

Senthil S Vel

Arthur O. Willey Professor
Department of Mechanical Engineering
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Education

Ph.D., Engineering Mechanics	Virginia Tech, Blacksburg, 1998
M.A., Mathematics	University of Pittsburgh, 1996
M.S., Mechanical Engineering	University of Pittsburgh, 1996
B.Tech., Aerospace Engineering	Indian Institute of Technology, Madras, India, 1993

Professional Experience

Arthur O. Willey Professor	Department of Mechanical Engineering, University of Maine, Orono, ME, 7/2007 - present.
Professor	Department of Mechanical Engineering, University of Maine, Orono, ME, 9/2011 - present.
Associate Professor	Department of Mechanical Engineering, University of Maine, Orono, ME, 9/2006 - 8/2011.
Assistant Professor	Department of Mechanical Engineering, University of Maine, Orono, ME, 9/2000-9/2006.
Postdoctoral Researcher	Department of Engineering Science and Mechanics, Virginia Tech, Blacksburg, VA, 1/1999-8/2000.
Graduate Research Assistant	Department of Engineering Science and Mechanics, Virginia Tech, Blacksburg, VA, 8/1996-12/1998.
Graduate Teaching Fellow	Department of Mechanical Engineering, University of Pittsburgh, PA, 8/1993-5/1996.

Honors and Awards

Professor of the Year, Sigma Phi Epsilon, University of Maine, 2006.

American Academy of Mechanics Junior Achievement Award, 2005. The award is given once a year, to one post-graduate researcher, to recognize outstanding research during the first decade of their professional career.

Dean's Award of Excellence, College of Engineering, University of Maine, December 2004.

Award for Outstanding Accomplishments in Teaching by Young Faculty, College of Engineering, University of Maine, October 2003.

CV updated November, 2011

Dean's Award of Excellence, College of Engineering, University of Maine, December 2002.

Dean's list of Outstanding Instructors 1999-2000, College of Engineering, Virginia Tech.

Listed in Who's Who Among America's Teachers, 9th edition, 2004-2005.

Listed in Who's Who in America, 60th Diamond Anniversary Edition, 2006.

Listed in Who's Who in Science and Engineering, 2006-2007.

RESEARCH

Current research interests include

Functionally Graded Materials – Analytical and computational techniques for the transient coupled thermoelastic analysis of functionally graded structures, simulation-based design of advanced material systems, application of mathematical optimization techniques for the design of material composition, microstructure and structural topology.

Computational Mechanics – Application of finite element and meshless methods, multi-scale analysis of composite materials, computational micromechanics, mathematical homogenization of polycrystalline aggregates.

Composite Materials – Development of three-dimensional elasticity solutions for thick composite structures, vibration and dynamic response of composite structures, analysis of sandwich composite structures, tapered sandwich structures, random heterogeneous materials.

Structural Optimization – Application of genetic algorithms for the optimization of composite structures and functionally graded materials, multi-objective optimization techniques for continuous and discrete design variables.

Smart Structures – Analysis and applications of a class of smart structures composed of piezoelectric materials integrated with composite structures, piezothermoelastic analysis of smart structures, structural health monitoring, active vibration suppression using piezoelectric actuators.

Refereed Journal Papers

1. Cook A.C.*, Vel S.S., 2012, Multiscale analysis of laminated plates with integrated piezoceramic fiber composite actuators, *Composite Structures*, **94**(2): 322-336.
2. Naus-Thijssen F.M.J.*, Goupee A.J.*, Johnson S.E., Vel S.S., Gerbi C., 2011, The influence of crenulation cleavage development on the bulk elastic properties and seismic wave velocities of phyllosilicate-rich rocks, *Earth and Planetary Science Letters*, **311**(3-4): 212-224.

