

**Curriculum Vitae**  
**Tom Mase**

February 16, 2018

## **Tom Mase**

California Polytechnic State University

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## **Education**

Ph.D., Mechanical Engineering, University of California, Berkeley, 1985

M.S., Mechanical Engineering, University of California, Berkeley, 1982

B.S., Mechanical Engineering, Michigan State University, 1980

## **Experience**

7/2017 to present: Faculty Athletic Representative, Report to Provost overseeing Athletic Department to ensure institutional control, student welfare, and academic integrity. California Polytechnic State University, San Luis Obispo, CA. 93407

9/2012 to present: Professor, Department of Mechanical Engineering, California Polytechnic State University, San Luis Obispo, CA 93407

7/2014 to 7/2017: Associate Chair, Mechanical Engineering, California Polytechnic State University, San Luis Obispo, CA 93407

9/2006 to 9/2012: Associate Professor, Department of Mechanical Engineering, California Polytechnic State University, San Luis Obispo, CA 93407

1/2009 to 6/2013: Director, Quality of Life Plus Laboratory, California Polytechnic State University, San Luis Obispo, CA 93407

4/2003 to 6/2009: Consultant (Executive Vice President of R&D and Innovation in 2006), Hot Stix Golf, Scottsdale, AZ

9/2007 to 4/2009: Bently Endowed Professor, Department of Mechanical Engineering, California Polytechnic State University, San Luis Obispo, CA 93407

8/2000 to 4/2006: Visiting Associate Professor, Composite Materials and Structures Center, Michigan State University, East Lansing, Michigan

5/1999 to 8/2000: Director of Product Simulation and Analysis, Cobra Golf Company, Carlsbad, California

7/1992 to 5/1999: Associate Professor with tenure, Department of Mechanical Engineering, GMI Engineering and Management Institute (currently named Kettering University), Flint, Michigan

4/1993 to 12/1994: Advanced Product Engineering, Callaway Golf Company, Carlsbad, California

9/1990 to 6/1992: Assistant Professor, Department of Mechanical Engineering, GMI Engineering and Management Institute, Flint, Michigan

8/1987 to 8/1990: Assistant Professor, Department of Mechanical Engineering, University of Wyoming, Laramie, Wyoming

11/1985 to 7/1987: Senior Research Engineer, Engineering Mechanics Department, General Motors Research Laboratories, Warren, Michigan

1/1985 to 10/1985 and 5/1982 to 5/1984: Research Assistant, Department of Mechanical Engineering, University of California, Berkeley

8/1984 to 12/1984, 9/1981 to 4/1982, and 9/1980 to 6/1981: Teaching Associate, Department of Mechanical Engineering, University of California, Berkeley

Summer 1984: Engineering Mechanics Department, General Motors Research Laboratories, Warren, Michigan

Summer 1981: Current Product Engineering, General Motors Proving Grounds, Milford, Michigan

## Honors

1991 Composite Material Symposium Best Paper Award, ASME Petroleum Division, 14th ASME Energy Technology Conference and Exhibition

Nominated for Mortor Board Outstanding Advisor Award, University of Wyoming, 1989-90

Faculty Advisor for Lincoln Arc Welding Foundation Bronze Award, "Design of a Mandrel Lifting Apparatus for a W-2 Filament Winder," 1989 Distinguished Teaching Assistant, Department of Mechanical Engineering, University of California, Berkeley, 1984-85, 1981-82

Earle C. Anthony Scholarship, University of California, Berkeley, 1980-81

## Professional Societies

American Society for Engineering Education (Attends and periodic participation in annual conference)

American Society of Mechanical Engineers (Not very active)

## Professional Activities

Golf Digest Hotlist Technical Panel, 2014-present, Annual meeting to assist equipment editors evaluate new equipment

Participant, McGraw-Hill Mechanics Focus Group, Chicago, IL, 23-25 February 2012

Reviewer 2010 ASEE Conference

Participant, McGraw-Hill Mechanics Focus Group, Dubuque, IA, 3 October 2008

Session Chair, 2007 IMECE, Seattle, Washington, Session 7-9-2 Integrating Undergraduate Research into the Curriculum

Conference Scientific Committee for the 6th Conference on Engineering in Sport, Munich, Germany, 2006

Golf Digest Hot List Technical Advisory Group, 2004, 2005, 2006

Conference Scientific Committee for the 5th Conference on Engineering in Sport, Davis, California, September 13-16, 2004

Reviewer for Finite Elements in Analysis and Design, July 2004

Mechanics of Materials Review for Society of Professional Engineers, February 13, 2003

Symposium Organizer for Composites in Recreation, 17th Annual Technical Conference of the American Society of Composites, West Lafayette, IN, October 2002

Symposium Organizer for The Impact of Technology in Mechanics Education, ASME Applied Mechanics Division Mechanics Education Committee, 1999 International Mechanical Engineering Conference and Exhibition, Nashville, TN

Co-Moderator, Internet Based Courses and Laboratories (Session 1358), ASEE Information Systems Division, 1999 ASEE Annual Conference and Exhibition, Charlotte, NC

