

**Prof. Wyatt S. Newman, Ph.D., P.E.**  
ECSE Dept, Case School of Engineering  
Case Western Reserve University  
Cleveland, OH 44106 tel: 216-368-6432

#### **EDUCATION:**

**Massachusetts Institute of Technology, Ph.D., Mechanical Engineering, 1987.** Concentration in design and control of dynamic systems; Dissertation: "High-Speed Robot Control in Complex Environments"  
**Columbia University, M.S. Electrical Engineering, 1982.** Concentration in network and control theory  
**Massachusetts Institute of Technology, M.S., Mechanical Engineering, 1980.** Thermal and fluid sciences; Thesis: "Analysis of Transient Behavior of a Liquid Helium Cooling System for a Superconducting Generator"  
**Harvard College, B.S., 1978,** cum laude, engineering science.

#### **EXPERIENCE:**

**Case Western Reserve University, Cleveland, OH, 1/88-present.**

*Professor of Electrical Engineering and Computer Science (assoc. prof, 1/88-6/98)*

*Research:* design and control of intelligent machines; design of robot controllers for open-architecture, multiprocessor-based hierarchical control.; design and control of laser-based sensing, targeting and machining systems; design of high speed and high precision robot and machine controls; development of impedance controllers for experimental and industrial robots; development of on-line, sensor-based robot controls for dynamic environments; design and control of autonomous vehicles and smart wheelchairs.

##### ***concurrent experience:***

**RoadPrintz, Inc., Cleveland Hts, OH;**

Chief Technology Officer and co-founder, 2017-present

**U. of Hong Kong, Hung Hing Ying Distinguished Visiting Professor in Science and Technology;**

6/2013-9/2015; (in residence, HKU, 1/2013-8/2014). Team leader "Team HKU" in DARPA Robotics Challenge.

**U. of Edinburgh, Distinguished Visiting Fellow;** Institute for Perception and Behavior; 9/2012-12/2012.

**Adjunct Faculty, The Cleveland Clinic, Cleveland, OH, 1997-2002;** Dept of radiation oncology; research collaboration in robotics and image-directed radiation therapy.

**Princeton University, Princeton, NJ, 1/05-6/06;** Visiting fellow, Lewis-Sigler Institute for Integrative Genomics; research collaboration in neuroscience and artificial neural networks for robot control

**Sandia National Laboratories, Albuquerque, NM, 8/95-8/96;** visiting faculty member in Intelligent Systems and Robotics Center; research in open-architecture robot controllers for hazardous environments.

**NASA Lewis Research Center, Cleveland, OH,** summer faculty fellow, 6/91-8/91, 6/92-8/92 performed research in drives and controls for robots in microgravity environments; 6/09-8/09 analysis for design and control of Stirling-cycle engines and coolers for space exploration.

**Center for Automation and Intelligent Systems Research, CWRU, Cleveland, OH, 7/89-9/94;**

Director; responsible for coordinating ~\$1.5M/yr budget, organizing faculty and industrial partners, interfacing with State and local organizations and university administration, defining strategic plans.

**Philips Laboratories, Briarcliff Manor, NY 9/80-1/88.** Senior Member of Technical Staff, Mech. Sys.

Group Research projects included: design and control of high-speed and sensory-interactive robotics; control system design for an implantable, total artificial heart; design and control contributions to electromechanical drives and magnetic levitation for Stirling-cycle cryocoolers.

**Philips Natuurkundig Laboratorium, Eindhoven, The Netherlands, 9/82-9/83;** Visiting scientist; investigated mechanical, electrical and electromagnetic design optimization of stepper motors at N.V. Philips central research lab. Composed CAD program for Philips motor factories.

#### **PATENTS:**

U.S. patent no. 4,483,425: "Vibration Control System"

U.S. patent no. 4,841,978: "Ultrasonic Scanning Device with Elastic Pumper"

U.S. patent no. 4,712,778: "Helical Spring Holder Assembly"

U.S. patent no. 4,837,467: "Linear Motor with Angularly Indexed Magnetic Poles"

U.S. patent no. 4,542,311: "Long Linear Stroke Reciprocating Electric Machine"

U.S. patent no. 5,779,833: "Method for Constructing Three Dimensional Bodies from Laminations"

U.S. patent no. 5,883,357: "Selective Vacuum Gripper"

U.S. patent no. 6,024,003: "Selective Vacuum Gripper"

U.S. patent no. 6,517,503: "Orthosis Knee Joint"

U.S. patent no. 6,770,045: "Orthosis Knee Joint"

U.S. patent no. 7,410,471: "Orthosis Knee Joint and Sensor"

U.S. patent no. 7,166,984: "Signaling and Reduced Torque Ripple in Brushless Repulsion Motors"

