

CURRICULUM VITAE

Gary L. Gray

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Department of Engineering Science and Mechanics
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EDUCATION

Ph.D., Engineering Mechanics, December 1993
Thesis Title: Chaos in a Class of Satellite Attitude Maneuvers
Department of Engineering Mechanics and Astronautics
University of Wisconsin–Madison
Madison, WI 53706

M.S., Engineering Mechanics, December 1988
Department of Engineering Mechanics
University of Wisconsin–Madison
Madison, WI 53706

S.M., Engineering Science, March 1987
Division of Applied Sciences
Harvard University
Cambridge, MA 02138

B.S., Mechanical Engineering, *cum laude*, May 1985
Department of Mechanical Engineering
Washington University
St. Louis, MO 63130

EXPERIENCE

Associate Professor, July 2000–Present
Department of Engineering Science and Mechanics
The Pennsylvania State University
University Park, PA

Assistant Professor, March 1994–June 2000
Department of Engineering Science and Mechanics
The Pennsylvania State University
University Park, PA

Research Fellow/Assistant, 1989–1994
Department of Engineering Mechanics and Astronautics
University of Wisconsin–Madison
Madison, WI

Teaching Assistant, 1987–1989, January–May 1993
Department of Engineering Mechanics and Astronautics
University of Wisconsin–Madison
Madison, WI

Teaching/Research Fellow, 1986–1987

Division of Applied Sciences

Harvard University

Cambridge, MA

Research Assistant, Summer 1986

Division of Plastic Surgery

Washington University School of Medicine

St. Louis, MO

PUBLICATIONS Books

Gary L. Gray, Francesco Costanzo, and Michael E. Plesha (2013) *Engineering Mechanics: Dynamics*, 2nd Edition, McGraw-Hill Higher Education, New York, New York.

Michael E. Plesha, Gary L. Gray, and Francesco Costanzo (2013) *Engineering Mechanics: Statics*, 2nd Edition, McGraw-Hill Higher Education, New York, New York.

Francesco Costanzo, Michael E. Plesha, and Gary L. Gray (2013) *Engineering Mechanics: Statics and Dynamics* (Combined Edition), 2nd Edition, McGraw-Hill Higher Education, New York, New York.

Gary L. Gray, Francesco Costanzo, and Michael E. Plesha (2010) *Engineering Mechanics: Dynamics*, McGraw-Hill Higher Education, New York, New York.

Michael E. Plesha, Gary L. Gray, and Francesco Costanzo (2010) *Engineering Mechanics: Statics*, McGraw-Hill Higher Education, New York, New York.

Francesco Costanzo, Michael E. Plesha, and Gary L. Gray (2010) *Engineering Mechanics: Statics and Dynamics* (Combined Edition), McGraw-Hill Higher Education, New York, New York.

Book Chapters

Gary L. Gray and Francesco Costanzo (2007) “Toward a New Approach to Teaching Problem Solving in Dynamics,” Chapter 9 in the book entitled *Learning to Solve Complex, Scientific Problems*, pp. 205–222, edited by Prof. David H. Jonassen (University of Missouri, Columbia), Lawrence Erlbaum Associates, ISBN: 0805859187.

Francesco Costanzo and Gary L. Gray (2007) “A Micro-Mechanics-Based Notion of Stress for use in the Determination of Continuum-Level Mechanical Properties via Molecular Dynamics,” Chapter 5 in the book entitled *Multiscale Modeling and Simulation of Composite Materials and Structures*, pp. 203–234, edited by Y. Kwon, D. H. Allen, and R. Talreja, Springer-Verlag. ISBN-13: 9780387363189

Refereed Journal Publications

Thomas A. Litzinger, Peggy Van Meter, Carla M. Firetto, Lucas J. Passmore, Christine B. Masters, Stephen R. Turns, Gary L. Gray, Francesco Costanzo, and Sarah E. Zappe (2010) “A Cognitive Study of Problem Solving in Statics,” *Journal of Engineering Education*, **99**(4), pp. 337–353.