Session Chair, Modelling 2, 2nd International Conference on the Engineering of Sport, July 1998

Southern Michigan Section Society of Experimental Mechanics Advisory Board (1996-98) Section Secretary 1997-98

Session Chair, Crashworthiness and Occupant Protection in Transportation, 1995 ASME Winter Annual Meeting

Session Chair, Crashworthiness and Occupant Protection in Transportation, 1993 ASME Winter Annual Meeting

Session Vice-Chair, 1992 Energy Technologies Conference and Exhibition Composite Material Symposium

Reviewer ASME Journal of Engineering Materials and Technology, 1989

Reviewer ASME Winter Annual Meeting, 1989

## University Activities

ME Department Committee, 2014-2017

ME Budget Committee, 2014-2017

QL+ Advisory Board, 2008-2013

CENG Corporate Challenge Golf Tournament Committee, 2008-present

ME Computing Committee, 2008-2013  
 ME Curriculum Committee, 2007-2013  
 ME Advancement Committee, 2008-2013  
 ME Graduate Committee, 2007-2013  
 ME Laboratory & Resources Committee, 2007-2013  
 ME Student Project Laboratory Committee, 2007-2013  
 Faculty Senate Secretary, 1998-99: (Revision of Faculty Handbook)  
 Board of Trustees Buildings and Grounds sub-committee faculty representative, 1998-99  
 Faculty Senate Sub-committee on Academic Computing, 1997-99  
 Faculty Senate Sub-committee on Academic Facilities and Operations, 1997-1990  
 North Central Accreditation Self-Study Committee Member, 1996-97  
 Faculty Senate, Department Representative, 1995-97  
 Faculty Advisor to Society of Automotive Engineers Student Formula Vehicle competition, 1995-96  
 Graduate Program Curriculum and Review Committee, GMI Engineering and Management Institute, 1991 to 1992  
 Faculty Advisor to Society of Automotive Engineers Student Club, Mini Baja, GMI Engineering and Management Institute, 1991  
 Founding Faculty Advisor to Society of Automotive Engineers Student Club, Mini Baja, University of Wyoming, 1989  
 College Curriculum Committee, University of Wyoming, 1989  
 Student Relations Committee, University of California, Berkeley, 1983

## Service Activities

Assistant Girls Golf Coach, San Luis Obispo High School, Fall 2011  
 Golf Association of Michigan Board of Governors (1992-1994)  
 Championship Committee, Handicap Committee, Rules of Golf Committee, Membership Development and Services Committee  
 Board of Director Member (1994) of MSU Tee Club, Michigan State University Alumni Booster Club  
 Treasurer, 1991-92, Edited MSU Tee Club Quarterly Newsletter (1991-1993)

## Teaching Activities

Table 1: Courses taught in chronological order.

Semester	Course	Students
UNIVERSITY OF WYOMING		
Fall 1987	ES 402 - Dynamics	20
Spring 1988	ES 402 - Dynamics	25
	ME 730 - Energy Methods	8
	ME 614 - Systems Design	4
	ME 402 - Dynamics	23
Fall 1988	ME 540 - Inter. Mech. of Materials	18
Spring 1989	ES 402 - Dynamics	35
	ME 730 - Energy Methods	21
	ME 614 - Systems Design	5
Fall 1989	ME 631 - Instr. and Sys. Dynamics	25
	ME 631 - 4 Lab Sections	25
	ME 833 - Advanced Elasticity	8

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**Table 1 – continued from previous page**

<b>Semester</b>	<b>Course</b>	<b>Students</b>
Spring 1990	ME 540 - Inter. Mech. of Materials	18
	ME 614 - Systems Design	11
KETTERING UNIVERSITY		
Fall 1990	ME 201 - Statics	17
	ME 201 - Statics	24
Winter 1991	ME 202 - Mechanics of Solids	33
	ME 202 - Mechanics of Solids	20
	ME 342 - Adv. Mechanics of Solids	15
Spring 1991	ME 202 - Mechanics of Solids	25
	ME 202 - Mechanics of Solids	32
	ME 342 - Adv. Mechanics of Solids	20
Fall 1991	ME 201 - Statics	19
	ME 631 - Adv. Mechanics of Solids	8
Winter 1992	ME 202 - Mechanics of Solids	29
	ME 202 - Mechanics of Solids	22
	ME 202 - Mechanics of Solids	30
Spring 1992	ME 301 - Dynamics	38
	ME 301 - Dynamics	37
	ME 342 - Adv. Mechanics of Solids	22
Summer 1992	ME 202 - Mechanics of Solids	25
	ME 202 - Mechanics of Solids	22
	ME 633 - Continuum Mechanics	5
Winter 1995	ME 301 - Dynamics	38
	ME 342 - Adv. Mechanics of Solids	26
Spring 1995	ME 301 - Dynamics	39
	ME 342 - Adv. Mechanics of Solids	32
Summer 1995	ME 633 - Continuum Mechanics	8
	ME 202 - Mechanics of Solids	23
Fall 1995	ME 202 - Mechanics of Solids	25
	ME 301 - Dynamics	35
	ME 301 - Dynamics	35
Winter 1996	ME 471 - Polymer Properties (Team taught)	21
	ME 342 - Adv. Mechanics of Solids	24
Summer 1996	ME 342 - Adv. Mechanics of Solids	15
	ME 633 - Continuum Mechanics	10
Fall 1996	ME 202 - Mechanics of Solids	25
	ME 342 - Adv. Mechanics of Solids	15
Winter 1997	ME 471 - Properties of Polymers	39
	ME 202 - Mechanics of Solids	27
Summer 1997	ME 342 - Adv. Mechanics of Solids	42
	ME 633 - Continuum Mechanics	13
Fall 1997	ME 342 - Adv. Mechanics of Solids	44
	ME 631 - Adv. Mechanics of Materials	16
Winter 1998	ME 301 - Dynamics	61
	ME 471 - Properties of Polymers	44
Summer 1998	ME 342 - Adv. Mechanics of Solids	43
	ME 633 - Continuum Mechanics	12
Fall 1998	ME 301 - Dynamics	52
	ME 342 - Adv. Mechanics of Solids	39
Winter 1999	ME 471 - Properties of Polymers	47
	ME 631 - Applied Solid Mechanics	24