*Graduate student co-authors

3. Naus-Thijssen F.M.J.* , Goupee A.J., Vel S.S., Johnson S.E., 2011, The influence of microstructure on seismic wave speed anisotropy in the crust: Computational analysis of quartz muscovite rocks, *Geophysical Journal International*, **185**, 609-621.
4. Vel S.S., 2011. Exact thermoelastic analysis of functionally graded anisotropic hollow cylinders with arbitrary material gradation, *Mechanics of Advanced Materials and Structures*, **18**, 14-31.
5. Vel S.S., 2010. Exact elasticity solution for the vibration of functionally graded anisotropic cylindrical shells, *Composite Structures*, **92**, 2712–2727.
6. Goupee A.J.* , Vel S.S., 2010. Transient multiscale thermoelastic analysis of functionally graded materials, *Composite Structures*, **92**, 1372–1390.
7. Vel S.S., Goupee A.J.* , 2010. Multiscale thermoelastic analysis of random heterogeneous materials. Part I: Microstructure characterization and homogenization of material properties, *Computational Materials Science*, **48**, 22-38.
8. Goupee A.J.* , Vel S.S., 2010. Multiscale thermoelastic analysis of random heterogeneous materials. Part II: Direct micromechanical failure analysis and multiscale simulations, *Computational Materials Science*, **48**, 39-53
9. Vel S.S., Pelletier J.L.* , 2007. Multi-objective optimization of functionally graded thick shells for thermal loading, *Composite Structures*, **81**, 386-400.
10. Goupee A.J.* , Vel S.S., 2007. Multi-objective optimization of functionally graded materials with temperature-dependent material properties, *Materials & Design*, **28**, 1861-1879.
11. Pelletier J.L.* , Vel S.S., 2006. Multi-objective optimization of fiber reinforced composite laminates for strength, stiffness and minimal mass, *Computers & Structures*, **84**, 2065-2080.
12. Goupee A.J.* , Vel S.S., 2006. Optimization of natural frequencies of bidirectional functionally graded structures, *Structural and Multidisciplinary Optimization*, **32**, 473-484.
13. Goupee A.J.* , Vel S.S., 2006. Two-dimensional optimization of material composition of functionally graded materials using meshless analyses and a genetic algorithm, *Computer Methods in Applied Mechanics and Engineering*, **195**, 5926-5948.
14. Pelletier J.L.* , Vel S.S., 2006. An exact solution for the steady-state thermoelastic response of functionally graded orthotropic cylindrical shells, *International Journal of Solids and Structures*, **43**, 1131-1158.
15. Vel S.S., Caccese V., Zhao H.* , 2005. Elastic coupling effects in tapered sandwich panels with laminated anisotropic composite facings, *Journal of Composite Materials*, **39**, 2161-2183.