- Pedro C. Andia, Francesco Costanzo, and Gary L. Gray (2006) "A Classical Mechanics Approach to the Determination of the Stress-Strain Response of Particle Systems," *Modelling and Simulation in Materials Science and Engineering*, **14**, pp. 741–757.
- Charles L. Randow, Gary L. Gray, and Francesco Costanzo (2006) "A Directed Continuum Model of Micro- and Nano-scale Thin Films," *International Journal of Solids and Structures*, **43**(5), pp. 1253–1275.
- Pedro C. Andia, Francesco Costanzo, and Gary L. Gray (2005) "A Lagrangian-Based Continuum Homogenization Approach Applicable to Molecular Dynamics Simulations," *International Journal of Solids and Structures*, **42**(24-25), pp. 6409–6432.
- Francesco Costanzo, Gary L. Gray, and Pedro C. Andia (2005) "On the Definitions of Effective Stress and Deformation Gradient for Use in MD: Hill's Macrohomogeneity and the Virial Theorem," *International Journal of Engineering Science*, **43**(7), pp. 533–555.
- Gary L. Gray, Andrew J. Miller, Thomas J. Yurick Jr., and Suzanne E. Mohny (2004) "Educational Software for Materials Processing," *Journal of Materials Education*, **26**(3-4), pp. 321–330.
- Francesco Costanzo, Gary L. Gray, and Pedro C. Andia (2004) "On the Notion of Average Mechanical Properties in MD Simulation via Homogenization," *Modelling and Simulation in Materials Science and Engineering*, **12**, pp. S333–S345.
- S. E. Mohny, A. J. Miller, and G. L. Gray (2003) "Software for Teaching Materials Processing and Diffusion," *JOM-e*, available online at http://www.tms.org/pubs/journals/JOM/0312/Mohny/Mohny-_0312.html.
- Thomas J. Yurick, Jr., Suzanne E. Mohny, and Gary L. Gray (2001) "Shape Memory Alloy Coils Optimized for Electrical Connectors," *IEEE Transactions on Components, Packaging, and Manufacturing Technology: Part A*, **24**(3), pp. 389–398.
- Andrew J. Miller, Gary L. Gray, and Andre P. Mazzoleni (2001) "Nonlinear Spacecraft Dynamics with a Flexible Appendage, Damping, and Moving Internal Submasses," *Journal of Guidance, Control, and Dynamics*, **24**(3), pp. 605–615.
- Francesco Costanzo and Gary L. Gray (2000) "On the Implementation of Interactive Dynamics," *International Journal of Engineering Education*, **16**(5), pp. 385–393.
- Igor Kulisic, Gary L. Gray, Thomas J. Yurick, Jr., and Suzanne E. Mohny (2000) "Performance of a Shape Memory Alloy Coil-Shaped Clamp for Enhanced Normal Force in Pin-and-Receptacle Electrical Connectors," *IEEE Transactions on Components, Packaging, and Manufacturing Technology: Part A*, **23**(2), June, pp. 227–233.
- Gary L. Gray, Daniel C. Kammer, Ian Dobson, and Andrew J. Miller (1999) "Heteroclinic Bifurcations in Rigid Bodies Containing Internally Moving Parts and a Viscous Damper," *ASME Journal of Applied Mechanics*, **66**(3), pp. 720–728.
- Gary L. Gray and Francesco Costanzo, (1999) "The Interactive Classroom and its Integration into the Mechanics Curriculum," *International Journal of Engineering Education*, **15**(1), pp. 41–50.
- Gary L. Gray, Andre P. Mazzoleni, and David R. Campbell III (1998) "Analytical Criterion for Chaotic Dynamics in Flexible Satellites with Nonlinear Controller Damping," *Journal of Guidance, Control, and Dynamics*, **21**(4), pp. 558–565.