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**Table 1 – continued from previous page**

<b>Semester</b>	<b>Course</b>	<b>Students</b>
<b>MICHIGAN STATE UNIVERSITY</b>		
Fall 2000	MSM 205 - Statics	187
Winter 2001	MSM 306 - Dynamics	70
Spring 2002	MSM 211 - Mechanics of Materials	93
	MSM 811 - Elasticity	10
Fall 2003	BE 331 - Machinery Principles in Biosystems Engineering	21
Spring 2003	BE 220 - Statics and Mechanics of Materials	13
	ME 821 - Elasticity	9
	ME 490 - Independent Study (4 credits, Kinsman)	1
Fall 2003	ME 490 - Independent Study (3 credits, Majewski)	1
	BE 331 - Machinery Principles in Biosystems Engineering	20
	ME 490 - Senior Design Project (Kersten, 3 hrs)	1
	ME 990 - Independent Study (Kepich, 6 hrs)	1
	ME 990 - Independent Study (Manchiraju, 1 hr)	1
Spring 2004	ME 221 - Statics	185
	ME 492 - Senior Design Project (Kersten, 3 hrs)	1
Fall 2004	BE 331 - Machinery Principles in Biosystems Engineering	27
	ME 490 - Independent Study (1 hr)	1
Fall 2005	BE 333 - Biosystems Engineering Experimentation	22
Spring 2006	ME 361 - Dynamics	42
	ME 481 - Senior Design	4
<b>CALIFORNIA POLYTECHNIC STATE UNIVERSITY</b>		
Winter 2007	ME 329 - Intermediate Design Lecture	32
	ME 329 - Intermediate Design Lab	16
	ME 428 - Senior Design Project (4 groups)	11
Spring 2007	ME 329 - Intermediate Design Lab (3 sections)	72
	ME 481 - Senior Project Lab	11
Fall 2007	ME 212 - Dynamics (1 section)	32
	ME 501 - Continuum Mechanics and Linear Elasticity	31
Winter 2008	ME 212 - Dynamics (1 section)	28
Fall 2008	ME 503 - Inelastic Material Stress Analysis (1 section)	19
	ME 501 - Continuum Mechanics & Linear Elasticity (1 section)	21
Winter 2009	ME 212 - Dynamics (2 sections)	62
	ME 503 - Inelastic Material Stress Analysis (1 section)	12
Spring 2009	ME 328 - Introduction to Design	64
	ME 328 Lab - Introduction to Design Lab (2 sections)	64
Fall 2009	ME 212 - Dynamics (2 sections)	68
	ME 428 - Senior Design Project Lab (1 section)	22
Winter 2010	ME 430 - Senior Design Project Lab (1 section)	13
	ME 428 - Senior Design Lecture (Czar)	71
	ME 428 - Senior Design Lab (1 section)	12
Spring 2010	ME 429 - Senior Design	11
	ME 430 - Senior Design	20
Fall 2010	Buy-out 6 WTU (Cobra Golf \$18,000)	
	ME 328 - Introduction to Design (2 sections)	73
	ME 328 - Introduction to Design Lab (3 sections)	73
	ME 430 - Senior Project Lab III	12
Winter 2011	ME 428 - Senior Project Lecture (Czar)	93
	ME 428 Senior Project Lab (1 section)	20
	ME 503 - Inelastic Material Stress Analysis	17
Spring 2011	ME 134 - Introduction to Mechanical Engineering	17
	ME 429 - Senior Project II Lab (1 section)	20

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**Table 1 – continued from previous page**