## PROFESSIONAL RECOGNITION

Licensed professional engineer; award for highest score in State of Ohio on 2005 Electrical Engineering professional engineering exam; senior member, IEEE; Named NSF Young Investigator in Robotics, 8/92-8/97, Inducted into Tau Beta Pi as a "distinguished engineer", 4/93; Board of directors, M.I.T. Club of Cleveland and Harvard Club of Cleveland (president, 7/10-6/12); Co-founder of CAM-LEM, Inc.; Frequent journal reviewer and conference session chair for ASME and IEEE; Frequent reviewer for NSF; Herbold Fellow, 2006; EECS teaching award, 2006; FIRST Robotics Woody Flowers mentoring award, 2007; team leader of "Team Case" entry of Dexter in the DARPA Urban Challenge, 2007; IEEE Senior Member; Treasurer, Cleveland Section of IEEE; Chair, Cleveland Chapter of IEEE Power and Energy Society; general chair IEEE EnergyTech2011, general chair IEEE EnergyTech2012. Named "Distinguished Visiting Fellow", U. Edinburgh, School of Informatics, Fall 2012. Named "Hung Hing Ying Distinguished Visiting Professor in Science and Technology", U. of Hong Kong, 6/2013-9/2015. Team leader, "TeamHKU", 2015 DARPA Robotics Challenge. Co-founder and CTO of RoadPrintz, Inc., Cleveland, OH, 2017.

## Publications:

1. W. Newman, *A Systematic Approach to Learning Robot Programming with ROS*, CRC Press, Taylor and Francis, Boca Raton, 2018 (textbook).
2. O. Özgüner et al., "Camera-Robot Calibration for the Da Vinci Robotic Surgery System," in *IEEE Transactions on Automation Science and Engineering*, vol. 17, no. 4, pp. 2154-2161, Oct. 2020, doi: 10.1109/TASE.2020.2986503.
3. R. C. Jackson, R. Yuan, D. -L. Chow, W. S. Newman and M. C. Çavuşoğlu, "Real-Time Visual Tracking of Dynamic Surgical Suture Threads," in *IEEE Transactions on Automation Science and Engineering*, vol. 15, no. 3, pp. 1078-1090, July 2018, doi: 10.1109/TASE.2017.2726689.
4. Marvel, J.A. and Newman, W.S., *Model Assisted Stochastic Learning for Robotic Applications*, IEEE Trans. Automation Science and Engineering, 2011, 8(4), pp 835-845.
5. Newman, W.S., et al., *Design Lessons for Building Agile Manufacturing Systems*. IEEE Trans. Robotics and Automation, 2000, 16(3): p. 228-238.
6. Inerfield, M.A.; Garverick, S.L.; Newman, W.S.; Yuandao Zhang *A SPICE model for a novel brushless adjustable-speed drive*, Industrial Electronics, IEEE Transactions on , Volume: 47 Issue: 6 , Dec. 2000, Page(s): 1307 -1318
7. Weinhaus, M.S., et al., *Feasibility of Real-Time Image-Directed Beam-Targeting in Moving-Target Radiation Therapy*. Int. J. Radiation Oncology, 1998. 42(1 (supplement)): p. 368.
8. Quinn, R.D., et al., *An Agile Manufacturing Workcell Design*. IIE Trans. (Focussed Issue on Agile Manufacturing), 1997. 29: p. 901-909.
9. Newman, W.S., et al., *A Novel Selective-Area Vacuum Gripper for Layered Assembly of Laminated Objects*. Robotics and Computer-Integrated Manufacturing, 1996. 12(4): p. 293-302.
10. Cawley, J.D., et al., *Computer-Aided Manufacturing of Laminated Engineering Materials*. American Ceramic Society Bulletin, 1996. 75(5): p. 75-79.
11. Wikman, T.S. and W.S. Newman, *Reflex Control for Safe Autonomous Robot Operation*. Reliability Engineering and System Safety, 1996. 53(3): p. 339-347.
12. Newman, W.S., *A New Laboratory Course in Controlled Electromechanical Dynamics: Engineering Techniques in Analysis and Synthesis*. Int. J. of Engineering Education, 1995. 11(4 and 5): p. 336-342.
13. Wikman, T.S., M.S. Branicky, and W.S. Newman, *Reflex Control for Robot System Preservation, Reliability and Autonomy*. Computers and Electrical Engineering, 1994. 20(5): p. 391-407.
14. Newman, W.S. and Y. Zhang, *Stable Interaction Control and Coulomb Friction Compensation Using Natural Admittance Control*. Journal of Robotic Systems, 1994. 11(1).
15. Newman, W.S., *Stability and Performance Limits of Interaction Controllers*. ASME J. Dynamic Systems, Measurement and Control, 1992. 114(4): p. 563-570.
16. Newman, W.S. and K. Souccar, *Robust, Near Time-Optimal Control of Nonlinear, Second-Order Systems: Theory and Experiments*. ASME J. Dynamic Systems, Measurement and Control, 1991. 113(Sept): p. 363-369.
17. Newman, W.S. and M.S. Branicky, *Real-Time Configuration-Space Transforms for Obstacle Avoidance*. Int. J. of Robotics Research, 1991. 10(6): p. 650-667.