16. Baillargeon B.P.*, Vel S.S., 2005. Active vibration suppression of sandwich beams using piezoelectric shear actuators: Experiments and numerical simulations, *Journal of Intelligent Material Systems and Structures*, **16**, 517-530.
17. Vel S.S., Baillargeon B.P.*, 2005. Analysis of static deformation, vibration and active damping of cylindrical composite shells with piezoelectric shear actuators, *Journal of Vibration and Acoustics*, **127**, 395-407.
18. Baillargeon B.P.*, Vel S.S., 2005. Exact solution for the vibration and active damping of composite plates with piezoelectric shear actuators, *Journal of Sound and Vibration*, **282**, 781-804.
19. Caccese V., Mewer R.C.*, Vel S.S., 2004. Detection of bolt load loss in hybrid composite/metal bolted connections, *Engineering Structures*, **26**, 895-906.
20. Vel S.S., Mewer R.C.*, Batra R.C., 2004. Analytical solution for the cylindrical bending vibration of piezoelectric composite plates, *International Journal of Solids and Structures*, **41**, 1625-1643.
21. Vel S.S., Batra R.C., 2004. Three-dimensional exact solution for the vibration of functionally graded rectangular plates, *Journal of Sound and Vibration*, **272**, 703-730.
22. Vel S.S., Batra R.C., 2003. Three-dimensional analysis of transient thermal stresses in functionally graded plates, *International Journal of Solids and Structures*, **40**, 7181-7196.
23. Vel S.S., Batra R.C., 2003. Generalized plane strain thermopiezoelectric analysis of multilayered plates, *Journal of Thermal Stresses*, **26**, 353-377.
24. Vel S.S., Batra R.C., 2002. Exact solution for thermoelastic deformations of functionally graded thick rectangular plates, *AIAA Journal*, **40**, 1421-1433.
25. Vel S.S., Batra R.C., 2001. Exact solution for rectangular sandwich plates with embedded piezoelectric shear actuators, *AIAA Journal*, **39**, 1363-1373.
26. Vel S.S., Batra R.C., 2001. Exact solution for cylindrical bending of laminated plates with embedded shear actuators, *Smart Materials and Structures*, **10**, 240-251.
27. Vel S.S., Batra R.C., 2001. Analysis of piezoelectric bimorphs and plates with segmented actuators, *Thin-walled Structures*, **39**, 23-44.
28. Vel S.S., Batra R.C., 2001. Generalized plane strain thermoelastic deformation of laminated anisotropic thick plates, *International Journal of Solids and Structures*, **38**, 1395-1414.
29. Vel S.S., Batra R.C., 2000. Closure to "The generalized plane strain deformations of thick anisotropic composite laminated plates", *International Journal of Solids and Structures*, **38**, 483-489.

30. Vel S.S., Batra R.C., 2000. Three-dimensional analytical solutions for hybrid multi-layered piezoelectric plates, *Journal of Applied Mechanics*, **67**, 558-567.
31. Vel S.S., Batra R.C., 2000. Cylindrical bending of laminated plates with distributed and segmented piezoelectric actuators/sensors, *AIAA Journal*, **38**, 857-867.
32. Vel S.S., Batra R.C., 2000. The generalized plane strain deformations of thick anisotropic composite laminated plates, *International Journal of Solids and Structures*, **37**, 715-733.
33. Vel S.S., Batra R.C., 1999. Analytical solutions for rectangular thick laminated plates subjected to arbitrary boundary conditions, *AIAA Journal*, **37**, 1464-1473.

Citations to Journal Papers

The journal papers listed above have received over 927[†] citations to date with the top 10 papers receiving an average of 65 citations each. The following sequence of papers on exact solutions for functionally graded materials have received the highest number of citations.

Journal Paper	Citations
Vel S.S., Batra R.C., 2002. Exact solution for thermoelastic deformations of functionally graded thick rectangular plates, <i>AIAA Journal</i> , 40 , 1421-1433. [2nd most highly cited paper out of 3,440 papers published in the AIAA Journal from 2000-2010]	146
Vel S.S., Batra R.C., 2004. Three-dimensional exact solution for the vibration of functionally graded rectangular plates, <i>Journal of Sound and Vibration</i> , 272 , 703-730. [7th most highly cited paper out of 6,891 papers published in the Journal of Sound and Vibration from 2000-2010]	134
Vel S.S., Batra R.C., 2003. Three-dimensional analysis of transient thermal stresses in functionally graded plates, <i>International Journal of Solids and Structures</i> , 40 , 7181-7196. [10th most highly cited paper out of 4,344 papers published in the International Journal of Solids and Structures from 2000-2010].	108

Conference papers

1. Vel S.S., Goupee A.J., 2008. Multiscale design of functionally graded materials, Proceedings of the 2008 NSF CMMI Engineering Research and Innovation Conference, Knoxville, Tennessee, January 2008.
2. Vel S.S., Goupee A.J., 2008. Multi-objective optimization of geometric dimensions and material composition of functionally graded components, Proceedings of the Multiscale and Functionally Graded Materials Conference 2006, Honolulu, Hawaii. Editors G. H. Paulino, M.-J. Pindera, R. H. Dodds, Jr., F. A. Rochinha, E. V. Dave, and L. Chen, American Institute of Physics, 978, pp. 610-615, 2008.