<b>Semester</b>	<b>Course</b>	<b>Students</b>
Fall 2011	ME 211 - Statics	35
	ME 212 - Dynamics	34
	ME 430 - Senior Project III Lab (1 section)	20
	ME 501 - Continuum Mechanics & Linear Elasticity	25
Winter 2012	ME 428 - Senior Project I Lecture (Czar)	60
	ME 428 - Senior Project I Lab	18
Spring 2012	ME 328 - Introduction to Design Lab (2 sections)	45
	ME 429 - Senior Project II Lab (1 section)	18
Fall 2012	ME 428 - Senior Project I	18
	ME 211 - Statics (2 sections)	70
Winter 2013	ME 503 - Inelastic Material Stress Analysis	11
	ME 429 - Senior Project II Lab	19
	ME 212 - Dynamics	37
Spring 2013	ME 212 - Dynamics (2 sections)	72
	ME 430 - Senior Project III Lab	19
Fall 2013	Difference in Pay Leave	
Winter 2014	Difference in Pay Leave	
Spring 2014	Difference in Pay Leave	
Fall 2014	ME 128-04, -06 Introduction to Mechanical Engineering I	36
	ME 501 - Continuum Mechanics	15
	Associate Chair Release	
Winter 2015	ME 428-01 - Senior Project I	72
	ME 428-02, -03 Senior Project Lab	32
	ME 503-01 Inelastic Stress Analysis	14
	Associate Chair Release	
Spring 2015	ME 429-01, -04 - Senior Project II Lab	32
	Associate Chair Release	
Fall 2015	ME 212-01, -02 - Dynamics	70
	ME 430-01, -04 Senior Project III Lab	32
	Associate Chair Release	
Winter 2016	ME 503 - Inelastic Stress Analysis	15
	Associate Chair Release	
Spring 2016	ME 212-03, -04 - Dynamics	70
	ME 329-05 - Intermediate Design Lab	18

## Undergraduate Theses Advised

Table 2: Undergraduate thesis advisees in chronological order.

<b>Student</b>	<b>Sponsor</b>	<b>Thesis Title</b>	<b>Date</b>
Amy Kay Hudson	Takata Restraint Systems, Inc.	Determination of the Effects of Thermoplastic Resin on Injection Molded Airbag Covers	June 2000
Sandi Marie Yost	TRW Chassis Systems, Inc.	Optimization of Journal Alignment Between Rotor and Ballnut Assembly	March 2000
Abhijit A. Phadnis	Northrop Grumman Corp.	An Improved Dam System for Fabrication of Polymer Matrix Composite Sandwich Panels	June 1999

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Table 2 – continued from previous page

Student	Sponsor	Thesis Title	Date
Timothy S. Irvin	Lescoa, Inc.	Thermodynamic Profile Analysis for Determining Material Selection and Packaging Sizes for Automotive Lighting	December 1998
Adrienne A. Davies	TRW, Safety Systems	Experimental Measurements of Pressure and Load Distributions of a Deploying Passenger Airbag Module	December 1998
Travis W. Simmons	Frididaire Company	Refrigerator Mid-Rail Analysis, Redesign and Implementation	June 1998
Ana K. Curkovic	General Motors	Development of Lift Assists for Underbody Area	June 1998
Jason J. Bare	TRW Safety Systems	Linear Loading Test Device for Side Impact Module Systems	June 1997
Michael A. Coventry	KAMAX-G. B. Dupont L.P.	The Design and Assembly of a Sorting Machine	June 1997
Lori K. Mulligan	Delphi	Gas Assisted Molding of Electric Center Components	June 1997
Cari-Lynn Smith	Ford Motor Company	Engine Signal Monitoring Diagnostic System	June 1997
Brett C. Duffy	AutoStyle Plastics	Buick H-car Beam Manufacturing Program	December 1996
Alicia L. Muszynski	Eaton Corporation	Evaluation of the Energy Flow Method for Predicting Noise Transmission in Vehicle Structural Components	December 1996
Cat Tuong Hoang Le	Delphi Automotive Systems	A Test Procedure for Benchmarking of an Airbag Module Performance	June 1996
John T. Wills	Takata, Inc.	Analysis and Design of Passenger Side Airbag Protector Cloth	June 1996
Vanita Ramnani	Delphi Automotive Systems	Design and Evaluation of Seat Suspensions for Static and Dynamic Comfort Self Tensioning Idler Pulley Timing	June 1996
Leanne Elizabeth James	Federal Mogal	Belt Tensioning and Vibration Analysis	June 1996
Toan Cong Ho	General Motors	Utilization of Active Materials as a Replacement of a Typical Mechanical Digit	June 1996
Michael J. Cubr	GM Allison Transmission	Development of a Design Tool to Support Heavy Duty Electric Vehicle Propulsion Systems	June 1993
Eugene D. Douglas	Dana Corporation	A Procedure for Vehicle Service History Data Utilization in Laboratory Testing	June 1993
Barbara M. Rybak	Mark One Corporation	Design of MK-2002 Small Envelope Hi-Helix Screw Shuttle	June 1993
Kathy A. Wojtalewicz	GM Truck and Bus	A Selection Process for an Optimal Front Bumper System on Light Duty Trucks	June 1993
Michael A. Zajchowski	Fitzsimons Manufacturing Co.	Design, Build and Implement Fully Automatic Rubber Seal to Fuel Filler Inlet Assembly System	June 1993
Ellen K. Findlow	Hughes Aircraft	Ceramic Circuit Card Surface Mount Component Adhesion Failures	June 1992
Greg Kraus	Moog Aerospace	Design Verification of an Advanced Material Rod Seal Gland	June 1992
Steven Dumanski	GM Canada	A Synchronous Redesign of the Plant Two Cradle Line	June 1992



## Graduate Students Advised

Table 3: Graduate thesis advisees in chronological order.