G. L. Gray, I. Dobson, and D. C. Kammer (1996) "Chaos in a Spacecraft Attitude Maneuver Due to Time-Periodic Perturbations," *ASME Journal of Applied Mechanics*, **63**(2), pp. 501–508.

Daniel C. Kammer and Gary L. Gray, "A Nonlinear Control Design for Energy Sink Simulation in the Euler-Poinsot Problem," *The Journal of the Astronautical Sciences*, **41**(1), 1993, pp. 53–72.

Proceedings & Conference Papers

Gary L. Gray (2009) "Some Simple Dynamics Demos," *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, Austin, TX, June 14–17. Awarded Best Presentation in the Mechanics Division of ASEE.

Peggy Van Meter, Carla Firetto, Lucas J. Passmore, Francesco Costanzo, Gary L. Gray, Thomas A. Litzinger, Christine B. Masters, Stephen R. Turns (2009) "Prompting Self-explanation to Improve Engineering Students' Problem Solving," *Proceedings of the 13th Biennial Conference of the European Association for Research on Learning and Instruction—EARLI 2009*, Amsterdam, the Netherlands, August 25–29.

Thomas Litzinger, Carla Firetto, Lucas Passmore, Peggy Van Meter, Kelli Higley, Christine Masters, Francesco Costanzo, Gary L. Gray, Steve Turns, and Jonna Kulikowich (2008) "Identifying and Remediating Deficiencies with Problem-Solving in Statics," *Proceedings of the 2008 American Society for Engineering Education Annual Conference & Exposition*, Session No. 402, Pittsburgh, PA, June 22–25.

Francesco Costanzo and Gary L. Gray (2008) "A Structured Approach to Problem Solving in Statics and Dynamics: Assessment and Evolution," *Proceedings of the 2008 American Society for Engineering Education Annual Conference & Exposition*, Pittsburgh, PA, June 22–25.

Gary L. Gray and Francesco Costanzo (2008) "A Problem-Centered Approach to Dynamics," *Proceedings of the 2008 American Society for Engineering Education Annual Conference & Exposition*, Pittsburgh, PA, June 22–25. Awarded Best Presentation by the Mechanics Division of ASEE.

Andrew J. Miller, Pedro C. Andia, Francesco Costanzo, and Gary L. Gray (2006) "The Stress-Strain Response of Nanoscale Systems," *The 43rd Annual Technical Meeting of the Society of Engineering Science*, August 13–16, p. 227, State College, PA.

Gary L. Gray, Francesco Costanzo, Don Evans, Phillip Cornwell, Brian Self, and Jill L. Lane (2005) "The Dynamics Concept Inventory Assessment Test: A Progress Report and Some Results," *Proceedings of the 2005 American Society for Engineering Education Annual Conference & Exposition*, June 12–15, Portland, OR, Session No. 3268.

Francesco Costanzo, Gary L. Gray, and Pedro C. Andia (2004) "On Hill's Macrohomogeneity Condition and the Virial Theorem," *41st Annual Technical Meeting of the Society of Engineering Science*, October 10–13, Lincoln, NE.

Charles L. Randow, Gary L. Gray, and Francesco Costanzo (2004) "A Micropolar Approach to Modeling Columnar Thin Films," *41st Annual Technical Meeting of the Society of Engineering Science*, October 10–13, Lincoln, NE.

