theses and Dissertations. Invited presentation at Ohio State U., Feb. 10, 1997
226. Networked Digital Library of Theses and Dissertations. Invited presentation at Vanderbilt U., Jan. 17, 1997 (w. J. Eaton, G. McMillan)
227. National Digital Library of Theses and Dissertations. Invited presentation, AT&T Laboratories, Murray Hill, NJ, Dec. 27, 1996.
228. National Digital Library of Theses and Dissertations. Invited presentation and chairing of working group session on this topic, NSF/DARPA/NASA DLI (Digital Library Initiative) meeting, Dec. 16-17, 1996
229. Electronic Theses and Dissertations, project briefing at Coalition for Networked Information Fall Meeting, San Francisco, Dec. 6-7, 1996
230. The Future Role of Publishers in the New Educational Dynamic. Chaired plenary luncheon for Proc. Frontiers in Education - FIE'96, Salt Lake City, Utah, Nov. 7, 1996.
231. Interactive Learning with a Digital Library in Computer Science. Invited long presentation for NSF CISE EI PIs workshop at FIE'96, Salt Lake City, Utah, Nov. 5-8, 1996.
232. IR Curriculum: Information Engineering to Digital Libraries. Invited presentation for Drexel University hosted Workshop/Symposium sponsored by the W.K. Kellogg Foundation "Information Retrieval 2000 --- Workplace Needs and Curricular Implications", Marriott Hotel, Philadelphia PA, May 24, 1996.
233. Virginia Tech's Digital Library Project. Invited short presentation for IBM Digital Library Consortium Meeting, Case Western Reserve University, Cleveland, May 2, 1996.
234. Perspectives on Information Technology. Invited presentation for the executives of the Corporate Research Center, Blacksburg, VA, Dec. 21, 1995.
235. Digital Libraries and CS Education. Invited Colloquium, George Mason U., Nov. 13, 1995.
236. Education and Research with a Digital Library in Computer Science. Invited presentation for IBM Almaden Research Center, Nov. 3, 1995.
237. Education and Research with a Digital Library in Computer Science. Invited presentation for IBM Watson Research Lab, Oct. 27, 1995.
238. Electronic librarians, intelligent network agents, and information catalogues. Invited presentation for Reconnecting Science and Humanities in Digital Libraries, sponsored by the Univ. of Kentucky and the British Library, 19-21 October 1995, Lexington, KY.
239. Computer Science Technical Reports Library. Invited presentation for Unlocking University Information, sponsored by SURA/SOLINET, Atlanta, Sept. 6-7, 1995.
240. IR Education in CS. Invited presentation for Panel on Education for IR, ACM SIGIR'95, Seattle, WA, July 12, 1995.
241. IR is at the Heart of Digital Libraries and the Global Information Infrastructure. Invited presentation for A SMART Celebration, Cornell Univ., Ithaca, NY, April 22, 1995.
242. How the Blacksburg Electronic Village will Lead to Changes in Careers. Invited presentation for Golden Keys Society Conference, Virginia Tech, Blacksburg, VA, April 1, 1995.
243. Improving CS Education with Digital Libraries. Invited Colloquium for Dept. of Computer Science, SUNY Buffalo, Dec. 2, 1994.
244. Interactive Accessibility. Invited presentation at MCNC, Research Triangle Park, NC, October 30, 1994.
245. Requirements for Knowledge Workers and Education. Invited presentation for Digital Library Academy Workshop, sponsored by IBM Academy of Technology, Edith Macy Conference Center, Briarcliff Manor, NY, Sept. 12-13, 1994.
246. Digital Libraries. Norfolk State University Seminar, Norfolk, VA, March 28, 1994.
247. Components of the Informatics Discipline. Panel presentation for session on Education of the New Information Specialist, ACM CSC'94, ACM Computer Science Conference, Phoenix, AZ, March 8, 1994.
248. Electronic Publishing Experiments: Report on Digital Libraries and their Relationship to SIG Activities.

- Presentation for ACM SIG Chairs Meeting, Phoenix, AZ, March 6, 1994.
249. Background to Current Work on Digital Libraries. Invited presentation for Workshop on Intelligent Access to On-line Digital Libraries, in connection with IEEE CAIA '94, San Antonio, TX, March 1, 1994
 250. Electronic Theses and Dissertations. Invited presentation for Workshop: Innovative Uses of High-Tech in Graduate School Operations, CSGS'94, Conf. of Southern Graduate Schools, 23rd Annual Meeting, Clearwater Beach, FL, Feb. 18-21, 1994.
 251. Digital Library Related Research. Seminar for Case Western Reserve University, Cleveland, OH, Dec. 21, 1993.
 252. Interactive Learning with a Digital Library in Computer Science. Invited presentation, as part of this year's program on Applications of Computers in Instruction, for Virginia Tech Chapter of Sigma Xi, Nov. 30, 1993, Blacksburg, VA.
 253. Worldwide Digital Libraries. Invited presentation for Virginia Tech Center for the Study of Science and Society, Nov. 18, 1993, Blacksburg, VA.
 254. Research In Digital Libraries and Networked Multimedia Information Access. Invited presentation for panel on Academic Research Trends in Information Storage and Retrieval, sponsored by SIG/SRT and SIG/MGT, ASIS'93, October 25-29, 1993, Columbus, OH.
 255. Improving the Undergraduate Experience through Research in Interactive Accessibility and Digital Libraries. Invited presentation for ACM Student Chapter, Virginia Tech, Blacksburg, VA, Sept. 29, 1993.
 256. Networked Multimedia Information Retrieval. Invited presentation for IBM European Networking Center, Heidelberg, Germany, Sept. 16, 1993.
 257. Blacksburg Electronic Village and the NREN. Coordinator and presenter in team representing the Blacksburg Electronic Village in briefing at National Science Foundation, Aug. 27, 1993, Washington, D.C.
 258. Envision-ing a Computer Science Digital Library. Invited presentation and chair for panel on Digital Libraries of the Future, ACM Multimedia 93, Aug. 4-6, 1993, Anaheim, CA.
 259. Technical Reports / Dissertations. Invited project presentation for Monticello Electronic Library meeting, sponsored by SURA, SURAnet, SOLINET, and NSF, July 29-30, 1993, Atlanta.
 260. Electronic Dissertation Project. Presentation for Invited SIGIR Panel on Information Retrieval, and panel chair, ACH-ALLC93, Joint International Conference of the Association for Computers and the Humanities and the Association for Literary and Linguistic Computing, June 16-19, 1993, Georgetown Univ., Washington, D.C..
 261. An Information Retrieval and Digital Library Perspective. Invited Presentation for Panel on Multimedia Databases, Joint Conf.: 1993 ACM SIGMOD International Conference on Management of Data and Twelfth ACM SIGACT-SIGMOD-SIGART Symposium on Principles of Database Systems (PODS), Washington, D.C., May 25-28, 1993.
 262. Envision, the Future. Invited presentation for Digital Libraries of the Future session, Online Publishing '93, Pittsburgh, PA, March 22-24, 1993.
 263. Digital Multimedia Standards and Systems. Invited Lecturer for Multimedia and GIS Workshop, sponsored by the National Center for Geographic Information (CNIG) and GIS Europe, Inc., Feb. 24-26, 1993, Lisbon, Portugal
 264. Personalized System of Instruction. Presentation and moderating panel on Individualized Instruction: Past, Present, and Future, for LRC Workshop, Virginia Tech, Blacksburg, VA, Feb. 4, 1993.
 265. Electronic Libraries. Invited presentation for session on Impacts of Application Environments on Hyperbase Systems, NSF Hyperbases Workshop, Oct. 14-16, 1992, Washington.
 266. Project Envision & Information Retrieval Invited presentation for NSF Workshop on Electronic Libraries, July 20-21, 1992, Washington, D.C.
 267. Digital Technology and Standards for Multimedia. Invited seminar for Informatik-Kolloquium and HypEdu (Swiss Special Interest Group for Hypermedia and Educational Computing and Software Ergonomics) at ETH (Eidgenossische Technische Hochschule) Zurich, Swiss Federal Institute of Technology Zurich, June 26, 1992.
 268. Constructing and Distributing Information Retrieval Databases. Invited presentation for "Databases for Research and Testing in Document Analysis and Information Retrieval" panel at Symposium on Document Analysis and Information Retrieval, March 16-18, 1992, Tropicana Hotel, Las Vegas, Nevada.
 269. Developing Interactive Digital Multimedia Applications and Archives. Invited seminar for Graduate Center, CUNY, NY, Feb. 6, 1992. Approaches to Improving Information Access. Invited seminar for