Student	Degree	Institute	Thesis Title	Date
Thomas Metzinger	MS	Cal Poly	Simulation of Body Armor Using Explicit Finite Elements	Fall 2016
George Rodriguez	MS	Cal Poly	Finite Element Modeling of Delamination Damage in Carbon Fiber Laminates Subject to Low-Velocity Impact and Comparison with Experimental Impact Tests Using Nondestructive Vibrothermography Evaluation	Spring 2016
Joel Stienkraus	MS	Cal Poly	Mechanical Integration of a Versatile Air Suspension into a Powered Wheelchair	Spring 2012
Scott Moreira	MS	Cal Poly	Predicting the Acoustic Response of the Golf Club & Ball Impact Using Solid Finite Elements and the Boundary Element Method	Fall 2011
Roger Sharpe	MS	Cal Poly	A Prediction of the Acoustical Output of a Golf Driver Head Using Finite Elements	Fall 2009
Nickolai Volkoff-Shoemaker	ME	Cal Poly	Finite Element Analysis of a Golf Ball and Driver Head Impact: Understanding the Feasibility of an Acoustical Optimization	Fall 2009
Ryan Graham	MS	Cal Poly	A System for Optimizing the Layup of a Composite Shaft	Fall 2011
Ryan Miller	MS	Cal Poly	A System for Measuring the Lift and Drag Forces of a Spinning Golf Ball Held Fixed Within a Wind Tunnel	Fall 2008
Mark Barker	MS	GMI	Virtual Test Lab for Automotive Bumper Test Simulation using LS-DYNA	1996
Stewart L. Atkinson	MS	UWyo	Evaluation of a Three Axis Testing Machine for Measurement of Graphite/Epoxy Material Properties	1991
Brian K. Bohl	MS	UWyo	Biaxial Characterization of Quasi-Isotropic Graphite/Epoxy Laminates	1990

## Graduate Student Committees

Table 4: Graduate thesis committees in chronological order.

Student	Degree	Institute	Date
Joseph Garrett	M.S.	Cal Poly State University	2016
Scott Garrett	M.S.	Cal Poly State University	2011
Clint Judd	M.S.	Cal Poly State University	2010
Nick Abbruzzese	M.S.	Michigan State University	2005
Benjamin Lin	M. S.	Michigan State University	2004

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**Table 4 – continued from previous page**

<b>Student</b>	<b>Degree</b>	<b>Institute</b>	<b>Date</b>
Eric G. Meyer	M. S.	Michigan State University	2004
Steve Thelander	M. S.	Michigan State University	2003
Edward M. Odom	Ph. D.	Univ. of Wyoming	1991
John L. Walker	M. S.	Univ. of Wyoming	1990
Todd R. King	Ph. D.	Univ. of Wyoming	1989
Julia A. King	Ph. D.	Univ. of Wyoming	1989

## Courses Utilizing Web

MSM 205 - Statics (MSU)  
 MSM 211 - Mechanics of Materials (MSU)  
 ME 301 & MSM 306 (MSU) - Dynamics  
 ME 342 - Advanced Mechanics of Materials (Kettering University)  
 BE 331 - Machinery Principles in Biosystems Engineering (MSU)  
 BE 333 - Biosystems Engineering Experimentation (MSU)  
 ME 471 - Properties of Polymers (Kettering University)  
 ME 631 - Applied Solid Mechanics (Graduate)  
 ME 810 - Continuum Mechanics (MSU)  
 MSM 811 - Elasticity (MSU)

## Consulting

BST Nano Carbon (2013-2014) - Simulation and product design & development for sporting goods industry (softball, paddle tennis).  
 Liquidmetal Technologies (2013-2014) - Explicit finite element analysis of golf products.  
 McGraw-Hill (2011-2014) - Lead author for Mechanics of Materials (Beer and Johnston) Learn Smart conceptual learning tool. Development of online material for Dynamics books.  
 CobraPUMA Golf (2010-2011) - General golf technology and R&D  
 Nike Golf (2004 - 2005) - General golf technology and R&D  
 Cleveland Golf (2004) - General golf technology and R&D  
 Liquid Metal Golf (2002) - Advise in simulation of golf club head impact.  
 Michael Fordney (2001) - Expert witness in snowmobile case. Provided track simulation and advice in deposition.  
 Hitachi Mobile Computing (1998)- Designed and manufactured 40 titanium putters for high-end sales gifts  
 Callaway Golf Company (1995-1997) - Impact simulation using LS-DYNA3D, club design, and materials characterization and modeling of golf ball impact

## Research, Gifts and Contract Work

Lockheed-Martin, QL+ Student Projects, 2011, \$25,000  
 CobraPUMA Golf, Gift to Mechanical Engineering, 2010, \$18,000  
 Pixl Golf, Gift to Professional Development account, 2009, \$500  
 Hot Stix Golf, Gift to Mechanical Engineering Department, Cal Poly, 2007 through 2008, \$60,000  
 Nike Golf, "Hybrid Club Fitting Algorithms," 2005, \$23,000