[†]Citations data obtained from ISI Web of Science, accessed Nov 20, 2011

3. Vel S.S., Baskiyar R., 2008. Thermally induced stresses in functionally graded thick tubes, Proceedings of the Multiscale and Functionally Graded Materials Conference 2006, Honolulu, Hawaii. Editors G. H. Paulino, M.-J. Pindera, R. H. Dodds, Jr., F. A. Rochinha, E. V. Dave, and L. Chen, American Institute of Physics, 978, pp. 688-693, 2008.
4. Vel S.S., Goupee A.J., Pelletier J.L., 2006. Multi-objective Design Optimization of Functionally Graded Materials, Proceedings of the 2006 NSF Design, Service, and Manufacturing Grantees and Research Conference, St. Louis, Missouri, July 24-27, 2006.
5. Vel S.S., Goupee A.J., 2005. A Methodology for the Optimization of Material Composition of Functionally Graded Materials, Proceedings of the 2005 NSF Design, Service and Manufacturing Grantees and Research Conference, Scottsdale, Arizona, Jan 3-6, 2005.
6. Caccese V., Mewer R.C., Vel, S.S., 2004. Detection of Bolt Load Loss using Frequency Domain Techniques, Proceedings of the 15th International Conference on Adaptive Structures and Technologies, Bar Harbor, Maine, October 24-27, 2004.
7. Vel S.S., Baillargeon B.P., 2004. Active Vibration Suppression of Smart Structures using Piezoelectric Shear Actuators, Proceedings of the 15th International Conference on Adaptive Structures and Technologies, Bar Harbor, Maine, October 24-27, 2004.
8. Goupee A.J., Vel S.S., 2004. Two-dimensional Thermomechanical Analysis and Optimization of Functionally Graded Materials, Advances in Computational and Experimental Engineering and Sciences, Eds. A. Tadeu and Satya N. Atluri, pp. 1705-1710, Tech Science Press.
9. Vel S.S., Baillargeon B.P., 2004. Active Vibration Suppression of Sandwich Beams using Piezoelectric Shear Actuators, Advances in Computational and Experimental Engineering and Sciences, Eds. A. Tadeu and Satya N. Atluri, Tech Science Press, pp. 2093-2098.
10. Baillargeon B.P., Vel S.S., Koplik J.S., 2004. Utilizing ABAQUS to analyze the active vibration suppression of structural systems, Proceedings of ABAQUS Users' Conference, Boston, May 2004.
11. Vel S.S., Batra R.C., 2003. Three-Dimensional Analysis of Transient Thermal Stresses in Functionally Graded Plates, Proc. The 5th Int. Congress on Thermal Stress and Related Topics, June 2003, (L. Librescu and P. Marzocca, Eds.), Paper #MA-2-4.
12. Vel S.S., Caccese V., Zhao H., 2002. Modeling and Analysis of Tapered Sandwich Beams, Proceedings of the American Society for Composites, Seventeenth Technical Conference, Purdue University, October 21-23, 2002.
13. Vel S.S., Batra R.C., 2002. Exact Solution for the Cylindrical Bending Vibration of Functionally Graded Plates, Proceedings of the American Society for Composites, Seventeenth Technical Conference, Purdue University, October 21-23, 2002.

14. Vel S.S., Batra R.C., 2003. Exact thermoelasticity solution for cylindrical bending deformations of functionally graded plates, Proceedings of IUTAM Symposium on Dynamics of Advanced Materials and Smart Structures, Yonezawa, Japan, May 20-24, 2002, Dynamics of Advanced Materials and Smart Structures, Edited by K. Watanabe and F. Ziegler, Kluwer Academic Publishers, Dordrecht.
15. Batra R.C., Vel S.S., 2000. Three-dimensional analysis of thick piezoelectric laminates. Advances in Computational Engineering & Sciences 2000, Volume I, Satya N. Atluri and Frederick W. Brust, editors, pp. 208-213, Tech Science Press.