- AT&T Bell Laboratories Murray Hill, NJ, Feb. 6, 1992.
270. Developing Interactive Digital Multimedia Applications and Archives. Invited presentation for Bell Communications Research, Morristown, NJ, Dec. 23, 1991.
 271. Building an Archive of Computer Science Literature. Invited seminar for Department of Computer Science, The Ohio State University, Nov. 5, 1991.
 272. Extended Boolean. Invited presentation for "Full Text: From Tutorial to Innovations, Part 2. Beyond Boolean" panel at ASIS '91, American Society for Information Science Annual Meeting, Oct. 28-30, 1991, Washington, D.C. Abstract on conf. proceedings p. 370.
 273. New Developments in Information Retrieval Systems and Technology. Invited presentation as part of "The SMART Project in Automatic Document Retrieval" Panel Session at SIGIR '91, 14th Intern'l Conf. on R & D in Information Retrieval, October 13-16, 1991, Chicago.
 274. Intelligent Information Retrieval. Invited presentation for Librarian Ex Machine 5.0 session sponsored by LITA, American Library Association 1991 Annual Conf., Atlanta, GA, July 2, 1991.
 275. Multimedia Databases. Invited presentation for 1991 NCR Imaging/Multimedia TIES, June 25, 1991, Kitchener, Canada.
 276. The Emergence of Digital Video in Interactive Computing Systems. Invited presentation for 1990 NCR Multimedia TIES, October 29-31, 1990, Atlanta, GA.
 277. Interactive Digital Video. Invited presentation for Data Processing Management Association, New River Valley Chapter, Sept. 13, 1990, Blacksburg, VA.
 278. DVI: A Tool for Tomorrow. Invited demonstration, presentation for Extension Technology Conference: Applied Technology, May 30 - June 2, 1990, Blacksburg, VA.
 279. Electronic Publishing and Information Retrieval Research. Invited presentation for joint meeting of Southern and Central Ohio Chapters of ASIS, March 7, 1990, Dayton, OH.
 280. Managing Large Data, Information, Knowledge Bases. Invited presentation for University-Wide Seminar on Engineering and Scientific Computing, sponsored by Dept. of Mathematics, Feb. 13, 1990, VPI&SU, Blacksburg, VA.
 281. Interactive Digital Video -- Technology and Applications for the Next Generation of Multimedia Systems. Invited presentation for seminar of Dept. of Computer Science, Dec. 13, 1989, Miami University of Ohio, Oxford, Ohio.
 282. Advances in Retrieval Software and Database Design. Invited Presentation for Information Industry Association Impact Seminar "The Second Generation of CD-ROM" on Nov. 13, 1989, New York City.
 283. Intelligent Handling of Naval Intelligence Messages: The CODER System. Invited presentation for Seventh Intelligence Community Artificial Intelligence / Advanced Computing Symposium, 4-6 October, 1989, Reston, VA.
 284. The Lexicon and Information Retrieval panel presentation for SIGIR '89, 12th Int'l Conf. on R&D in Information Retrieval, June 25 - 28, 1989, Cambridge, MA.
 285. Development of the CODER Distributed System. Invited presentation for Computer Science Colloquium, University of Utah, March 30, 1989, Salt Lake City, Utah.
 286. Expert-Based Retrieval: The CODER Prototype. Invited presentation for "Intelligent Access to Information" session at University of Utah health sciences INFOFAIR, March 30, 1989, Salt Lake City, Utah.
 287. Electronic Publishing panel presentation, for ACM Conf. on Document Processing Systems, Dec. 5-9, 1988, Santa Fe, NM.
 288. The State of the Art in Information Retrieval: Background for Hypertext. Invited presentation for "The Range and Power of Standards & the Desktop," sponsored by Graphic Communications Assoc. and National Assoc. of Desktop Publishers, Nov. 16-18, 1988, Boston, MA.
 289. Experimental Information Retrieval. Invited presentation, Center for Medical Informatics Seminar Series, Nov. 3, 1988, Columbia Univ., NY.
 290. Medium and Message: The Future of the Electronic Book. Invited presentation for panel at Univ. of Waterloo Centre for the New Oxford English Dictionary 4th Annual Conf., Information in Text, Oct. 27-28, 1988, Waterloo, Canada.
 291. Interfaces for User Modeling. Invited presentation for "Interface Issues in Interactive Information Retrieval," SIG UOI / ACM SIGIR joint session, at 51st American Society for Information Science Annual Mtg., Oct. 23-27, 1988, Atlanta, GA.
 292. Hypertext and Hypermedia are Aspects of Information Storage and Retrieval. Invited presentation for