PACE Grant, Manufacture of Student Design in China, 2005, \$10,000  
PACE Grant, Development of LS-DYNA Courseware, 2004, \$6,000  
Hot Stix Technologies, 2004-6, \$100,286  
Liquid Metal Technologies, "Impact simulation of golf driver heads," 2003, \$5,000  
Nike Golf, "Impact simulation of golf driver head," 2003, \$3,910  
Karsten Manufacturing, "Material testing of golf ball core and cover materials," (Invoice 1422) 2003, \$2,047  
Michigan Universities Commercialization Initiative Challenge Fund, "Prototype Development of a New Device for Controlling the Most Serious Honey Bee Pest, the Varroa Mite, as a key collaborator, 2002, \$30,000  
Quantum Composites, "Creep Testing of a Filled Thermoplastic," 2002, \$4,025  
Winzeler Stamping, "Flexible Hose Development and Testing," 2002, \$7,296  
Gougeon Brothers Inc., "3-D Laminate Testing: 3-point Bend, Short Beam Shear, Compression, Tg, and CTE," 2002, \$5,400  
Royal Precision Golf, "Benchmarking Golf Shaft Stiffness," 2001-2, \$5,180  
Max Manufacturing, LLC, "Durability Testing of PP Roofing Shingles," 2001-2, \$5,405  
Cleveland Golf, "Golf Ball Finite Element Material Model Characterization," 2001-2, \$4,720  
Dow Corning, "Characterization and Testing of Si Matrix Composites," 2001-2, \$6,774  
Gougeon Brothers Inc., "Neat Resin Testing," 2001, \$575  
SC Johnson & Sons, Inc., "Tensile and Flexure Testing of Two Extruded Sheet Materials," 2001, \$4,945  
Venture Industries, "Testing of Sandwich Panel and Pultruded Bars," 2001-2, \$18,654  
SC Johnson & Sons, Inc., "Molding and Three-Point Bend Tests of LDPE Blends," 2000, \$9,200  
SC Johnson & Sons, Inc., "Penetration Testing of Plastic Food Containers," 2000, \$1,552  
Michigan Molecular Institute, "Cyclic Fatigue Testing of Four Polymer Materials", 2001, \$6,273  
General Motors Corporation, "Virtual Bumper Test Laboratory," 1998, \$20,000, co-PI  
Callaway Golf, "Laser Holography on Golf Club Heads and Shaft Damping Measurement," 1997, \$3,000, Co-PI with David Parker and Dan Russell  
Callaway Golf, "Surllyn Tensile Testing and Club Head Digitization," 1996, \$1,500, Co-PI with Laura Sullivan and Gwan Lei  
Callaway Golf, 1996, Donation to Vehicle Crashworthiness Simulation Laboratory, \$30,000, PI  
PGA Tour, "Design and Verification of a Ball Hitting Robot," 1995, \$15,000, PI  
Cobra Golf II, Inc., "Development of a Golf Club Design Metric Using Strain Gauges," \$24,700, 1995, PI  
NASA/ASEE Fellowship, NASA Lewis Research Center, Cleveland, Ohio, "Probabilistic Composite Mechanics," \$20,000, 1990-91, PI  
Honeywell, Inc., Defense Systems Division, Brooklyn Park, Minnesota, "Design and Fabrication of a Triaxial Testing Facility," \$240,000, 1988-1990, Co-PI  
General Electric Company, Evandale, Ohio, "Biaxial Failure Mechanisms in Silicon Carbide/Titanium Metal Matrix Composites," \$17,200, 1988, Co-PI  
E. I. DuPont de Nemours & Company, Wilmington, Delaware, "Biaxial Characterization of "Delrin" 200 LP," \$20,120, 1987-1988, PI

## Proposals

"Subcontract for Wheelchair Transfer Assist", PI: Tom Mase, Sponsor: US Department of Veterans Affairs - 2011 Innovation Initiative via Quality of Life Plus, GDO#: 11-365, GDO Analyst: Trish Brock, Date submitted: 6/17/11, \$138,000  
"Fuel Cell Technology Collaboration Between PowerHouse Energy and Cal Poly" to Cal Poly State University, September, 2007, \$1,631,910 savings to Cal Poly  
"Biofiber-Reinforced Structural Composites for Use in Matting/Temporary Roadway Panels (A03-213)," SBIR Phase I Plus with Grass Roots Inc., August 2003, \$37,686  
"Low Cost, High Speed Manufacturing of Bio-Composite using Water Based Processing," Consortium for Plant Biotechnology Research, July 2003, \$268,799, not funded, co-PI

"Engineering of Drone Foundation, Power Supply and Development of a Commercialization Plan for Varroa Mite Zapper," Michigan University Commercialization Initiative, June 2003, \$40,994, not funded. co-PI

"Establishment of a Center of Excellence in Finite Element Crash Analysis," submitted to USDOT National Highway Administration, April 2002, \$374,863, not funded, Co-PI