Technical Reports

1. Vel S.S., Kumar R., 2010. A robotic endoscope for the management of difficult airways, MTI Final Project Report.
2. Singh A., Vel S.S., Caccese V., 2008. Design optimization and fatigue analysis of laser stake welded connections, Project Report, Office of Naval Research, ONR Grant N00014-05-1-0735.
3. Vel S.S., Caccese V., Baillargeon B.P, 2005. Active vibration suppression of composite structures using piezoelectric shear actuators, NASA/MSGC Grant EP-04-07, Final Project Report.
4. Mewer R.C., Vel S.S., 2003. Analysis and structural health monitoring of composite plates with piezoelectric sensors and actuators, NASA/MSGC Grant SG-03-02, Final Project Report.
5. Mewer R.C., Vel S.S., Caccese V., 2003, Detection of bolt stress relaxation in hybrid bolted connections for the MACH program, University of Maine, Department of Mechanical Engineering. Report No. UM-MACH-RPT-01-07.
6. Menchen K., Vel S.S., 2002. Active vibration control of curved composites using piezoelectric actuators, Report to the Maine Space Grant Consortium under the Fellowship and Scholarship Program at the University of Maine.
7. Pelletier J.L., Vel S.S., 2002. Health monitoring of composite structural systems using embedded piezoelectric actuators and sensors, Report to the Maine Space Grant Consortium under the Fellowship and Scholarship Program at the University of Maine.

Conference Presentations and Abstracts

1. Vel S.S., Johnson S.E., Cook A.C., Goupee A.J., Song W.J., Okaya D., Integrated analytical-computational framework for the calculation of bulk elastic properties and seismic wave speeds in polycrystalline materials, GSA Abstracts with Programs, Vol. 43, No. 5, p. 198, 2011 GSA Annual Meeting, Minneapolis, MN, 9–12 October 2011.
2. Okaya D., Johnson S.E., Vel S.S., Christensen N. I., Factors for the use of seismic anisotropy to examine crustal deformation and metamorphism within cratons, GSA Abstracts with Programs, Vol. 43, No. 5, p. 198, 2011 GSA Annual Meeting, Minneapolis, MN, 9–12 October 2011.

3. Johnson S.E., Vel S.S., Gerbi C.C., Cook A.C., Song W.J., Okaya D., Evaluating the effects of shear zone development on seismic anisotropy in the deep cratonic crust: natural examples and computational methods, GSA Abstracts with Programs, Vol. 43, No. 5, p. 198, 2011 GSA Annual Meeting, Minneapolis, MN, 9–12 October 2011.
4. Johnson S.E., Vel S.S., Gerbi C.C., Song W.J., Okaya D.A., Cook A.C., The effects of strain localization and shear zone development on elastic anisotropy at a variety of scales, Penrose Conference on Deformation Localization in Rocks: New Advances, The Geological Society of America, June 27-July 2, 2011, Cap de Creus, Catalonia, Spain.
5. Johnson S.E., Vel S.S., Gerbi C.C., Cook A.C., Song W.J., Naus-Thijssen F.M.J., Goupee A.J., Microscale stress and strain distributions, fabric evolution, and crustal seismic anisotropy, The Interrelationships Between Deformation and Metamorphism, International meeting in honor of Tim Bell, Granada, Spain, May 23-26, 2011.
6. Vel S.S., Johnson S.E., Modelling the bulk elastic properties and seismic anisotropy of polycrystalline materials, Microdynamic Modelling of Ice and related materials conference, May 7-11, 2011, University of Glasgow, Scotland, U.K.
7. Johnson S.E., Naus-Thijssen F.M.J., Vel S.S., Goupee A.J., Okaya D.A., Numerical modeling of microstructural processes and fabric evolution: an essential step in exploring crustal seismic anisotropy, Pardee Symposium on Crustal Tectonic Deformation as Revealed by Seismic Anisotropy, Geological Society of America Annual Meeting, Portland, Oregon, 18-21 October, 2009.
8. Naus-Thijssen F.M.J., Goupee A.J., Johnson S.E., Vel S.S., Computational modeling of rock fabrics: Implications for seismic anisotropy in the Crust, Eos Transactions, American Geophysical Union, Vol. 90, Fall Meeting Supplement, paper no. DI41B-1804, 2009.
9. Vel S.S., Goupee A.J., Simultaneous optimization of structural topology and material composition of functionally graded materials, Multiscale and Functionally Graded Materials Conference 2006, Honolulu, Hawaii, October 15-18, 2006.
10. Vel S.S., Thermoelastic analysis of functionally graded anisotropic tubes with temperature dependent material properties, Multiscale and Functionally Graded Materials Conference 2006, Honolulu, Hawaii, October 15-18, 2006.
11. Vel S.S., Goupee A.J., Optimization of material composition of functionally graded materials, 8th U.S. National Congress on Computational Mechanics, Austin, TX, July 25-27, 2005.
12. Caccese V., Mewer R.C., Vel S.S., Detection of bolt load loss using frequency domain techniques, 15th International Conference on Adaptive Structures and Technologies, Bar Harbor, Maine, October 24-27, 2004.
13. Vel S.S., Baillargeon B.P., Active vibration suppression of smart structures using piezoelectric shear actuators, 15th International Conference on Adaptive Structures and Technologies, Bar Harbor, Maine, October 24-27, 2004.