- NCR sponsored Hypertext Workshop, Oct. 5-7, 1988, Atlanta, GA.
293. Relating Information Retrieval Research to CD-ROM. Invited presentation for "Advanced Information Handling" session, at CD-ROM Expo, Sept. 26-29, 1988, Chicago, IL.
 294. The Emergence of CD-ROM: Image vs. Information Access. Invited presentation for Old Dominion Chapter AIIM, Sept. 13, 1988, Richmond VA.
 295. Automatic Methods for Information Retrieval. Invited presentation for Annual Meeting of American Association of Law Libraries, June 26-28, 1988, Atlanta, GA.
 296. Information Retrieval Models, Methods and Merits. Invited presentation for Microsoft's Third Int'l CD-ROM Conf., March 1-3, 1988, Seattle, WA.
 297. Advances in Information Retrieval. First seminar for Lotus Development Corp. Information Retrieval Series, October 5, 1987, Cambridge, MA.
 298. UNIX Today. Seminar for Lynchburg Chapter of Data Processing Man. Assoc. Computer Show, September 4, 1987, Lynchburg, VA.
 299. Experimental Systems for Advanced Retrieval. Seminar at AT&T Bell Laboratories, July 15, 1987, Holmdel, NJ.
 300. Experimental Systems for Advanced Retrieval: SMART and CODER. Seminar for the School of Information Studies, Syracuse University, April 28, 1987, Syracuse, NY.
 301. Experimental Systems for Testing the Applicability of Advanced Retrieval Methods: Lessons Learned from SMART and CODER. Seminar for Grad. Library School, Univ. of Chicago, April 9, 1987, Chicago, IL.
 302. Why UNIX: A Personal Perspective. Presentation for Roanoke Chapter of Data Processing Management Assoc., March 19, 1987, Roanoke, VA.
 303. The CODER System: A Testbed for AI Methods in Information Retrieval. Seminar on "Applications of Artificial Intelligence and Expert Systems to Database Production and Information Retrieval" at NFAIS (National Federation of Abstracting and Information Services) 29th Annual Conference, March 1-4, 1987, Washington, D.C.
 304. Why UNIX. Presentation for New River Valley PC Users Group, December 17, 1986, Blacksburg, VA.
 305. Effective Retrieval of Composite Documents. NSF Research Panel at American Society for Information Science 49th ASIS Annual Meeting, Sept. 28 - Oct. 2, 1986, Chicago, IL.
 306. Information Retrieval Research Opportunities. Presentation for Westinghouse Electric Corp. Technologies Enterprises, June 24, 1986, Monroeville PA.
 307. Overview of Information Retrieval Research. Presentation at AT&T Document Development Organization, March 24, 1986, Winston- Salem, NC.
 308. Research in Electronic Conferencing. Presentation for SIG/UIO Panel at American Society for Information Science 48th American Society for Information Science Annual Mtg., Oct. 20-24, 1985, Las Vegas, NE.
 309. Overview of Information Retrieval Research. Seminar at Bell Communications Research, Aug. 7, 1985, Morristown, NJ.
 310. Overview of Information Retrieval Research. Seminar at AT&T Bell Laboratories, Aug. 5, 1985, Murray Hill, NJ.
 311. Theory and Applications for Extended Information Retrieval. Seminar at AT&T Bell Laboratories, July 30, 1985, Holmdel, NJ.
 312. Composite Document Extended Retrieval: An Overview. Seminar at AT&T Bell Laboratories, July 23, 1985, Holmdel, NJ.
 313. UNIX in Education. In seminar on "UNIX, Micro Computers, And You," sponsored by Virginia Western Community College and Sperry Corp., May 16, 1985, Roanoke, VA.
 314. Improved Retrieval Using a Relational Thesaurus Expansion of Boolean Logic Queries. Presentation and paper for workshop on relational models of the lexicon, June 29, 1984, Stanford Univ., Palo Alto, CA.

TECHNICAL REPORTS, OTHER PUBLICATIONS:

1. Kavanaugh, Andrea, Yang, Seungwon, Sheetz, Steven, Li, Lin Tzy, Fox, Edward (2011) Between a Rock and a Cell Phone: Social Media Use during Mass Protests in Iran, Tunisia and Egypt. Technical Report TR-11-10, Computer Science, Virginia Tech. July 2011. <http://eprints.cs.vt.edu/archive/00001149/>

2. Kavanaugh, Andrea, Fox, Edward, Sheetz, Steven, Yang, Seungwon, Li, Lin Tzy, Whalen, Travis, Shoemaker, Donald, Nastev, Apostel, Xie, Lexing (2011) Social Media for Cities, Counties and Communities. Technical Report TR-11-09, Computer Science, Virginia Tech. July 2011.
<http://eprints.cs.vt.edu/archive/00001148/>
3. N. Short, A. L. Abbott, M. Hsiao, and E. Fox "A Bayesian Approach to Fingerprint Minutia Localization and Quality Assessment using Adaptable Templates," CESCO Technical Report, CESCO-2011-002, Bradley Dept. of Electrical and Computer Engineering, Virginia Tech, June 2, 2011.
http://www.cesca.centers.vt.edu/research/technical_report/TechReport_2011_002.pdf
4. K. Hoyle, N. Short, M. S. Hsiao, and A. L. Abbott, E. A. Fox, "Minutiae + Friction Ridges = Triplet-Based Features for Determining Sufficiency in Fingerprints," CESCO Technical Report, CESCO-2011-001, Bradley Dept. of Electrical and Computer Engineering, Virginia Tech, June 2, 2011.
http://www.cesca.centers.vt.edu/research/technical_report/fingerprint_sufficiency.pdf
5. Murthy, Uma, Li, Lin Tzy, Hallerman, Eric, Fox, Edward, Perez-Quinones, Manuel, Delcambre, Lois, Torres, Ricardo (2011) Use of Subimages in Fish Species Identification: A Qualitative Study. Technical Report TR-11-02, Computer Science, Virginia Tech. <http://eprints.cs.vt.edu/archive/00001142/>
6. Kavanaugh, A., Fox, E., Sheetz, S., Shoemaker, D., Natsev, A., Xie, L. Social Media for Cities, Counties and Communities. Final Grant Report, submitted to Virginia Tech Center for Community Security and Resilience (CCSR), March 2011.
7. Nadia P. Kozievitch, Edward Fox, and Ricardo da S. Torres. Analyzing Compound Object Technologies from the 5S Perspective. University of Campinas (UNICAMP) Instituto de Computacao, Technical Report IC-11-01, Brazil, Jan. 2011, 26 pages, <http://www.ic.unicamp.br/~reltech/2011/11-01.pdf>
8. N. Short, A. L. Abbott, M. Hsiao, and E. Fox "Extraction of Hierarchical Extended Features in Fingerprint Images," CESCO Technical Report, CESCO-2010-001, Bradley Dept. of Electrical and Computer Engineering, Virginia Tech, November 12, 2010.
http://www.cesca.centers.vt.edu/research/technical_report/TechReport_2010_001.pdf
9. Nadia P. Kozievitch, Sherley Codio, Jennifer A. Francois, Edward Fox, and Ricardo da S. Torres. Exploring CBIR concepts in the CTRnet Project. University of Campinas (UNICAMP) Instituto de Computacao, Technical Report IC-10-32, Brazil, November 2010, 20 pages,
<http://www.ic.unicamp.br/~reltech/2010/10-32.pdf>
10. Murthy, U., Kozievitch, N. P., Leidig, J., Torres, R. da S., Yang, S., Goncalves, M., Delcambre, L., Archer, D., and Fox, E. A. Extending the 5S Framework of Digital Libraries to Support Complex Objects, Superimposed Information, and Content-Based Image Retrieval Services. Technical Report TR-10-05, Computer Science, Virginia Tech, April 2010, <http://eprints.cs.vt.edu/archive/00001114/>.
11. Nadia P. Kozievitch, Ricardo da Silva Torres, Thiago Falcao, Evandro Ramos, Felipe Andrade, Silmara Marques Allegretti, Marlene Tiduko Ueta, Rubens Riscala Madi, Uma Murthy, Edward A. Fox, Yinlin Chen, and Eric Hallerman. Evaluation of a Tablet PC image annotation and retrieval tool in the parasitology domain. University of Campinas (UNICAMP) Instituto de Computacao, Technical Report IC-09-23, Brazil, July 2009, 16 pages, <http://www.ic.unicamp.br/~reltech/2009/09-23.pdf>
12. Tripathi, Jyotirmaya. ETD Collection and Preservation from India. Independent Study Project Report. Computer Science, Virginia Tech, Blacksburg, VA, July 2008, <http://pubs.dlib.vt.edu:9090/193/>
13. Volpe, James, McMillan, Gail and Fox, Edward A. Integration of VT ETD-db with Banner. Technical Report TR-08-04, Virginia Tech Department of Computer Science, Jan. 2008,
<http://eprints.cs.vt.edu/archive/00001018/>
14. Andrews, Nicholas O. and Fox, Edward A. Recent Developments in Document Clustering. Technical Report TR-07-35, Virginia Tech Department of Computer Science, Oct. 2007,
<http://eprints.cs.vt.edu/archive/00001000/>
15. Andrews, Nicholas O. and Fox, Edward A. Clustering for Data Reduction: A Divide and Conquer Approach. Technical Report TR-07-36, Virginia Tech Department of Computer Science, Oct. 2007,
<http://eprints.cs.vt.edu/archive/00000999/>
16. Kim, Seonho, Fox, Edward A., Fan, Weiguo, North, Chris, Tatar, Deborah, and Torres, Ricardo da Silva. Design and Evaluation of Techniques to Utilize Implicit Rating Data in Complex Information Systems. Technical Report TR-07-20, Virginia Tech Department of Computer Science, May 2007,
<http://eprints.cs.vt.edu/archive/00000980/>
17. Pomerantz, Jeffrey, Oh, Sanghee, Wildemuth, Barbara M., Yang, Seungwon, and Fox, Edward A. (2007) Digital Library Education in Computer Science Programs. Technical Report TR-07-09, Virginia Tech