- Don L. Evans, Gary L. Gray, Francesco Costanzo, Phillip Cornwell, and Brian P. Self (2004) “Rigid Body Dynamics: Student Misconceptions and Their Diagnosis,” in the *XXI International Congress of Theoretical and Applied Mechanics*, Warsaw, Poland, August 15–21.
- Charles L. Radow, Gary L. Gray, and Francesco Costanzo (2004) “A Polar Continuum Model of a Columnar Thin Film,” *Proceedings of ECCOMAS 2004—European Congress on Computational Methods in Applied Sciences and Engineering*, Jyväskylä, Finland, July 24–28, paper no. 195, 12 pages, published on CD-ROM only, ISBN No. 951-39-1869-6.
- D. L. Evans, Gary L. Gray, Stephen Krause, Jay Martin, Clark Midkiff, Branisla M. Notaros, Michael Pavelich, David Rancour, Teri Reed-Rhoads, Paul Steif, Ruth Streveler, and Kathleen Wage (2003) “Progress on Concept Inventory Assessment Tools,” *33rd ASEE/IEEE Frontiers in Education Conference*, Boulder, CO, November 5–8, pp. T4G-1–T4G-8.
- Gary L. Gray, Francesco Costanzo, Pedro C. Andia, and Thomas J. Yurick (2003) “Determination of the Mechanical Properties of Amorphous Columnar Thin Films from MD Simulations,” *Proceedings of the 7th US National Congress on Computational Mechanics*, Albuquerque, NM, July 28–30, CD-ROM ISBN: 0-9743254-0-6.
- Francesco Costanzo and Gary L. Gray (2003) “Creating Labeled ‘Stand-Alone’ Figures in \LaTeX Using WARMreader and Adobe Illustrator under Mac OS X,” *Proceedings of The 24th Annual Meeting and Conference of the TeX Users Group*, Waikoloa, Hawaii, July 20–24.
- Gary L. Gray and Francesco Costanzo (2003) “Experiences and Lessons Learned Teaching \LaTeX to a Group of University Students,” *Proceedings of The 24th Annual Meeting and Conference of the TeX Users Group*, Waikoloa, Hawaii, July 20–24.
- D. Kent Johnson, Jill L. Lane, Gary L. Gray, Francesco Costanzo, and Tao Zhang (2003) “Assessment of a Problem-Centered Approach to Putting the Motion back in Dynamics,” *Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition*, June 22–25, Nashville, TN, Session No. 2230.
- Charles L. Radow, Andrew J. Miller, Francesco Costanzo, and Gary L. Gray (2003) “Mathematica Notebooks for Classroom Use in Undergraduate Dynamics: Demonstration of Theory and Examples,” *Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition*, June 22–25, Nashville, TN, Session No. 3268.
- Gary L. Gray, Don Evans, Phillip Cornwell, Francesco Costanzo, and Brian Self (2003) “Toward a Nationwide Dynamics Concept Inventory Assessment Test,” *Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition*, June 22–25, Nashville, TN, Session No. 1168. Recipient of the *ASEE Mechanics Division Best Presentation Award* for Session 1168.
- Gary L. Gray, Francesco Costanzo, Thomas J. Yurick, and Pedro C. Andia (2002) “Deriving Continuum Properties from MD Simulations for Columnar Thin Films,” *39th Annual Technical Meeting of the Society of Engineering Science*, October 13–16, University Park, PA.