14. Goupee A.J., Vel S.S., Two-dimensional thermomechanical analysis and optimization of functionally graded materials, 2004 International Conference on Computational and Experimental Engineering and Sciences, July 26-29, 2004, Madeira, Portugal.
15. Vel S.S., Baillargeon B.P., Active vibration suppression of sandwich beams using piezoelectric shear actuators, 2004 International Conference on Computational and Experimental Engineering and Sciences, July 26-29, 2004, Madeira, Portugal.
16. Baillargeon B.P., Vel S.S., Koplik J.S. Utilizing ABAQUS to analyze the active vibration suppression of structural systems, 2004 ABAQUS Users' Conference, Boston, May 25-27, 2004.
17. Vel S.S., Batra R.C., Three-dimensional analysis of transient thermal stresses in functionally graded plates, The 5th International Congress on Thermal Stresses and Related Topics, June 2003, Blacksburg, VA.
18. Vel S.S., Caccese V., Zhao H., Modeling and analysis of tapered sandwich beams, Proceedings of the American Society for Composites, 17th Technical Conference, Purdue University, October 21-23, 2002.
19. Vel S.S., Batra R.C., Exact solution for the cylindrical bending vibration of functionally graded plates, Proceedings of the American Society for Composites, 17th Technical Conference, Purdue University, October 21-23, 2002.
20. Vel S.S., Batra R.C., Generalized plane strain thermopiezoelectric analysis of multilayered plates, 14th U.S. National Congress of Theoretical and Applied Mechanics, Blacksburg, VA, June 23-28, 2002.
21. Vel S.S., Batra R.C., Three-dimensional exact solution for the vibration of functionally graded rectangular plates, 14th U.S. National Congress of Theoretical and Applied Mechanics, Blacksburg, VA, June 23-28, 2002.
22. Vel S.S., Batra R.C., Exact solution for cylindrical thermoelastic deformations of functionally graded thick plates, IUTAM Symposium on Dynamics of Advanced Materials and Smart Structures, Yonezawa, Japan, May 20-24, 2002.
23. Vel S.S., Batra R.C., Exact thermoelasticity solution for functionally graded thick rectangular plates, 6th U.S. National Congress on Computational Mechanics, Dearborn, MI, July 31-Aug 4, 2001.
24. Vel S.S., Batra R.C., Exact solution for rectangular sandwich plates with embedded piezoelectric shear actuators, 2001 Mechanics and Materials Summer Conference, San Diego, CA, June 27-29, 2001.
25. Vel S.S., Batra R.C., Analytical solutions for the cylindrical bending of hybrid laminates: statics and vibration, 4th ARO Workshop on Smart Structures, Penn State, University Park Campus, August 16-18, 1999.