- Department of Computer Science, Feb. 2007, <http://eprints.cs.vt.edu/archive/00000945/>
18. Matthew Phillips, Edward A. Fox, and Fernando das Neves. Finding Computer Science Syllabi on the World Wide Web. Virginia Tech Dept. of Computer Science Technical Report TR-06-25, Oct. 2006, <http://eprints.cs.vt.edu/archive/00000930/>
 19. Ananth Raghavan, Divya Rangarajan, Rao Shen, Marcos Andre Goncalves, Naga Srinivas Vemuri, Weiguo Fan, Edward A. Fox. Schema Mapper: A Visualization Tool for Digital Library Integration. TCDL Bulletin, 2(1), 2005, <http://www.ieee-tcdl.org/Bulletin/v2n1/raghavan/raghavan.html>
 20. Shen, Rao, Vemuri, Naga Srinivas, Vijayaraghavan, Vidhya, Fan, Weiguo, and Fox, Edward A. EtanaViz: A Visual User Interface to Archaeological Digital Libraries. Technical Report TR-05-14, Computer Science, Virginia Tech, 24 October 2005, <http://eprints.cs.vt.edu/archive/00000725/>
 21. Rangarajan, Divya. SchemaMapper: A tool for visualization of schema mapping. Technical Report TR-05-09, Computer Science, Virginia Tech, 26 August 2005, <http://eprints.cs.vt.edu/archive/00000679/>
 22. Rao Shen, Marcos Andre Goncalves, Weiguo Fan, Edward A. Fox. Requirements Gathering and Modeling of Domain-Specific Digital Libraries with the 5S Framework: An Archaeological Case Study with ETANA. Technical Report TR-05-07, Computer Science, Virginia Tech, 13 April 2005, <http://eprints.cs.vt.edu/archive/00000713/>
 23. Ananth Raghavan, Naga Srinivas Vemuri, Rao Shen, Marcos A. Goncalves, Weiguo Fan, Edward A. Fox. Incremental, Semi-automatic, Mapping-Based Integration of Heterogeneous Collections into Archaeological Digital Libraries: Megiddo Case Study. Technical Report TR-05-06, Computer Science, Virginia Tech, 13 April 2005, <http://eprints.cs.vt.edu/archive/00000712/>
 24. Ananth Raghavan, Divya Rangarajan, Rao Shen, Marcos Andre Goncalves, Naga Srinivas Vemuri, Weiguo Fan, Edward A. Fox. Schema Mapper: A Visualization Tool for DL Integration. Technical Report TR-05-05, Computer Science, Virginia Tech. 13 April 2005, <http://eprints.cs.vt.edu/archive/00000711/>
 25. Rao Shen, Naga Srinivas Vemuri, Ananth Raghavan, Marcos Andre Goncalves, Divya Rangarajan, Weiguo Fan, Edward A. Fox. Integration of Heterogeneous Digital Libraries with Semi-automatic Mapping and Browsing: From Formalization to Specification to Visualization. Technical Report TR-05-04, Computer Science, Virginia Tech, 13 April 2005, <http://eprints.cs.vt.edu/archive/00000710/>
 26. Xi, Mr. Wensi and Zhang, Mr. Benyu and Fox, Dr. Edward A. (2004) SimFusion: A Unified Similarity Measurement Algorithm for Multi-Type Interrelated Web Objects. Technical Report TR-04-19, Computer Science, Virginia Polytechnic Institute and State University, <http://eprints.cs.vt.edu:8000/archive/00000773/>
 27. Zhang, Baoping and Goncalves, Marcos Andre and Fan, Weiguo and Chen, Yuxin and Fox, Edward A. and Calado, Pavel and Cristo, Marco. Intelligent Fusion of Structural and Citation-Based Evidence for Text Classification. Technical Report TR-04-16, Computer Science, Virginia Tech, 30 August 2004, <http://eprints.cs.vt.edu:8000/archive/00000758/>
 28. Kanade, Abhijat. Project AlcoZone - Independent Study Report supervised. Technical Report TR-04-11, Computer Science, Virginia Tech, 14 May 2004, <http://eprints.cs.vt.edu:8000/archive/00000748/>
 29. Kampanya, Nithiwat. User Study of the Digital Library Clustering Result Visualization. Technical Report TR-04-10 supervised, Computer Science, Virginia Tech, 28 April 2004, <http://eprints.cs.vt.edu:8000/archive/00000747/>
 30. Scarborough, M.; Fox, E.; and Arnold, L. Search Tool Implementation for Historical Archive. Technical Report TR-04-09, Computer Science, Virginia Tech, 7 June 2004, <http://eprints.cs.vt.edu:8000/archive/00000746/>
 31. Ravindranathan, Unni and Shen, Rao and Goncalves, Marcos and Fan, Weiguo and Fox, Edward and Flanagan, James (2004) ETANA-DL: Managing Complex Information Applications - An Archaeology Digital Library. Technical Report TR-04-05, Computer Science, Virginia Tech, Feb. 2004, <http://eprints.cs.vt.edu/archive/00000684/>
 32. Ravindranathan, Unni and Shen, Rao and Goncalves, Marcos and Fan, Weiguo and Fox, Edward and Flanagan, James. ETANA-DL: A Digital Library for Integrated Handling of Heterogeneous Archaeological Data. Technical Report TR-04-04, Computer Science, Virginia Tech, Feb. 2004, <http://eprints.cs.vt.edu/archive/00000683/>
 33. Torres, Ricardo and Medeiros, Claudia and Goncalves, Marcos Andre and Fox, Edward. A Digital Library Framework for Biodiversity Information Systems. Technical Report TR-04-01b, Computer Science, Virginia Tech, 26 August 2005, <http://eprints.cs.vt.edu/archive/00000681/>
 34. Perugini, Saverio and McDevitt, Kathleen and Richardson, Ryan and Perez-Quinones, Manuel and Shen,