- Francesco Costanzo, Gary L. Gray, Pedro C. Andia, Thomas J. Yurick, Jr., and Charles Randow (2002) "On the Relation Between Morphology and Elastic Properties in Amorphous Columnar Thin Films," *WCCM V Fifth World Congress on Computational Mechanics*, International Association for Computational Mechanics, July 7–12, Vienna, Austria.
- Pedro C. Andia, Francesco Costanzo, Gary L. Gray, and Thomas J. Yurick (2000) "Calculation of Intrinsic Stresses and Elastic Moduli in Nonhomogeneous Thin Films," in *Multiscale Modeling of Materials—2000*, L. P. Kubin, J. L. Bassani, K. Cho, H. Gao and R. L. B. Selinger (eds.), Materials Research Society Symposium Proceedings, Pittsburgh, PA, Vol. 653, pp. Z10.3.1–Z10.3.6.
- Thomas J. Yurick, Jr., Suzanne E. Mohney, and Gary L. Gray (2000) "Optimization of Shape Memory Alloys for Use in Electrical Connectors," *Proceedings of the 46th IEEE Holm Conference on Electrical Contacts*, pp. 47–59.
- Pedro C. Andia, Francesco Costanzo, and Gary L. Gray (2000) "On the Estimation of Intrinsic Stresses and Elastic Moduli in Thin Films" in *Complex Mediums*, Edited by Akhlesh Lakhtakia Wener S. Weiglhofer, and Russell F. Messier, *Proceedings of SPIE's 45th Annual Meeting*, July 30–August 1, San Diego, CA, Volume 4097, pp. 280–290.
- Francesco Costanzo and Gary L. Gray (1999) "Mechanics Reform: A Report from the Trenches," *1999 Frontiers in Education Conference*, San Juan, Puerto Rico, November 10–13, Paper 1172, pp. 12c5-7–12c5-12.
- Patricia M. Yaeger, Rose M. Marra, Francesco Costanzo, Gary L. Gray, and Dhushy Sathianathan (1999) "Interactive Mechanics: Effects of Student-Centered Activities on Learning," *1999 Frontiers in Education Conference*, San Juan, Puerto Rico, November 10–13, Paper 1290.
- Andrew J. Miller, Gary L. Gray, and Andre P. Mazzoleni (1999) "Nonlinear Dynamics of a Viscously Damped Spacecraft With a Flexible Appendage and Time-Dependent Forcing," *Astrodynamics 1999: Proceedings of the AAS/AIAA Astrodynamics Specialist Conference*, Girdwood, Alaska, August 16–18, Paper AAS 99-458. Published in the *Advances in the Astronautical Sciences* series, vol. 103, Eds. Kathleen C. Howell *et al.*, pp. TBD.
- Matthew D. Toniolo, Mokin Lee, and Gary L. Gray (1999) "Comparison of Melnikov's Method and Numerical Simulation for Predicting Nonlinear Dynamics in the Pitch Motion of Actively Controlled Satellites in a Gravity Gradient Field," *Astrodynamics 1999: Proceedings of the AAS/AIAA Astrodynamics Specialist Conference*, Girdwood, Alaska, August 16–18, Paper AAS 99-377. Published in the *Advances in the Astronautical Sciences* series, vol. 103, Eds. Kathleen C. Howell *et al.*, pp. TBD.
- Francesco Costanzo and Gary L. Gray (1999) "Collaborative Learning in Undergraduate Dynamics Courses: Some Examples," *Proceedings of the 1999 ASEE Annual Conference and Exposition*, Charlotte, North Carolina, June 20–23. Published by the American Society for Engineering Education on CD-ROM only (12 pages, no page numbers), Library of Congress Call Number: T62.A4301.
- Gary L. Gray and Francesco Costanzo (1999) "Interactive Dynamics: A Collaborative Approach to Learning Undergraduate Dynamics," *Proceedings of the 1999 ASEE*