26. Vel S.S., Batra R.C., Analytical solutions for the generalized plane state of deformation of piezothermoelastic laminated plates, Symposium on Coupled Field Problems in Smart Structures. 1999 ASME Mechanics and Materials Conference, Blacksburg, June 27-30, 1999.
27. Vel S.S., Batra R.C., Analytical solutions for the deformation of rectangular laminated plates subjected to arbitrary boundary conditions, Symposium on Recent Developments in Anisotropic Elasticity. 1999 ASME Mechanics and Materials Conference, Blacksburg, June 27-30, 1999.
28. Vel S.S., Batra R.C., The cylindrical bending of a laminated elastic plate due to piezoelectric actuators, 13th U. S. National Congress of Applied Mechanics, University of Florida, Gainesville, June 1998.
29. Vel S.S., Batra R.C., Cylindrical bending vibration of a clamped elastic plate due to PZT actuators, McNU'97, The 1997 Joint Summer Meeting of ASME, ASCE and SES, Northwestern University, Evanston, June 1997.

Other Professional Presentations

1. "Structural system monitoring using embedded piezoelectric sensors", NASA Langley Research Center, Hampton, VA, February 23, 2001.

Grants and Contracts

1. Integrated analytical-computational analysis of microstructural influences on seismic anisotropy, **National Science Foundation**, Co-PI with Scott E. Johnson (PI), Chris Gerbi (Co-PI) and Andrew Goupee (Co-PI), \$383,171.
2. Collaborative Research: Multiscale analysis of geological structures that influence crustal seismic anisotropy, **National Science Foundation**, PI with S.E. Johnson (Co-PI) in collaboration with D. Okaya at the University of Southern California, 7/1/10-7/1/12, total project budget \$356,000 including the UMaine budget of \$195,003.
3. Development of a self-guiding robotic intubation device, **Maine Technology Institute**, PI, \$27,160, 3/30/09-2/15/10.
4. Developing of a Lunar Outpost Wireless Monitoring & Analysis System (LOWMAS), **NASA** through Maine Space Grant Consortium, \$179,985, Co-PI with V. Caccese (PI), 5/2007-4/2009.
5. Laser Welded Steel Sandwich Panel Bridge Deck Development, Evaluation and Test Plan, **Maine DOT** through PLSystems Incorporated, Co-PI with V. Caccese (PI), \$85,000, 5/2007-4/2008.
6. Structural integrity and optimal design of rigidizable and inflatable systems for the NASA lunar habitat, **Maine Space Grant Consortium**, \$79,898, Co-PI with V. Caccese (PI), 12/2006-12/2007.

7. Structural response of hybrid ship connections subjected to fatigue loads, **Office of Naval Research**, Arlington, Virginia, \$1,040,809, Co-PI with V. Caccese (PI), 7/2005-7/2008.
8. Design of functionally graded materials using transient nonlinear simulations and genetic algorithm optimization, **National Science Foundation**, Arlington, Virginia, \$276,076, Principal Investigator: S. Vel, 8/2004-8/2007.
9. Active vibration suppression of composite structures using piezoelectric shear actuators, **NASA** through Maine Space Grant Consortium, Washington, D.C., \$114,442, PI with V. Caccese (Co-PI), 2/2002-4/2005.
10. Modular advanced composite hull-form (MACH) technology, **Office of Naval Research**, Arlington, Virginia, \$3,967,634, Co-PI with V. Caccese, 7/2001-6/2005.