- Rao and Ramakrishnan, Naren and Williams, Chris and Fox, Edward A. Enhancing Usability in CITIDEL: Multimodal, Multilingual, and Interactive Visualization Interfaces. Feb. 2004, <http://eprints.cs.vt.edu:8000/archive/00000713/>. Also in Proceedings Fourth ACM/IEEE-CS Joint Conference on Digital Libraries (JCDL2004), Tucson, AZ, 10 pages. <http://eprints.cs.vt.edu:8000/archive/00000713/>
35. Krowne, Aaron and Fox, Edward A. (2003) An Architecture for Multischeming in Digital Libraries. Technical Report TR-03-25, Computer Science, Virginia Tech, Sep. 2003, 17 pages. <http://eprints.cs.vt.edu:8000/archive/00000692/>
 36. Goncalves, Marcos and Zhu, Qinwei and Kelapure, Rohit and Fox, Edward (2003) Rapid Modeling, Prototyping, and Generation of Digital Libraries- A Theory-Based Approach. Technical Report TR-03-16, Computer Science, Virginia Tech, June 2003, 11 pages. <http://eprints.cs.vt.edu:8000/archive/00000676/>
 37. Fox, Edward and Carroll, John and Fan, Patrick and Cassel, Lillian and Zubair, Mohammed and Maly, Kurt and McMillan, Gail and Ramakrishnan, Naren and Halbert, Martin (2003) Science of Digital Libraries(SciDL). Technical Report TR-03-13, CS, Virginia Tech, June 2003, 17 pages. <http://eprints.cs.vt.edu:8000/archive/00000671/>
 38. Fox, Dr. Edward and Garach, Kunal (2003) CITIDEL Collection Building. Technical Report TR-03-14, Computer Science, Virginia Polytechnic Institute and State University, May 2003, 34 pages. <http://eprints.cs.vt.edu:8000/archive/00000663/>
 39. Suleman, Senior Lecturer in Computer Science Hussein and Fox, Professor of Computer Science Edward and Krowne, Graduate Student Aaron and Luo, Graduate Student Ming and Kelapure, Graduate Student Rohit (2003) Building Digital Libraries from Simple Building Blocks. Technical Report TR-03-09, Computer Science, Virginia Tech, April 2003, 17 pages. <http://eprints.cs.vt.edu:8000/archive/00000656/>
 40. Goncalves, Marcos Andre and Fox, Edward A. and Watson, Layne T. and Kipp, Neill A. (2003) Streams, Structures, Spaces, Scenarios, Societies (5S): A Formal Model for Digital Libraries. Technical Report TR-03-04, Computer Science, Virginia Tech. <http://eprints.cs.vt.edu/archive/00000653/>
 41. Bazaz, Anil and Fox, Edward A. (2003) PRESERVATION OF ETDs ON NDLTD Version 1.0. Technical Report TR-03-02, Computer Science, Virginia Tech. <http://eprints.cs.vt.edu:8000/archive/00000640/>
 42. Prabhune, Aniket and Fox, Edward (2002) XML for ETDs. Technical Report TR-02-28, Computer Science, Virginia Tech. <http://eprints.cs.vt.edu:8000/archive/00000635/>
 43. Suleman, Hussein and Fox, Edward A. (2002) Beyond Harvesting: Digital Library Components as OAI Extensions. Technical Report TR-02-25, Computer Science, Virginia Tech. <http://eprints.cs.vt.edu:8000/archive/00000625/>
 44. Fox, Edward A. (2002) Overview of a Guide for Electronic Theses and Dissertations. Technical Report TR-02-24, Computer Science, Virginia Tech. <http://eprints.cs.vt.edu:8000/archive/00000624/>
 45. Fox, Edward A. (2002) Overview of Digital Library Components and Developments. Technical Report TR-02-23, Computer Science, Virginia Tech. <http://eprints.cs.vt.edu:8000/archive/00000623/>
 46. Koneru, Srikanth and Fox, Edward (2002) Open Peer to Peer Technologies. Technical Report TR-02-19, Computer Science, Virginia Tech. <http://eprints.cs.vt.edu:8000/archive/00000613/>
 47. Wang, Li and Fox, Edward A. (2002) Crawling on the World Wide Web. Technical Report TR-02-10, Computer Science, Virginia Tech. <http://eprints.cs.vt.edu:8000/archive/00000572/>
 48. Anthony Atkins, Edward Fox, Robert France, Hussein Suleman. ETD-MS: An Interoperability Metadata Standard for Electronic Theses and Dissertations - version 1.00, revision 2, <http://www.ndltd.org/standards/metadata/ETD-MS-v1.00-rev2.html>, <http://www.ndltd.org/standards/metadata/current.html>
 49. M. Goncalves, E. Fox, L. Watson, and N. Kipp. Streams, Structures, Spaces, Scenarios, Societies (5S): A Formal Model for Digital Libraries. Virginia Tech Department of Computer Science Technical Report TR-01-12, July 2001. <http://eprints.cs.vt.edu/archive/00000536/>
 50. E. Fox. 1999 NSF Information and Data Management Workshop: Research Agenda for the 21st Century - IDM'99, entered in NSF's FastLane 6/9/2001
 51. Neill Kipp, Edward A. Fox, Gail McMillan and John L. Eaton. FIPSE Final Report, 11/30/99, in PDF (<http://www.ndltd.org/pubs/FIPSEfr.pdf>) and Word (<http://www.ndltd.org/pubs/FIPSEfr.doc>) formats.
 52. B. Liu, G. Abdulla, and E. Fox. Web Traffic Latency: Characteristics and Implications. Virginia Tech Dept. of Computer Science Technical Report, July 1998.
 53. O. Balci, C. Ulusarac, P. Shah and E. Fox. A Library of Reusable Model Components for Visual Simulation of the NCSTRL System. TR-98-02, Virginia Tech Dept. of Computer Science Technical