- Annual Conference and Exposition*, Charlotte, North Carolina, June 20–23. Published by the American Society for Engineering Education on CD-ROM only (13 pages, no page numbers), Library of Congress Call Number: T62.A4301.
- Patricia M. Yaeger, Rose M. Marra, Gary L. Gray and Francesco Costanzo (1999) “Assessing New Ways of Teaching Dynamics: An Ongoing Program to Improve Teaching,” *Proceedings of the 1999 ASEE Annual Conference and Exposition*, Charlotte, North Carolina, June 20–23. Published by the American Society for Engineering Education on CD-ROM only (10 pages, no page numbers), Library of Congress Call Number: T62.A4301.
- Costanzo, Francesco and Gary L. Gray (1998) “Interactive Mechanics,” *Proceedings of the Workshop on Reform of Undergraduate Mechanics Education*, Hosted by the Engineering Mechanics Faculty of The Pennsylvania State University, University Park, Pennsylvania, August 16–18.
- Igor Kulisic, Gary L. Gray, and Suzanne E. Mohny (1998) “Shape Memory Alloy Coil-Shaped Clamp for Enhanced Normal Force in Electrical Connectors,” *Proceedings of the 44th IEEE Holm Conference on Electrical Contacts*, Arlington, Virginia, October 26–28, pp. 20–25.
- Gary L. Gray and Andre P. Mazzoleni (1998) “Analytical Criterion for Chaotic Dynamics in Flexible Spacecraft with Nonlinear Controller Damping and Nonautonomous Forcing,” in the Symposium on Structural Dynamics, Nonlinear Dynamics and Control, *Proceedings of the 35th Annual Technical Meeting of the Society of Engineering Science*, Pullman, Washington, September 27–30, p. 78.
- Gary L. Gray, Andre P. Mazzoleni, and David R. Campbell III (1996) “Chaotic Dynamics in a Spacecraft with a Flexible Appendage and with Energy Dissipation via a Nonlinear Controller,” *Spaceflight Mechanics 1996: Proceedings of the AAS/AIAA Spaceflight Mechanics Conference*, Austin, Texas, February 12–15, Paper AAS 96-219. Published in the *Advances in the Astronautical Sciences* series, vol. 93, Eds. G. Edward Powell *et al.*, pp. 1093–1111.
- Gary L. Gray and David R. Campbell III (1995) “Numerical Investigation of Complex Dynamics and Chaos in a Satellite Attitude Maneuver,” *Proceedings of the 32nd Annual Technical Meeting of the Society of Engineering Science*, New Orleans, Louisiana, October 29–November 1, pp. 185–186.
- David R. Campbell III and Gary L. Gray (1995) “Numerical Determination of Manifold Intersections as a Precursor to Chaos in Spacecraft Attitude Dynamics,” *Proceedings of the 32nd Annual Technical Meeting of the Society of Engineering Science*, New Orleans, Louisiana, October 29–November 1, pp. 75–76.
- Mark C. Stabb and Gary L. Gray (1994) “Chaos in Controlled, Gravity Gradient Satellite Pitch Dynamics via the Method of Melnikov — Saddle Stabilization,” *AIAA Dynamics Specialist Conference*, Hilton Head, South Carolina, April 21–22, Paper AIAA 94-1671-CP.
- Gary L. Gray and Mark C. Stabb (1993) “Chaos in Controlled, Gravity Gradient Satellite Pitch Dynamics via the Method of Melnikov — Center Stabilization,” *Spaceflight Mechanics 1993: Proceedings of the AAS/AIAA Spaceflight Mechanics Conference*, Pasadena, California, February 22–24, Paper AAS 93-132. Published in the *Advances in the Astronautical Sciences* series, vol. 82, Eds. Robert G. Melton *et al.*, pp. 147–166.

Gary L. Gray, Ian Dobson, and Daniel C. Kammer (1993) “Detection of Chaotic Saddles in an Attitude Maneuver of a Spacecraft Containing a Viscous Damper,” *Spaceflight Mechanics 1993: Proceedings of the AAS/AIAA Spaceflight Mechanics Conference*, Pasadena, California, February 22–24, Paper AAS 93-133. Published in the *Advances in the Astronautical Sciences* series, vol. 82, Eds. Robert G. Melton *et al.*, pp. 167–184.

Daniel C. Kammer and Gary L. Gray (1993) “A Nonlinear Control Design for Energy Sink Simulation in the Euler-Poinsot Problem,” *Spaceflight Mechanics 1993: Proceedings of the AAS/AIAA Spaceflight Mechanics Conference*, Pasadena, California, February 22–24, Paper AAS 93-106. Published in the *Advances in the Astronautical Sciences* series, vol. 82, Eds. Robert G. Melton *et al.*, pp. 111–132.