18. Newman, W.S., *Robust, Near Time-Optimal Control*. IEEE Trans. Automatic Control, 1990. **35**(7): p. 841-843.
19. Newman, W.S. and N. Hogan, *Time Optimal Control of Balanced Manipulators*. ASME J. Dynamic Systems, Measurement and Control, 1989. **111**(2).
20. O. Özgüner *et al.*, "Camera-Robot Calibration for the Da Vinci Robotic Surgery System," in *IEEE Transactions on Automation Science and Engineering*, vol. 17, no. 4, pp. 2154-2161, Oct. 2020, doi: 10.1109/TASE.2020.2986503.
21. O. Özgüner, R. Hao, R. C. Jackson, T. Shkurti, W. Newman and M. C. Cavusoglu, "Three-Dimensional Surgical Needle Localization and Tracking Using Stereo Endoscopic Image Streams," 2018 IEEE International Conference on Robotics and Automation (ICRA), Brisbane, QLD, 2018, pp. 6617-6624, doi: 10.1109/ICRA.2018.8460867.
22. D. Chow, P. Xu, E. Tuna, S. Huang, M. C. Çavuşoğlu and W. Newman, "Supervisory control of a DaVinci surgical robot," 2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Vancouver, BC, 2017, pp. 5043-5049, doi: 10.1109/IROS.2017.8206389.
23. R. C. Jackson, R. Yuan, D.L. Chow, W. Newman and M. Cenk Cavusoglu, "Automatic Initialization and Dynamic Tracking of Surgical Suture Threads", accepted to appear in IEEE Int. Conf. Robotics and Automation, September, 2015.
24. Z-H Chong, R.T.W. Hung, K-H Lee, W. Wang, W.L. Ng, W. Newman, "Autonomous Wall Cutting with an Atlas Humanoid Robot", IEEE Tech. for Practical Robot Applications, May, 2015.
25. Der-Lin Chow and Wyatt Newman, "Trajectory Optimization for Robotic Suturing IEEE Tech. for Practical Robot Applications, May, 2015.
26. Der-Lin Chow, Russell Jackson, M. Cenk Cavusoglu, Wyatt Newman, "A Novel Vision Guided Knot-Tying Method for Autonomous Robotic Surgery," IEEE International Conference on Automation Science and Engineering, August, 2014.
27. Cong Du, Kit-Hang Lee and Wyatt Newman, "Manipulation Planning for the Atlas Humanoid Robot", IEEE Int. Conf. on Robotics and Biomimetics, December, 2014.
28. Kit-Hang Lee and Wyatt Newman, "Natural Admittance Control of an Electro-Hydraulic Humanoid Robot" IEEE Int. Conf. on Robotics and Biomimetics, 2014.
29. Li Ma, Ernest Cheung and Wyatt Newman, "Using Planar Features for Fast Localization in Indoor Environments" IEEE Int. Conf. on Robotics and Biomimetics, 2014.
30. Ernest Cheung, Chao Cao and Wyatt Newman, "Initial Pose Estimation Using Cross-Section Contours" IEEE Int. Conf. on Robotics and Biomimetics, 2014.
31. Zheng Hao Chong, et al., "Autonomous Valve Turning with an Atlas Humanoid Robot", 2014 IEEE-RAS International Conference on Humanoid Robots.
32. Zheng Hao Chong, et al., "Autonomous Valve Turning with an Atlas Humanoid Robot", (video submission) 2014 IEEE-RAS International Conference on Humanoid Robots.
33. S. Cockrell, G. Lee, and W. Newman, "Determining Navigability of Terrain Using Point Cloud Data," in Proc. 2013 International Conference on Rehabilitation Robotics, Seattle, USA, 2013.
34. C. Rockey, E. Perko and W. Newman, "An evaluation of Low-Cost Sensors for Smart Wheelchairs", in Proc. 2013 IEEE Int. Conf on Automation Science and Engineering, pp 249-254.
35. E. Venator, G. Lee and W. Newman, "Hardware and Software Architecture of ABBY: An Industrial Mobile Manipulator", in Proc. 2013 IEEE Int. Conf on Automation Science and Engineering, pp 324-329.
36. D.L. Chow and W. Newman, "Improved Knot-Tying Methods for Autonomous Robot Surgery", in Proc. 2013 IEEE Int. Conf on Automation Science and Engineering, pp 461-465.
37. A. Deal, D.L. Chow and W. Newman, "Hybrid Natural Admittance Control for Laparoscopic Surgery", 2012 IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS), pp 1277-1283.
38. Smith, A., Lee, G.S., and Newman, W.S., *Analysis of Hybrid Fuel-Cell/Stirling-Engine Systems for Domestic Combined Heat and Power*, IEEE Energytech2012, May, 2012.
39. E. Madigan and W. Newman, "What do users want from 'smart' wheelchairs?," in Proc. 2012 International Congress on Nursing Informatics, Montreal, Canada, 2012.
40. Buckmaster, D.J. and Newman, W.S., *Stirling Duplex System Modeling for Control System Analysis*, 2011 International Energy Conversion Engineering Conference, San Diego, June, 2011.
41. Buckmaster, D.J. and Newman, W.S., *Analysis of a Stirling-Cycle Power Converter for Domestic Combined Heat and Power*, IEEE Energytech2011, May, 2011.