- Report, Jan. 1998. URN: ncstrl.vatech_cs/TR-98-02
54. G. Abdulla, A.H. Nayfeh and E. Fox. Modeling Correlated Proxy Web Traffic Using Fourier Analysis. TR-97-19, Virginia Tech Dept. of Computer Science Technical Report, Nov. 1997. URN: ncstrl.vatech_cs/TR-97-19
 55. G. Abdulla, B. Liu, R. Saad and E. Fox. Characterizing World Wide Web Queries. TR-97-04, Virginia Tech Dept. of Computer Science Technical Report, March 1997. URN: ncstrl.vatech_cs/TR-97-04
 56. G. Abdulla, E. Fox, M. Abrams and S. Williams. WWW Proxy Traffic Characterization with Application to Caching. TR-97-03, Virginia Tech Dept. of Computer Science Technical Report, March 1997. URN: ncstrl.vatech_cs/TR-97-03
 57. E. Fox. Section in "Report on Building and Using Test Collections Panel, SIGIR 1996", ed. Donna Harman. ACM SIGIR Forum, Fall 1996, 30(2): 8.
 58. G. Abdulla, M. Abrams and E. Fox. Scaling the World-Wide Web. TR-96-06, Virginia Tech Dept. of Computer Science Technical Report, March, 1996.
 59. E. Fox. Virginia Tech Department of Computer Science Information Access Laboratory. ACM SIGIR Forum, Lab Report Special Section, 30(1), Spring 1996.
 60. H. Gladney, Z. Ahmed, R. Ashany, N. Belkin, E. Fox and M. Zemankova. Digital Library: Gross Structure and Requirements (Report from a Workshop). IBM Research Report RJ9840, IBM Almaden Research Center, May, 1994. Virginia Tech Dept. of Computer Science Technical Report 94-25, June, 1994.
 61. K. Maly, J. French, A. Selman and E. Fox. Wide Area Technical Report Service, TR_94_13, Old Dominion Univ. Dept. of Computer Science, June 1994.
 62. L. Nowell, E. Fox, L. Heath, D. Hix, W. Wake and E. Labow. Seeing Things Your Way: Information Visualization for a User-Centered Database of Computer Science Literature, TR-94-06, VPI&SU Computer Science Dept., Jan. 1994, Blacksburg, VA.
 63. K. Dalal and E. Fox. Document Translation: Dissertations and Technical Reports, TR-93-31, VPI&SU Computer Science Dept., Sep. 21, 1993, Blacksburg, VA.
 64. J. Leggett, J. Schnase, J. Smith, E. Fox, eds. Final Report of the NSF Workshop on Hyperbase Systems. Texas A&M Univ. Dept. of Computer Science Hypermedia Research Lab Report TAMU-HRL 93-002, July 1993. For workshop on Oct. 15-16, 1992 in Washington, D.C.
 65. E. Fox, R. France, E. Sahle, A. Daoud, and B. Cline. Development of a Modern OPAC: From REVTOLC to MARIAN, TR-93-06, VPI&SU Computer Science Dept., Feb. 17, 1993, Blacksburg, VA.
 66. S. Betrabet, E. Fox, and Q. Chen. A Query Language for Information Graphs, TR-93-03, VPI&SU Computer Science Dept., Jan. 1993, Blacksburg, VA.
 67. K. Maly, E. Fox, J. French, and A. Selman. Wide Area Technical Report Service, TR_92_44, Old Dominion Univ. Dept. of Computer Science, Dec. 1992
 68. E. Fox. Book review for Managing Interactive Video/Multimedia Projects, by Bergman & Moore, ACM Computing Reviews, April 1992.
 69. S. Patel, G. Abdulla, M. Abrams, and E. Fox. NMFS: Network Multimedia File System Protocol, TR-92-54, VPI&SU Computer Science Dept., Nov. 1992, Blacksburg, VA.
 70. D. Brueni, E. Fox, L. Heath, D. Hix, L. Nowell, and W. Wake. What if there were Desktop Access to the Computer Science Literature?, TR-92-42, VPI&SU Computer Science Dept., Aug. 12, 1992, Blacksburg, VA.
 71. E. A. Fox, Qi Fan Chen, and L. S. Heath. LEND and Faster Algorithms for Constructing Minimal Perfect Hash Functions, TR-92-02, VPI&SU Computer Science Dept., Feb. 1992, Blacksburg, VA.
 72. E. A. Fox and L. Wilson. Comparison of Advanced Retrieval Approaches for Online Catalog Access. Final Report, Virginia Polytechnic Institute and State University, Blacksburg, Univ. Lib., ERIC Clearinghouse on Information Resources, ED 338 262, 1991, 21 pages.
 73. C.A. Shaffer, L.W. Carstensen, V.F. Miranda, S.K. Kriss, R.W. Morrill, and E.A. Fox. Project GeoSim: the first two modules, TR 91-26, VPI&SU Comp. Sci. Dept., Oct 1991.
 74. E. A. Fox, M. Prabhakar Koushik, Qi Fan Chen, and Robert K. France. Integrated access to a large medical literature database, TR-91-15, VPI&SU Computer Science Dept., May 1991, Blacksburg, VA.
 75. E. A. Fox and W. C. Lee. FAST-INV: A Fast Algorithm for Building Large Inverted Files, TR-91-10, VPI&SU Computer Science Dept., April 1991, Blacksburg, VA.
 76. E. Fox, Q.-F. Chen, A. Daoud, and L. Heath. Order Preserving Minimal Perfect Hash Functions and Information Retrieval, TR-91-1, VPI&SU Computer Science Dept., Feb. 1991, Blacksburg, VA.