Gary L. Gray, Daniel C. Kammer, and Ian Dobson (1992) “Chaos in an Attitude Maneuver of a Damped Satellite Due to Time-Periodic Perturbations,” *Spaceflight Mechanics 1992: Proceedings of the AAS/AIAA Spaceflight Mechanics Meeting*, Colorado Springs, Colorado, February 24–26, Paper AAS 92-171. Published in the *Advances in the Astronautical Sciences* series, vol. 79, Eds. Roger E. Diehl *et al.*, pp. 593–612.

STUDENT ADVISING

Doctoral Students

- David R. Campbell III (Ph.D., Engineering Science and Mechanics), *Analytical and Numerical Analysis of Nonlinear Phenomena for a Class of Spacecraft Attitude Acquisition Maneuvers*, 1997.
- Thomas J. Yurick, Jr. (Ph.D., Engineering Science and Mechanics), *Simulating the Deposition of Thin Films Using Parallel Molecular Dynamics Simulations*, 2003.
- Pedro C. Andia (Ph.D., Engineering Science and Mechanics), *Analysis of the Mechanical Properties and Morphology of Thin Films Grown via Molecular Dynamics Simulations*, 2003.
- Charles Randow (Ph.D., Engineering Science and Mechanics), *A Directed Continuum Model of a Columnar Thin Film*, 2005.

Masters Students

- Igor Kulisic (M.S., Materials Science and Engineering), *Analysis and Design of Shape Memory Alloys to Enhance Performance of Electrical Connectors*, 1998.[†]
- Andrew Miller (M.S., Engineering Science and Mechanics), *Melnikov and Numerical Analysis of a Nonautonomously Perturbed Spacecraft with Flexibilities, Nonlinear Controller Damping, and a Viscous Rotor*, 1999.[‡]
- Thomas J. Yurick, Jr. (M.S., Engineering Science and Mechanics), *Optimization of Shape Memory Alloy Enhanced Automotive Electrical Connectors*, 2000.[§]
- Matthew Toniolo (M.S., Engineering Science and Mechanics), *Numerical Investigation of Nonlinear Dynamics, and Validation of the Analytical Melnikov Criterion, for a Controlled Gravity Gradient Spacecraft*, 2000.

[†] Won the second place award for the presentation of his thesis work at the 1998 Cooperative Program in Metals Science and Engineering.

[‡] Awarded a two-year NASA Space Grant Consortium Fellowship for his thesis research, 1999–2001.

[§] Won the second place award for a poster of his thesis work at the 1999 Cooperative Program in Metals Science and Engineering.

- Lisa DeChristopher (M.E., Engineering Science and Mechanics), *Animation of Rigid Body Rotation using Euler Angles and Euler Parameters*, 2001.

Undergraduate Senior Thesis Students

- Jennifer Greenbaum (Engineering Science and Mechanics), B.S., *Numerical Investigation of Nonlinear Dynamics in a Controlled Spacecraft*, 1996.[¶]
- Matthew Wyczalkowski (Engineering Science and Mechanics), B.S., *Adequate and Accurate Local Field Calculations for Dielectric Composites With Intensity-Dependent Permittivity*, 1996.
- Matthew Toniolo (Engineering Science and Mechanics), B.S., *A Virtual Laboratory for Engineering Materials*, 1997.
- Mark Ford (Engineering Science and Mechanics), B.S., *Motorcycle Dynamics Analysis for Motocross Competition*, 1999.
- Nicholas Marchetti (Materials Science and Engineering), B.S., *The Effect of Transition Temperature on the Force Generated During Constrained Recovery in Shape Memory Alloys*, 1999.