42. Marvel, J.A. and Newman, W.S., *Model Assisted Stochastic Learning for Robotic Applications*, IEEE Trans. Automation Science and Engineering, 2011, **8**(4), pp 835-845.
43. Marvel, Jeremy A., and Wyatt S. Newman. *Assessing Internal Models for Faster Learning of Robotic Assemblies*, IEEE International Conference on Robotics and Automation 2010.
44. Hudson, R.E. and Newman, W.S., *Independent Component Analysis and Bayes' Theorem for Robotics and Automation*, IEEE Int. Conf. Robotics and Automation 2010.
45. Marvel, Jeremy, Richard Hudson, and Wyatt Newman, *Modeling and Training Radial Basis Functions with Integrate-and-Fire Neurons*, Proceedings of the IEEE International Conference on Machine Learning and Applications. 12-14 December, 2010.
46. Marvel, Jeremy A., and Wyatt S. Newman, *Accelerating Robotic Assembly Parameter Optimization Through the Generation of Internal Models*, Proceedings of the IEEE International Conference on Technologies for Practical Robot Applications. 9-10 November, 2009. Pp. 42-47.
47. Marvel, Jeremy A., and Wyatt S. Newman. *Internal Model Generation for Evolutionary Acceleration of Automated Robotic Assembly Optimization*, Proceedings of the Performance Metrics for Intelligent Systems (PerMIS) 2009 Workshop. 21-23 September, 2009.
48. Marvel, J.A., W.S. Newman, D.P. Gravel, G. Zhang, J. Wang, and T. Fuhlbrigge. *Automated Learning for Parameter Optimization of Robotic Assembly Tasks Utilizing Genetic Algorithms*, Proceedings of the 2008 IEEE International Conference on Robotics and Biomimetics. 21-26 February, 2009. Pp. 179-184.
49. David J. Buckmaster, Wyatt S. Newman and Steven J. Somes, *Compliant Motion Control for Robust Robotic Surface Finishing*, 7th World Congress on Intelligent Control and Automation, Chongqing, China, June, 2008.
50. Newman, W., Quinn, R., Team *Case and the 2007 DARPA Urban Challenge*, 4<sup>th</sup> Int. Symp. On Adaptive Motion of Animals and Machines, CWRU, June, 2008.
51. Somes, S.D.; Buckmaster, D.J.; Newman, W.S.; *Overcoming Traditional Automation Limitations Through Compliant Control and Contact Sensing*, Automation Science and Engineering, 2007. CASE 2007. IEEE International Conference on, 22-25 Sept. 2007 Page(s):295 – 299.
52. D. Buckmaster, S. Somes, W. Newman, *Process Control for Robotic Surface Finishing*, 2007 IEEE Int. Conf. Rob. Auto. Video proceedings.
53. W. Newman, A. Covitch and R. May, *A Client/Server Approach to Open-Architecture Behavior-Based Robot Programming*, Proceedings NASA SMC-IT conference, August, 2006.
54. R. Hudson, P. Larimar, W. Newman, B. Strowbridge, *Optimal Neural Stimulation*, presented at "Bulbfest", Carnegie Mellon University, June, 2006.
55. M. C. Cavusoglu, J. Rotella, W. S. Newman, S. Choi, J. Ustin, S. S. Sastry, *Control Algorithms for Active Relative Motion Cancelling for Robotic Assisted Off-Pump Coronary Artery Bypass Graft Surgery*. Proc 12th Int. Conf. on Advanced Robotics (ICAR 2005), Seattle, WA, USA, July 18th-20th, 2005.
56. Somes, S; Dohring, M and Newman, W. *Preliminary Design and Testing of a Novel Robot Design for Metal Finishing Applications*, IEEE Int. Conf. Rob. Auto 2005.
57. Covitch, A; May, R. Newman, W; *Behavior-Based Robot Programming for Mechanical Assembly*; IEEE Int. Conf. Rob. Auto 2005 (video proceedings)
58. Yingxi Chen; Newman, W.S.; *A human-robot interface based on electrooculography*. Robotics and Automation, 2004. Proceedings. ICRA '04. 2004 IEEE International Conference on , Volume: 1 , April 26-May 1, 2004 Pp:243 – 248.
59. Al-Hammouri, A.; Covitch, A.; Kose, M.; Rosas, D.; Newman, W.S.; Liberatore, V.; *Compliant control and software agents for Internet robotics*. Object-Oriented Real-Time Dependable Systems, 2003. (WORDS 2003). Proceedings of the Eighth International Workshop on , 15-17 Jan. 2003 Pages:280 – 287.
60. Hebbbar, R. and Newman, W. S., *Passivity Analysis of Sampled-Data Interactive System*, in IEEE Int. Conf. on Robotics and Automation, 2003.
61. Dohring, M. and Newman, W. S., *The Passivity of Natural Admittance Control Implementations*, in IEEE Int. Conf. on Robotics and Automation, 2003.
62. Birkhimer, C. E., Hebbbar, R. and Newman, W. S., *Towards Automatic Transfer of Human Skills for Robotic Assembly*, Intelligent Robots and Systems, 2003. Proceedings. 2003 IEEE/RSJ International Conference on.
63. Birkhimer, C. E., Dohring, M. E., Hebbbar, H. and Newman, W. S., *Human Inspiration for Blind Robotic Assemblies Using Force-Feedback*, Proc. 12<sup>th</sup> Yale Workshop on Adaptive and Learning Systems, Yale U., May 28-30, 2003, pp 207-212.