77. E. Fox. Final Report on NSF Grant IRI-8703580: Organizing Lexical Knowledge for Information Retrieval. VPI&SU Dept. of Computer Science, Oct. 1990, Blacksburg, VA.
78. E. A. Fox. Advanced Retrieval Methods for Online Catalogs. Report under "External and Collaborative Research" section of Annual Review of OCLC Research, July 1989 - June 1990, OCLC Online Computer Library Center, Inc., Dublin, OH, 32-34.
79. E. A. Fox, L. S. Heath, Q.-F. Chen, and A. M. Daoud. Practical Minimal Perfect Hash Functions for Large Databases, TR-90-41, VPI&SU Computer Science Dept., Aug. 1990, Blacksburg, VA.
80. J.T. Nutter, E.A. Fox, and M.W. Evans. Building a Lexicon from Machine-Readable Dictionaries for Improved Information Retrieval, TR-90-17, VPI&SU Computer Science Dept., 1990, Blacksburg, VA.
81. E.A. Fox, D. Hix, E.E. Schwartz, A. Siochi, P. Koushik, and D. Inman. Interactive Digital Video Authoring and Prototyping, TR-90-13, VPI&SU Computer Science Dept., Dec. 1989, Blacksburg, VA.
82. R.B. Quizon and E. Fox. Virginia Disc 2: Preparing, Presenting and Retrieving MARC Standard Library Data on a CDROM, TR-90-5, VPI&SU Computer Science Dept., Feb. 1990, Blacksburg, VA.
83. E. Fox, L. Heath, and Q.-F. Chen. An $O(n \log n)$ Algorithm for Finding Minimal Perfect Hash Functions, TR-89-10, VPI&SU Comp. Sci. Dept., April 1989, Blacksburg, VA.
84. S. Datta and E. Fox. Implementation of a Perfect Hash Function Scheme, TR-89-9, VPI&SU Computer Sci. Dept., April 1989, Blacksburg, VA.
85. P. M. Koushik and E. A. Fox. CD-ROM: The New Wave in Information Storage. In CS Bits & Bytes, 1 (3): 1,4; VPI&SU Comp. Sci. Dept., Feb. 15, 1989, Blacksburg, VA.
86. E. Fox, Q.-F. Chen, L. Heath, and S. Datta. A More Cost Effective Algorithm for Finding Perfect Hash Functions, TR-88-30, VPI&SU CS Dept., Sept. 1988, Blacksburg, VA.
87. W. Lee and E. Fox. Experimental Comparison of Schemes for Interpreting Boolean Queries, TR-88-27, VPI&SU Comp. Science Dept., September 1988, Blacksburg, VA.
88. M. Weaver, R. France, Q. Chen, E. Fox. A Frame-Based Language in Information Retrieval, TR-88-25, VPI&SU Comp. Science Dept., Aug. 1988, Blacksburg, VA.
89. E. Fox. A Review of Publishing and Access Issues for Optical Discs and CD-ROMs, TR-88-22, VPI&SU Computer Science Dept., August 1988, Blacksburg, VA.
90. R. C. Wohlwend and E. Fox. Creation of a Prolog Fact Base from the Collins English Dictionary, M.S. thesis, TR-88-24, VPI&SU Comp.Sci. Dept., 1988, Blacksburg, VA.
91. R. K. France and E. Fox. An Artificial Intelligence Environment for Information Retrieval Research, M.S. thesis, TR-88-10, VPI&SU Comp.Sci. Dept., 1988, Blacksburg, VA.
92. M. Weaver and E. Fox. Implementing an Intelligent Retrieval System: The CODER System, Version 1.0, TR-88-6, VPI&SU Comp.Sci. Dept., Feb.1988, Blacksburg, VA.
93. E. Fox. Final Report on NSF Grant IST-8418877: Effective Retrieval of Composite Documents. VPI&SU Dept. of Computer Science, Oct. 1987, Blacksburg, VA.
94. E. Fox. Final Report on CIT Grant INF-85-016: Improved Automatic Analysis, Indexing, Storage and Retrieval of Corporate Documentation and Network Information. VPI&SU Dept. of Computer Science, Oct. 1987, Blacksburg, VA.
95. E. Fox. Workshop on Distributed Expert-Based Information Systems: A Perspective. ACM SIGIR Forum, Spring/Summer 1987, 21(3-4):18- 20.
96. E. Fox. Development of the CODER System: A Test-Bed for Artificial Intelligence Methods in Information Retrieval, TR-86-40, VPI&SU Computer Science Dept., December 1986, Blacksburg, VA.
97. E. Fox, R. Wohlwend, P. Sheldon, Q. Chen, and R. France. Building the CODER Lexicon: The Collins English Dictionary and Its Adverb Definitions, TR-86-23, VPI&SU Computer Science Dept., October 1986, Blacksburg, VA.
98. E. Fox. A Call for Integrating Advanced Information Retrieval Models with CD-ROM / Microcomputer Systems, TR-86-14, VPI&SU Computer Science Dept., June 1986, Blacksburg, VA.
99. E. Fox. Expert Retrieval for Computer Message Systems, TR-86-13, VPI&SU Computer Science Dept., June 1986, Blacksburg, VA.
100. E. Fox and S. Birch. A UNIX Requirement for Computer Science Majors, TR-86-11, VPI&SU Computer Sci. Dept., May 1986, Blacksburg, VA.
101. E. Fox and R. France. Architecture of an Object-Oriented Expert System for Composite Document Analysis, Representation, and Retrieval, TR-86- 10, VPI&SU Computer Sci. Dept., April 1986, Blacksburg, VA.
102. E. Fox and R. France. A Knowledge-Based System for Composite Document Analysis and Retrieval:

- Design Issues in the CODER Project, TR-86-6, VPI&SU Computer Science Dept., March 1986, Blacksburg, VA.
103. E. Fox and S. Sharan. A Comparison of Two Methods for Soft Boolean Operator Interpretation in Information Retrieval, TR-86-1, VPI&SU Computer Science Dept., Jan. 1986, Blacksburg, VA.
 104. E. Fox and J. Mindel. Communication and Information Sharing in Virginia, Final Report for Contract C-85-026, Virginia Center for Innovative Technology, Jan. 1986.
 105. E. Fox. Development of a Prototype Electronic Mail and Bulletin Board Distributed System to Facilitate C.I.T. Operations, Supplemental Report for Contract C-85-026, Virginia Center for Innovative Technology, May 1986.
 106. E. Fox and J. Mindel. Summary Report on the Virginia Networking and Telecommunications Planning Conference (Oct. 15/16, 1985, Fredericksburg, VA), Virginia Center for Innovative Technology, Jan. 1986
 107. E. Fox. Book Review of Representation and Exchange of Knowledge as a Basis of Information Processes, H. J. Dietschmann (ed.). In Information Processing & Management, 1985, 21(5): 465-466.
 108. E. Fox. Information Storage and Retrieval of Composite Documents: A User Oriented Model of Computer Message Systems. TR-85-34, VPI&SU Computer Science Dept., Aug. 1985, Blacksburg, VA.
 109. E. Fox. Composite Document Extended Retrieval: An Overview. TR-85-1, VPI&SU Computer Science Dept., Jan. 1985, Blacksburg, VA.
 110. E. Fox. Characterization of Two New Experimental Collections in Computer and Information Science Containing Textual and Bibliographic Concepts. TR 83-561, Cornell Univ. Dept. of Computer Science, Sept. 1983, Ithaca, NY.
 111. E. Fox. Some Considerations for Implementing the SMART Information Retrieval System under UNIX. TR 83-560, Cornell Univ. Dept. of Comp. Science, Sept. 1983, Ithaca, NY.
 112. E. Fox. Extending the Boolean and Vector Space Models of Information Retrieval with P-Norm Queries and Multiple Concept Types. Cornell University dissertation, Aug. 1983. Available from: University Microfilms International, Ann Arbor, Michigan.
 113. G. Salton, E. Fox and E. Voorhees. Advanced Feedback Methods in Information Retrieval. TR 83-570. Cornell Univ. Dept. of Computer Science, Aug. 1983, Ithaca, NY.
 114. G. Salton, E. Fox and E. Voorhees. A Comparison of Two Methods for Boolean Query Relevance Feedback. TR 83-564, Cornell Univ. Dept. of Computer Science, July 1983, Ithaca, NY.
 115. G. Salton, C. Buckley and E. Fox. Boolean Query Formulation with Relevance Feedback. TR 83-539, Cornell Univ. Dept. of Computer Science, Jan. 1983, Ithaca, NY.
 116. E. Fox. Lexical Relations: Enhancing Effectiveness of Information Retrieval Systems. ACM SIGIR Forum, Winter 1980, 15(3): 5-36.