TEACHING ACTIVITIES

Courses Taught

- Engineering Mechanics 212 — *Dynamics*
- Engineering Mechanics 212H — *Dynamics (Honors)*
- Engineering Mechanics 213 — *Strength of Materials*
- Engineering Mechanics 401 — *Design and Synthesis in Vibrations*
- Engineering Mechanics 407 — *Computer Methods in Engineering Design*
- Engineering Mechanics 409 — *Advanced Mechanics*
- Engineering Mechanics 520 — *Advanced Dynamics*
- Engineering Mechanics 522 — *Theory of Vibrations*
- Engineering Science 97A — *Exploring Engineering Through Science Fiction*
- Engineering Science 404H — *Analysis in Engineering Science*
- Engineering Science 497E/597E — *Mathematical Software Tools in Engineering Science*

PROFESSIONAL ACTIVITIES

Meetings and Workshops Organized

- Co-chair and co-technical chair for the *43rd Annual Technical Meeting Society of Engineering Science*, held at Penn State University on August 13–16th, 2006.
- *2000 Workshop on Reform of Undergraduate Mechanics Education*, State College, PA, Summer 2000.
- *1998 Workshop on Reform of Undergraduate Mechanics Education*, State College, PA, August 17–18, 1998.
- ASME Workshop on Computing in Undergraduate Mechanics Education, *ASME Mechanics and Materials Conference*, Baltimore, MD, June 12–14, 1996.

[¶]Selected to present her work at the *National Conference on Undergraduate Research*, University of North Carolina in Asheville, April 17–20, 1996.

Society Participation

- Past Division Chair of the Mechanics Division of the *American Society for Engineering Education* (ASEE), 2011–2012.
- Past Division Chair of the Mechanics Division of the *American Society for Engineering Education* (ASEE), 2010–2011.
- Division Chair of the Mechanics Division of the *American Society for Engineering Education* (ASEE), 2009–2010.
- Program Chair of the Mechanics Division of the *American Society for Engineering Education* (ASEE), 2008–2009.
- Member of the *Society for Engineering Science* (SES), 1994–Present.
- Member of the *American Society for Engineering Education* (ASEE), 1993–Present.

Consulting

- Technical Consultant to *The JPM Company* (Lewisburg, PA), 1998–2000.

HONORS

American Society for Engineering Education, *Mechanics Division Best Presentation Award* for “Some Simple Dynamics Demos,” *American Society for Engineering Education Annual Conference & Exposition*, Austin, TX, 2009.

American Society for Engineering Education, *Mechanics Division Best Presentation Award* for “A Problem-Centered Approach to Dynamics,” *American Society for Engineering Education Annual Conference & Exposition*, Pittsburgh, PA, 2008.

American Society for Engineering Education, *Mechanics Division Best Presentation Award* for “The Dynamics Concept Inventory Assessment Test: A Progress Report and Some Results,” *American Society for Engineering Education Annual Conference & Exposition*, Portland, OR, 2005.

American Society for Engineering Education, *Mechanics Division Best Paper Award* for “The Dynamics Concept Inventory Assessment Test: A Progress Report and Some Results,” *American Society for Engineering Education Annual Conference & Exposition*, Portland, OR, 2005.

Penn State Engineering Society Premier Teaching Award, 2002.

American Society of Engineering Education Outstanding New Mechanics Educator Award, 1999.

Penn State Engineering Society Outstanding Teaching Award, 1999.

General Electric Learning Excellence Award, First Prize Winner, 1998.

Penn State Provost’s Collaborative and Curricular Innovations Award, 1998.

Best Paper in Conference at the *Third Annual AAS/AIAA Spaceflight Mechanics Conference* for “A Nonlinear Control Design for Energy Sink Simulation in the Euler-Poinsot Problem,” Pasadena, CA, February 22–24, 1993.

Outstanding Teaching Assistant Award, Engineering Mechanics Department, 1992–93.
Sigma Xi Honor Society, 1992.

NASA/Wisconsin Space Grant Consortium Fellowship, 1991–1992.

University of Wisconsin Assigned Fellowship, 1990–1991.

Harvard University Fellowship, 1985–1986.

Robert M. Morris Scholarship, 1983–1985.

Tau Beta Pi and Pi Tau Sigma Honor Societies, 1984.

Robert B. and Sophia Whiteside Scholarship, 1981–1985.