64. Newman, W. S., Birkhimer, C. E. and Dohring, M. E., *Design of Robot Controllers for Cooperative Interactive Dynamics*, AIAA Conf on Autonomous Systems, Sept 2003.
65. Bhasin, K., Liberatore, V., and Newman, W. S., *IP Communications and Distributed Agents for Unmanned Autonomous Vehicles*, AIAA Conf on Autonomous Systems, Sept 2003.
66. Birkhimer, C. E., Dohring, M. E., Hebbar, H. and Newman, W. S., *Human Inspiration for Blind Robotic Assemblies Using Force-Feedback*, Proc. 12<sup>th</sup> Yale Workshop on Adaptive and Learning Systems, Yale U., May 28-30, 2003, pp 207-212.
67. Newman, W. S. et al., "Flexible Robotic Assembly for Power-Train Applications", IEEE Robotics and Automation Magazine, September 2002.
68. Kozlowski, D.; Stoughton, R.; Newman, W.S.; Hebbar, R., *Automated Force Controlled Assembly Utilizing a Novel Hexapod Robotic Manipulator*, World Automation Congress, 2002. Proceedings of the 5th Biannual , Volume: 14 , 9-13 June 2002 Page(s): 547 -552.
69. Hebbar, R., W. Newman, et al., *Flexible Robotic Assembly for Powertrain Applications*, .; IEEE 2002 Int. Conf. On Robotics and Automation, video proceedings. (won best video award)
70. Ngai, L., Newman, W.S.; Liberatore, V., *An experiment in Internet-based, human-assisted robotics*, Proceedings. ICRA '02. IEEE International Conference on , Volume: 2 , 11-15 May 2002 Page(s): 2190 -2195 vol.2
71. Wei, Jing and Newman, W. S., *Improving robotic assembly performance through autonomous exploration*, Robotics and Automation, 2002. Proceedings. ICRA '02. IEEE International Conference on , Volume: 3 , 11-15 May 2002, Page(s): 3303 -3308.
72. Dohring, M.; Newman, W., *Admittance enhancement in force feedback of dynamic systems*, Robotics and Automation, 2002. Proceedings. ICRA '02. IEEE International Conference on , Volume: 1 , 11-15 May 2002, Page(s): 638 -643 vol.1.
73. Morris, D.M.; Hebbar, R.; Newman, W.S., *Force guided assemblies using a novel parallel manipulator*, Robotics and Automation, 2001. Proceedings 2001 ICRA. IEEE International Conference on , Volume: 1 , 2001, Page(s): 325 -330 vol.1.
74. Wei, T.; Choi, S.; Newman, W.S., *Development of a sheet-based material handling system for layered manufacturing*, Robotics and Automation, 2001. Proceedings 2001 ICRA. IEEE International Conference on , Volume: 2 , 2001, Page(s): 1352 -1357 vol.2.
75. Newman, W.S.; Zhao, Y.; Pao, Y.-H., *Interpretation of force and moment signals for compliant peg-in-hole assembly*, Robotics and Automation, 2001. Proceedings 2001 ICRA. IEEE International Conference on , Volume: 1 , 2001, Page(s): 571 -576 vol.1
76. Chuckpaiwong, I.; Newman, W.S., *Reflexive collision avoidance for a novel parallel manipulator*, Intelligent Robots and Systems, 2001. Proceedings. 2001 IEEE/RSJ International Conference on , Volume: 3 , 29 Oct.-3 Nov. 2001, Page(s): 1293 -1298 vol.3.
77. Gravel, D.P.; Newman, W.S., *Flexible robotic assembly efforts at Ford Motor Company*, Intelligent Control, 2001. (ISIC '01). Proceedings of the 2001 IEEE International Symposium on , 5-7 Sept. 2001, Page(s): 173 -182.
78. Newman, W. S. et al., *Intelligent Strategies for Compliant Robotic Assembly*, Proc. 11<sup>th</sup> Yale Workshop on Adaptive and Learning Systems, Yale U., June 4-5, 2001, pp 139-146.
79. Choi, S. and W.S. Newman. *Design and Evaluation of a Novel Laser-Cutting Machine for Computer-Aided Manufacturing of Laminated Engineering Materials*. in *IEEE Int. Conf. on Robotics and Automation*. pp 1551 -1556. San Francisco, CA: IEEE.
80. Choi, S., T. Wei, and W.S. Newman. *On the Development of a Laser-Cutting System for Solid Freeform Fabrication*. in *2000 Japan-USA Symposium on Flexible Automation*. (in press). Ann Arbor, MI: ASME.
81. Newman, W.S., et al. *Calibration of a Motoman P8 Robot Based on Laser Tracking*. in *IEEE Int. Conf. on Robotics and Automation*. pp 3597 -3602 San Francisco, CA: IEEE.
82. Sharma, K., et al. *Experimental Evaluation of a Robotic Image-Directed Radiation Therapy System*. in *IEEE Int. Conf. on Robotics and Automation*. pp 2913-2918, San Francisco, CA, 2000: IEEE.
83. Newman, W. S. and Choi, S., "Machine Design for Computer-Aided Manufacturing of Laminated Engineering Materials", Proceedings of the 2000 NSF Design and Manufacturing Research Conf., Vancouver, BC, Canada, 1/2000.
84. Beer, R., Branicky, M., Chiel, H., Merat, F., Newman, W., Pao, Y-H , Phillips, S. , Quinn, R., Ritzmann, R., "Progress in Agile Procedural Learning Systems", , Proceedings of the 2000 NSF Design and Manufacturing Research Conf., Vancouver, BC, Canada, 1/2000.