ACM SIGIR FORUM CHAIRMAN STATEMENTS:

1. E. Fox. ACM SIGIR Forum, Fall 1994, 28(2): 1-3
2. E. Fox. ACM SIGIR Forum, Spring 1994, 28(1): 1-2.
3. E. Fox. ACM SIGIR Forum, Fall 1993, 27(3): 1-3.
4. E. Fox. ACM SIGIR Forum, Spring 1993, 27(1): 1-2.
5. E. Fox. ACM SIGIR Forum, Fall 1992, 26(2): 2-3.
6. E. Fox. ACM SIGIR Forum, Spring 1992, 26(1): 1.
7. E. Fox. ACM SIGIR Forum, Fall 1991, 25(2): 2-3.

REVIEWS:

- E. Fox. Review of "Digital Libraries" by William Y. Arms, MIT Press, 2000, Kluwer Journal "Information Retrieval", 2001.

THESIS AND DISSERTATION ONLINE DOCUMENTS (Selected Advisees):

1. Jonathan Paul Leidig, "Epidemiology Experimentation and Simulation Management through Scientific Digital Libraries" September 2012, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-08222012-145818/>
2. Noha Ibrahim ElSherbiny, "Secure Digital Libraries", June 2011, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-06302011-161547/>
3. Uma Murthy, "Digital Libraries with Superimposed Information: Supporting Scholarly Tasks that Involve Fine Grain Information", April 2011, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-04142011-175752/>
4. Logambigai Venkatachalam, "Scalability of Stepping Stones and Pathways", May 2008, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-05072008-225923/>
5. Seonho Kim, "Visualizing Users, User Communities, and Usage Trends in Complex Information Systems Using Implicit Rating Data", May 2008, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-04252008-122316/>
6. Ryan Richardson, "Using Concept Maps as a Cross-Language Resource Discovery Tool", July 2007, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-07022007-184525/>
7. Douglas Gorton, "Practical Digital Library Generation into DSpace with the 5S Framework", April 2007, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-04252007-161736/>
8. Yuxin Chen, "A Novel Hybrid Focused Crawling Algorithm to Build Domain-Specific Collections", Feb. 2007, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-02162007-005107/>
9. Johnny L. Sam Rajkumar, "ETANA-CMV: A coordinated multiple view visual browsing interface for ETANA-DL", Dec. 2006, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-01052007-154321/>
10. Shahrooz Feizabadi, "Garbage Collection Scheduling for Utility Accrual Real-Time Systems", Dec. 2006, PhD dissertation, co-advisors Godmar Back and Edward A. Fox, <http://scholar.lib.vt.edu/theses/available/etd-12222006-020218/>
11. Vikram Raj Vidya Sagar, "A Digital Library Success Model for Computer Science Student Use of a Meta-Search System", Aug. 2006, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-01192007-162739/>
12. Baoping Zhang, "Intelligent Fusion of Evidence from Multiple Sources for Text Classification", June 2006, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-07032006-152103/>
13. Devdutta Bhosale, "AlcoZone: An Adaptive Hypermedia based Personalized Alcohol Education", May 2006, MS thesis, Fox as co-chair, committee chair Sandeep Shukla, <http://scholar.lib.vt.edu/theses/available/etd-05172006-153545/>
14. Rao Shen, "Applying the 5S Framework To Integrating Digital Libraries", April 2006, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-04212006-135018/>
15. Ananth Raghavan, "Schema Mapper: A Visualization Tool for Incremental Semi-automatic Mapping-based Integration of Heterogeneous Collections into Archaeological Digital Libraries: The ETANA-DL Case Study", May 2005, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-05182005-114155/>
16. Marcos Andre Goncalves, "Streams, Structures, Spaces, Scenarios, and Societies (5S): A Formal Digital Library Framework and Its Applications", Nov. 2004, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-12052004-135923/>
17. Fernando Adrian Das Neves, "Stepping Stones and Pathways: Improving Retrieval by Chains of Relationships between Documents", Sep. 2004, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-11012004-003013/>
18. Unnikrishnan Ravindranathan, "Prototyping Digital Libraries Handling Heterogeneous Data Sources - An ETANA-DL Case Study", April 2004, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-04262004-153555/>
19. Aaron Krowne, "An Architecture for Collaborative Math and Science Digital Libraries", July 2003, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-09022003-150851/>
20. Rohit Dilip Kelapure, "Scenario-Based Generation of Digital Library Services", June 2003, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-06182003-055012/>
21. Ye Zhou, "Reengineering PhysNet in the uPortal Framework", May 2003, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-06092003-164230/>
22. Kunal Garach, "CITIDEL Collection Building", May 2003, MS independent study report, <http://eprints.cs.vt.edu:8000/archive/00000663/>
23. Ganesh K. Panchanathan, "Digital library logging and analysis using XML", May 2003, MS independent study report, <http://eprints.cs.vt.edu:8000/archive/00000664/>

24. Aniket Prabhune, "XML for ETDs", Dec. 2002, MS independent study report, <http://eprints.cs.vt.edu:8000/archive/00000635/>
25. Hussein Suleman, "Open Digital Libraries", Nov. 2002, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-11222002-155624/>
26. Qinwei Zhu, "SSGraph: A Modeling Tool for Digital Libraries", Nov. 2002, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-11272002-210531/>
27. Srikanth Koneru, "Open Peer to Peer Technologies", Sept. 2002, MS independent study report, <http://eprints.cs.vt.edu:8000/archive/00000613/>
28. Li Wang, "Crawling on the World Wide Web", June 2002, MS independent study report, <http://eprints.cs.vt.edu:8000/archive/00000572/>
29. Jun Wang, "VIDI: A Lightweight Protocol Between Visualization Systems and Digital Libraries", May 2002, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-07012002-145841/>
30. Robert France, "Effective, Efficient Retrieval in a Network of Digital Information Objects", Nov. 2001, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-11272001-124212/>
31. Ohm Sormil, "Parallel Inverted Index for Large-Scale, Dynamic Digital Libraries", Jan. 2001, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-02062001-114915/>
32. Jianxin Zhao, "Making Digital Libraries Flexible, Scalable and Reliable: Reengineering the MARIAN System in JAVA", June 1999, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-070499-204531/>
33. Ghaleb Abdulla, "Analysis and Modeling of World Wide Web Traffic", May 1998, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-33098-142912/>
34. Binzhang Liu, "Characterizing Web Response Time", April 1998, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-4798-11230/>
35. David R. DeVaux, "A Tutorial on Authorware", April 1996, MS project report, <http://scholar.lib.vt.edu/theses/available/etd-18409759651581/>
36. Lucio Cunha Tinoco, "Online Evaluation in WWW-based Courseware: The QUIZIT System", Jan. 1996, MS thesis, <http://scholar.lib.vt.edu/theses/available/etd-638192839711171/>
37. Amjad M. Daoud, "Efficient data structures for information retrieval", 1993, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-10202005-102821/>
38. QiFan Chen, "An object-oriented database system for efficient information retrieval applications", 1992, PhD dissertation, <http://scholar.lib.vt.edu/theses/available/etd-06062008-170433/>

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