"Intelligent Drift and Pull Technology (IDAPT)," submitted to NIST ATP Program with Sandalwood Enterprises, Inc., Southfield, MI, November, 1996, \$2.2M, not funded, Co-PI

## Patents

8,007,372 Golf club head with localized grooves and reinforcement

6,679,784 Golf club set

6,582,322 Golf club head with multi-radius face

6,530,846 Golf club set

6,454,664 Golf club head with multi-radius face

5,351,953 Dynamically matched set of golf clubs and method and apparatus for designing the same using the inertia tensor

## Publications

G.T. Mase, R. Sharpe, N. Volkoff-Shoemaker and S. Moreira, "Modelling the Sound of a Golf Club Impact," invited paper, Proc IMechE, Part P, Journal of Sports Engineering and Technology, Sage Publishing, 226(2), 107-113, c 2012.

G.T. Mase, R.E. Smelser, and G.E. Mase, *Continuum Mechanics for Engineers*, 3rd Edition, CRC Press, 2009 (with solutions manual)

Tom Mase, "Ask Dr. Tom", a column in *Golf Magazine*

- November 2007 Issue – Golf Ball Compression
- December 2007 Issue – Graphite Shaft Price
- January 2008 Issue – Vertical Moment of Inertia
- March 2008 Issue – Knock-offs
- April 2008 Issue – Fitting for Beginners
- July 2008 Issue – Grooves on Driver
- August 2008 Issue – Reshape grooves
- November 2008 Issue – Wedge Flex
- December 2008 Issue – Wedge Grooves
- January 2009 Issue – USGA Ruling
- February 2009 – Driver Mass
- March 2009 – Trampoline Effect

Tom Mase, Mark Timms and Cory West, "Player Fitting of Golf Equipment Using a Calibration Club," The Engineering of Sport 6, Volume 3: Developments for Innovation, Eckehard Fozzy Moritz and Steve Haake, Editors, Springer Science+Business Media, New York, NY, 2006, pp 341-346

Tom Mase, "A High Tech View of Fitting Golfers," PCS Journal, Vol. 17, No. 1, Professional Clubmakers Society, Louisville, KY, January/February 2006, pp. 20-23

Hiroaki Miyagawa, Thomas Mase, Chiaki Sato, Edward Drown, Lawrence T. Drzal, and Kozo Ikegami, "Comparison of Experimental and Theoretical Transverse Elastic Modulus of Carbon Fiber," accepted in Carbon

Hiroaki Miyagawa, Chiaki Sato, Thomas Mase, Edward Drown, Lawrence T. Drzal, Kozo Ikegami, "Transverse Elastic Modulus of Carbon Fibers Measured by Raman Spectroscopy", Materials Science and Engineering Part A-Structural Materials: Properties, Microstructure and Processing, 412-1/2 (2005), 88-92

T. Mase, "Big technology sometimes comes in small packages-like tiny, little nanotubes," Golfsmith Clubmaker, Golfsmith International, L.P., September/October 2005, pp 12-13

- T. Mase, "Launch parameters impact your game," Golfsmith Clubmaker, Golfsmith International, L.P., April 2005, pp 12-13
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## Television Appearances

See Tables 5 and 6.

Table 5: Golf Channel Episode WB 05-002 showings

Date	Time	Program Description	Episode No.	Rating
Tue, Mar 1, 2005	8:30 AM	The Golf Channel What's in the Bag? Driver...Accuracy	WB_05-002	TV-G
Thu, Mar 3, 2005	12:00 PM	The Golf Channel What's in the Bag? Driver...Accuracy	WB_05-002	TV-G
Tue, Mar 29, 2005	1:00 AM	The Golf Channel What's in the Bag? Driver...Accuracy	WB_05-002	TV-G
Mon, Apr 18, 2005	10:50 PM	The Golf Channel What's in the Bag? Driver...Accuracy	WB_05-002	TV-G
Tue, Apr 19, 2005	3:20 AM	The Golf Channel What's in the Bag? Driver...Accuracy	WB_05-002	TV-G
Tue, Apr 19, 2005	6:30 PM	The Golf Channel What's in the Bag? Driver...Accuracy	WB_05-002	TV-G

Table 6: Airings of "A Better Golf Game," produced by the American Institute of Physics, Discoveries & Breakthroughs in Science, January 2005"

Channel	Market	Station	Affiliation
14	MINNEAPOLIS-ST. PAUL	KCCO	CBS
14	MINNEAPOLIS-ST. PAUL	KCCW	CBS
14	MINNEAPOLIS-ST. PAUL	WCCO	CBS
30	NASHVILLE	WTVF	CBS
36	SALT LAKE CITY	KUSG	CBS
49	PROVIDENCE-NEW BEDFORD	WPRI	CBS
52	JACKSONVILLE	WJXT	IND
52	JACKSONVILLE	WPXC	PAX
54	AUSTIN	KEYE	CBS
57	LITTLE ROCK-PINE BLUFF	KLRT	FOX
69	GREEN BAY-APPLETON	WFRV	CBS
94	DAVENPORT-R.ISLAND-MOLINE	KWQC	NBC
72	TUCSON (SIERRA VISTA)	KOLD	CBS
82	CHAMPAIGN&SPRNGFLD-DECATU	WCIA	CBS
89	TRI-CITIES TN-VA	WCYB	NBC
110	LANSING	WSYM	FOX
201	ST. JOSEPH	KQTV	ABC