85. Stoughton, R., et al. *The ParaDex Manipulator: a Novel, Parallel-Actuated Robot Design for Mechanical Assembly*. in IEEE Int. Conf. on Robotics and Automation, video proceedings., San Francisco, CA, 2000: IEEE.
86. Wang, Y., W.S. Newman, and R.S. Stoughton. *Workspace Analysis of the ParaDex Robot--a Novel, Closed-Chain, Kinematically-Redundant Manipulator*. in IEEE Int. Conf. on Robotics and Automation. pp 2392 -2397, San Francisco, CA, 2000,: IEEE.
87. Beer, R.D., et al. *Progress in Agile Procedural Learning Systems*. in *Proceedings of the 1999 NSF Design and Manufacturing Grantees Conference*. 1999. Long Beach, CA: National Science Foundation.
88. Choi, S. and W.S. Newman. *Design and Evaluation of a Novel Laser-Cutting Machine for Computer-Aided Manufacturing of Laminated Engineering Materials*. in *Proceedings of the 1999 Solid Freeform Fabrication Symposium*. 1999. Austin, TX: U. Texas at Austin.
89. Newman, W.S., et al. *Force-Responsive Robotic Assembly of Transmission Components*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. pp 2096 -2102, 1999. Detroit, MI: IEEE.
90. Newman, W.S., et al. *Impedance Based Assembly*. in *IEEE Int. Conf. on Robotics and Automation, video proceedings*. 1999. Detroit, MI: IEEE.
91. Newman, W.S. and J.D. Cawley. *Computer-Aided Manufacturing of Laminated Engineering Materials*. in *Proceedings of the 1999 NSF Design and Manufacturing Grantees Conference*. 1999. Long Beach, CA: National Science Foundation.
92. Ameduri, S.A., et al. *Feasibility of Human/Robot Cooperation in Image-Directed Radiation Oncology*. in *Telem manipulator and Telepresence Technologies V, proceedings of SPIE*. 1998. Boston, MA: SPIE.
93. Mathewson, B.B., et al. *Machine Design, Control and Performance of Automated Computer-Aided Manufacturing of Laminated Engineering Materials*. in *Proceedings of the 1998 Solid Freeform Fabrication Symposium*. 1998. Austin, TX: U. Texas at Austin.
94. Newman, W.S., et al. *Analysis, Design and Control of a Novel, Optically-Commutated Adjustable-Speed Motor*. in *Sensors and Controls for Intelligent Machining, Agile Manufacturing, and Mechatronics, proceedings of SPIE*. 1998. Boston, MA: SPIE.
95. Newman, W.S. and J.D. Cawley. *Computer-Aided Manufacturing of Laminated Engineering Materials*. in *Proceedings of the 1998 NSF Design and Manufacturing Grantees Conference*. 1998. Monterrey, MX: National Science Foundation.
96. Quinn, R.D., et al. *Technologies for Robust Agile Manufacturing*. in *IEEE Int. Conf. on Robotics and Automation, video proceedings*. 1998: IEEE.
97. Quinn, R.D., et al. *Technologies for Robust Agile Manufacturing*. in *IASTED Int. Conf. on Robotics and Manufacturing*. 1998. Banff, Alberta: IASTED.
98. Velasco, V.B. and W.S. Newman. *Computer-Assisted Gripper and Fixture Customization Using Rapid-Prototyping Technology*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1998. Leuven, Belgium: IEEE.
99. Birkhimer, C.E., et al. *Linear Control of the NASA Three Degree of Freedom Reaction Compensation Platform*. in *Proceedings of the 11th Symposium on Structural Dynamics and Control*. 1997. Virginia Polytech, Blacksburg, VA: Virginia Polytechnic Institute.
100. Causey, G.C., et al. *Design of a Flexible Parts Feeding System*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1997. Albuquerque, NM: IEEE.
101. Cawley, J.D., W.S. Newman, and A.H. Heuer. *CAM-LEM: Computer-Aided Manufacturing of Laminated Engineering Materials*. in *Proceedings of the 1997 NSF Design and Manufacturing Grantees Conference*. 1997. Seattle, WA: NSF.
102. Chamis, C.D., S.A. Ameduri, and W.S. Newman. *Automatic Control-Code Generation from Simulation for Flexible Material Handling Systems*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1997. Albuquerque, NM: IEEE.
103. Choi, S., et al. *CAD and Control Technologies for Computer-Aided Manufacturing of Laminated Engineering Materials*. in *Proceedings of the 1997 Solid Freeform Fabrication Symposium*. 1997. Austin, TX: U. Texas at Austin.
104. Jo, J.Y., et al. *Virtual Testing of Agile Manufacturing Software Using 3D Graphical Simulation*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1997. Albuquerque, NM: IEEE.
105. Merat, F.L., et al. *Advances in Agile Manufacturing*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1997. Albuquerque, NM: IEEE.
106. Quinn, R.D., et al. *Advances in Agile Manufacturing*. in *IEEE Int. Conf. on Robotics and Automation, video proceedings*. 1997: IEEE.

107. Velasco, V.B., et al., *Computer-Assisted Gripper and Fixture Customization via Rapid Prototyping*, in *Proceedings of the IASTED International Conference on Robotics and Manufacturing*. 1997, IASTED: Cancun, Mexico. p. 115-120.
108. Zheng, Y. and W.S. Newman, *Software Design Challenges for Computer-Aided Manufacturing of Laminated Engineering Materials (CAM-LEM)*, in *Proceedings of the 6th European Conference on Rapid Prototyping and Manufacturing*. 1997: Nottingham, UK. p. 21-30.
109. Newman, W.S. *Young Investigator Projects in Robotics and Manufacturing*. in *Proceedings of the 1996 NSF Design and Manufacturing Grantees Conference*. 1996. Albuquerque, NM: National Science Foundation.
110. Newman, W.S. and J.D. Cawley. *Computer-Aided Manufacturing of Laminated Engineering Materials*. in *Proceedings of the 1996 NSF Design and Manufacturing Grantees Conference*. 1996. Albuquerque, NM: National Science Foundation.
111. Quinn, R.D., et al. *Design of an Agile Manufacturing Workcell for Light Mechanical Applications*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1996. Albuquerque, NM: IEEE.
112. Quinn, R.D., et al. *Design of an Agile Manufacturing Workcell for Light Mechanical Applications*. in *IEEE Int. Conf. on Robotics and Automation*, video proceedings. 1996.
113. Zheng, Y., B.B. Mathewson, and W.S. Newman. *Progress in Computer-Aided Manufacturing of Laminated Engineering Materials Utilizing Thick, Tangent-Cut Layers*. in *Proceedings of the 1996 Solid Freeform Fabrication Symposium*. 1996. Austin, TX: U. Texas at Austin.
114. Cawley, J.D., et al. *Al<sub>2</sub>O<sub>3</sub> Ceramics Made by CAM-LEM Technology*. in *Proceedings of the 1995 Solid Freeform Fabrication Symposium*. 1995. Austin, TX: U. Texas at Austin.
115. Mathewson, B.B. and W.S. Newman. *Integration of Force Strategies and Natural Admittance Control*. in *IEEE Int. Conf. on Robotics and Automation*, video proceedings. 1995: IEEE.
116. Mathewson, B.B., et al. *Automated Fabrication of Ceramic Components from Tape-Cast Ceramic*. in *Proceedings of the 1995 Solid Freeform Fabrication Symposium*. 1995. Austin, TX: U. Texas at Austin.
117. Newman, W.S., Y. Zheng, and C.C. Fong, *Trajectory Generation from CAD Models for Computer-Aided Manufacturing of Laminated Engineering Materials*, in *Proceedings of the 26th International Symposium on Industrial Robots*. 1995, MEP: Singapore. p. 153-158.
118. Birkhimer, C.E., W.S. Newman, and B. Choi. *Design, Characterization and Control of the NASA Three-Degree-of-Freedom Reaction Compensation Platform*. in *Proceedings of the 28th Aerospace Mechanisms Symposium*. 1994. NASA Lewis Research Center, Cleveland, OH: NASA.
119. Dohring, M.E. and W.S. Newman. *The Effect of Robot Design on Force Control Performance with Implications for Micro-Gravity Applications*. in AIAA. 1994. Huntsville, AL: AIAA.
120. Glosser, G.D. and W.S. Newman. *The Implementation of a Natural Admittance Controller on an Industrial Manipulator*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1994. San Diego, CA: IEEE.
121. Martens, J.D. and W.S. Newman. *Stabilization of Stair-Climbing with a Tracked Mobile Robot*. in *IEEE Int. Conf. on Robotics and Automation*, Video Proceedings. 1994: IEEE.
122. Martens, J.D. and W.S. Newman. *Stabilization of a Mobile Robot Climbing Stairs*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1994. San Diego, CA: IEEE.
123. Mathewson, B.B. and W.S. Newman. *Integration of Force Strategies and Natural Admittance Control*. in *Proceedings of the ASME Mechanical Engineering Congress and Exposition, DSC-Vol 55-1*. 1994. Chicago, IL: ASME.
124. Sayeh, S. and W.S. Newman. *A New Technique for Solving Robot Calibration Equations with Partially Known Constraints*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1994. San Diego, CA: IEEE.
125. Velasco, J.V.B., et al., *Design, Characterization and Control of the Unique Mobility Robot*, in *Proceedings of the 28th Aerospace Mechanisms Symposium*. 1994, NASA: NASA Lewis Research Center, Cleveland, OH. p. 63-78.
126. Dohring, M.E., E. Lee, and W.S. Newman. *A Load-Dependent Transmission Friction Model: Theory and Experiments*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1993. Atlanta, GA: IEEE.
127. Dohring, M.E., et al. *A Compact Roller-Gear Pitch-Yaw Joint Module: Design and Control Issues*. in *Proceedings of the 27th Aerospace Mechanisms Symposium*. 1993. Moffet Field, CA: NASA.
128. Newman, W.S. and D.W. Osborn. *A New Method for Kinematic Parameter Calibration via Laser Line Tracking*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1993. Atlanta, GA: IEEE.