## Presentations

"Providing the Average Golfer a Tour Quality Fit," Better Golf Though Technology Conference, MIT, Boston, MA, 24 February 2008

"A High Tech View to Fitting Golfers," Professional Clubmakers Society International Conference and Exhibition, Louisville, KY, March 3, 2006

"Where is Technology Taking Golf Equipment?" Keynote Guest Speech, 2004 Annual Clubmakers Conference, Austin, TX, October 7-11, 2004

"Simulation and Assessment of Cure Volume Shrinkage Stresses on Carbon/Vinyl Ester Composites," presented to the 27th Annual Meeting of The Adhesion Society, Manoj K. Chaudhury, Ed., Wilmington, NC, February 15, 2004

"Engineering the Perfect Golf Game," presented to NASA Glenn Structures and Materials Division, June 25, 2002

- "Engineering the Perfect Golf Game," invited lecture at University of Nebraska Mechanical Engineering Department, April 7, 2000
- "Experimental Evaluation of Polybutadiene Rubber Constitutive Parameters for Simulation, 1997 SEM Spring Conference and Exhibition, Bellevue, WA, June 1997
- "Physics, Engineering, and Golf," presented to the ASM's Saginaw Valley Chapter, Birch Run, MI, September 18, 1996
- "Experiences in Developing a Virtual Test Center for Golf", presented to GMI Engineering & Management Institute's Industrial Liaison, Flint, MI, September 10, 1996
- "Industry-Classroom Collaborations: Photoelastic and Finite Element Analysis of an Engine Decking Bar," presented to Society of Experimental Mechanics' Southern Michigan Section, Flint MI, April 30, 1996
- "Design as an Integral Part of Advanced Mechanics of Solids," presented to the Michigan Mechanics Teachers Conference, Oakland, MI, March 11, 1996
- "PGA Tour's Ball Hitting Machine," presented to United States Golf Association and PGA Tour staff, Far Hills, NJ, February 29, 1996
- "Integrated Golf Shaft Design," presented to the Golf Clubmakers Association's International Seminar '95, Austin, TX, September 23, 1995
- "Engineering Golf Clubs: Concept to Customer," presented to University of California, San Diego's CONNECT lecture series, San Diego, California, June 17, 1994
- "Quantification of Scatter in Composite Materials Via Probabilistic Mechanics," presented to the 1992 ASME Energy Technology Conference and Exhibition, Houston, Texas, January 27, 1992
- "Probabilistic Composite Integrated Analysis," presented to the Sixteenth Annual Mechanics of Composites Review, Dayton, OH, November 13, 1991
- "Stroh's Formulation as Applied to Surface Waves in Anisotropic Media," presented to the Fracture and Fatigue Branch, Structures and Materials Division, NASA Lewis Research Center, Cleveland, Ohio, July 31, 1991
- "Probabilistic Micro- and Micromechanics in Polymer Matrix Composites," presented to the ASME Energy Technology Conference and Exhibition, Houston, Texas, January, 21, 1991
- "Evaluation of Graphite/Epoxy Laminates Under Biaxial Loading," presented to the 5th Technical Conference of the American Society for Composites on Composite Materials, East Lansing, MI, 10-13 June 1990
- "Biaxial Characterization of 3501-6 and EPON 826 Epoxy Resins," presented to the Society of Experimental Mechanics Spring Conference, Albuquerque, NM, June, 1990
- "Measuring Multiaxial Strength of Composite Materials," presented at the ONR Workshop on Multiaxial Evaluation of Fiber Composite Materials, General Dynamics Electric Boat Division, Crystal City, VA, March 21, 1990
- "Biaxial Characterization of Carbon/Epoxy Unidirectional and Quasi-isotropic Composites," presented to the ASME Energy Technology Conference and Exhibition, New Orleans, LA, January 17, 1990
- "An Assessment of Add-on Energy Absorbing Devices for Vehicle Crashworthiness," presented at the Winter Annual Meeting of the American Society of Mechanical Engineers, San Francisco, CA, December, 1989
- "Failure Strength of Laminates Undergoing Multiaxial Loading," presented at the Twenty-first Midwest Mechanics Conference, Michigan Technological University, Houghton, MI, August 1989
- "Biaxial Failure Mechanisms in Silicon Carbide/Titanium Metal Matrix Composites," presented to General Electric Aircraft Engines Group, Evandale, OH, January 27, 1989
- "Acoustoelasticity in Layered Composites," presented at the Winter Annual Meeting of the American Society of Mechanical Engineers, Chicago, IL, November 1988.
- "Acoustoelasticity Using Surface Waves in Anisotropic Materials," presented to the Tenth U. S. Congress on Applied Mechanics, June 16, 1986
- "Data Acquisition for Drop Impact Testing," presented to the General Motors Research Laboratories PC Data Acquisition Seminar, May 20, 1986