129. Wikman, T.S., M.S. Branicky, and W.S. Newman. *Reflexive Collision Avoidance: A Generalized Approach*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1993. Atlanta, GA: IEEE.
130. Krishnaswamy, V.K. and W.S. Newman. *On-line Motion Planning Using Critical Point Graphs in Two-Dimensional Configuration Space*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1992. Nice, France: IEEE.
131. Newman, W.S. *A New Laboratory Course in Controlled Electromechanical Dynamics: Unifying Engineering Techniques in Analysis and Synthesis*. in *Proceedings of the ASEE Annual Conference*. 1992. Toledo, Ohio: ASEE.
132. Newman, W.S., et al. *The Detrimental Effect of Friction on Space Microgravity Robotics*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1992. Nice, France: IEEE.
133. Newman, W.S., et al. *Experimental Evaluation of a New Traction-Drive Robotic Transmission*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1992. Nice, France: IEEE.
134. Newman, W.S., et al. *A 23.2:1 Ratio, 300 Watt, 26 N-m Output Torque, Planetary Roller-Gear Robotic Transmission: Design and Evaluation*. in *Proceedings of the 26th Aerospace Mechanisms Symposium*. 1992. Greenbelt, MD: NASA.
135. Wikman, T.S. and W.S. Newman. *A Fast, On-Line Collision Avoidance Method for a Kinematically Redundant Manipulator Based on Reflex Control*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1992. Nice, France: IEEE.
136. Wikman, T.S. and W.S. Newman, *Reflex Control for Robot System Preservation and Reliability*, in *Robotics and Manufacturing: Recent Trends in Research, Education, and Applications*, L. Jamshidi, Mullins and Shahinpoor, Editor. 1992, ASME: Santa Fe, NM. p. 979-986.
137. Newman, W.S. *Recent Advances in Impedance Control at Case Western Reserve University*. in *IEEE Int. Conf. on Robotics and Automation*, video proceedings. 1991: IEEE.
138. Newman, W.S. and M.E. Dohring. *Augmented Impedance Control: An Approach to Compliant Control of Kinematically Redundant Manipulators*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1991. Sacramento, CA: IEEE.
139. Newman, W.S. and J.J. Patel. *Experiments in Torque Control of the AdeptOne Robot*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1991. Sacramento, CA: IEEE.
140. Branicky, M.S. and W.S. Newman. *Rapid Computation of Configuration-Space Obstacles*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1990: IEEE.
141. Newman, W.S. and M.S. Branicky. *Experiments in Reflex Control for Industrial Manipulators*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1990: IEEE.
142. Newman, W.S. and M.E. Dohring. *Augmented Impedance Control of Kinematically Redundant Manipulators*. in *Proceedings of the ASME Winter Annual Meeting*. 1990. Dallas, TX: ASME.
143. Newman, W.S., et al. *Preliminary Work in Impedance Control on a Kinematically Redundant Manipulator*. in *Proceedings of the ASME Winter Annual Meeting*. 1989. San Francisco: ASME.
144. Newman, W.S., M.D. Vertal, and J.J. Patel. *Redesign of an AdeptOne Robot Controller for Impedance Control*. in *Proceedings of the ASME Winter Annual Meeting*. 1989. San Francisco: ASME.
145. Newman, W.S. *Automatic Obstacle Avoidance at High Speeds via Reflex Control*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1989: IEEE.
146. Newman, W.S. *High Speed Robot Control and Obstacle Avoidance Using Dynamic Potential Functions*. in *Proc. IEEE Int. Conf. on Robotics and Automation*. 1987: IEEE.
147. Newman, W.S. and N. Hogan, *Time Optimal Control of Balanced Manipulators*, in *Proceedings of the ASME Winter Annual Meeting*. 1986, ASME.
148. Newman, W.S. *Design Optimization of a High Speed Scanner Motor for an Infrared Imaging Device*. in *Proceedings of the 15th Incremental Motion Control Systems and Devices Symposium*. 1986. Urbana-Champaign.
149. Newman, W.S., *Adaptive Control of a Total Artificial Heart*, in *Proceedings of the ASME Winter Annual Meeting*. 1985, ASME.
150. Newman, W.S. and C.S. Keung. *A 10-degree K Triple-Expansion Stirling-Cycle Cryocooler*. in *Proceedings of the 2nd Biennial Conference on Refrigeration for Cryogenic Sensors and Electronic Systems*. 1982. Greenbelt, MD: NTIS.