TEACHING AND ADVISING

Undergraduate Courses Taught and Teaching Evaluations

Course Number	Course	Semester	Enrollment	Overall Rating of Instructor [§]
MEE 150	Applied Mechanics: Statics	Fall 2001	45	4.25
		Spring 2002	41	4.75
MEE 252	Statics and Strength of Materials	Fall 2000	24	4.74
		Fall 2002	22	4.47
MEE 370	Modeling, Analysis and Control of Mechanical Systems	Fall 2003	51	4.73
		Fall 2004	38	4.69
		Fall 2005	36	4.88
		Fall 2006	35	4.73
		Fall 2008	35	4.67
		Fall 2009	50	4.79
		Fall 2010	63	4.43
MEE 381	Design II: Machine Design	Spring 2001	32	4.58
		Spring 2002	31	4.54
		Spring 2003	38	4.42
		Spring 2004	44	4.68
		Spring 2005	41	4.47
		Spring 2006	43	4.79
		Spring 2007	32	4.83
		Spring 2008	45	4.58
		Spring 2009	40	4.97
		Spring 2010	52	4.75
		Spring 2011	64	4.64
MEE 450	Introduction to the Mechanics of Composite Materials	Spring 2001	39	4.81
		Fall 2002	34	3.85
		Fall 2003	24	4.80

§ Scale ranges from 1 (poor) to 5 (excellent)

Graduate Courses Taught and Teaching Evaluations

Course Number	Course	Semester	Enrollment	Overall Rating of Instructor[§]
MEE 550	Mechanics of Laminated Composite Structures	Spring 2003	4	4.50
		Spring 2005	2	5.00
		Spring 2007	5	5.00
		Spring 2009	7	4.71
		Fall 2010	3	5.00
MEE554	Theory of Elasticity	Fall 2002	12	4.67
		Spring 2004	6	5.00
		Spring 2006	7	4.71
		Spring 2008	9	5.00
		Fall 2009	7	5.00
MEE557	Continuum Mechanics	Fall 2005	16	4.12
MEE 500	Research Methods	Summer 2006	9	-

§ Scale ranges from 1 (poor) to 5 (excellent)

Graduate Advising

Ph.D. students

1. Jacob L. Pelletier, “Multiscale analysis of heterogeneous materials”, expected 2013.
2. Alden C. Cook, “Nonlinear analysis of heterogeneous materials”, expected 2014.
3. Andrew J. Goupee, “Multiscale investigation of random heterogeneous media in materials and earth sciences”, Graduated May 2010. Co-authored 3 refereed journal papers and 2 conference papers. Placement: Research Assistant Professor, AEWCA Advanced Composites and Structures Center, University of Maine.

M.S. students

1. Jeffrey Poirier, “Analysis and optimization of laser welded steel sandwich panels for static and dynamic loads”, December 2011.
2. Alden C. Cook, “Multiscale piezothermoelastic analysis of smart composite materials”, May 2011, Currently pursuing doctoral studies at the University of Maine under my supervision.
3. Anshuman Singh, “Analysis and design optimization of laser stake welded connections”, May 2008. Placement: Engineer, General Electric.

4. Andrew J. Goupee, “Methodology for the thermomechanical simulation and optimization of functionally graded materials”, August 2005. Co-authored 3 refereed journal papers and 2 conference papers. Placement: Continuing towards Ph.D. at UMaine.
5. Jacob L. Pelletier, “Thermoelastic analysis and optimization of functionally graded plates and shells”, August 2005. Co-authored 3 refereed journal papers and 1 conference paper. Placement: Entrepreneur, North Berwick, Maine. Currently pursuing doctoral studies at the University of Maine under my supervision.
6. Brian P. Baillargeon, “Active vibration suppression of smart structures using piezoelectric shear actuators”, December 2003. Co-authored 3 refereed journal papers and 3 conference papers. Placement: Applications Engineer at ABAQUS, Warwick, Rhode Island.
7. Richard C. Mewer, “Analysis and structural health monitoring of composite plates with piezoelectric sensors and actuators”, May 2003. Co-authored 2 refereed journal papers and 1 conference paper. Placement: Engineer, Portsmouth Naval Shipyard, Portsmouth, NH.
8. Huyue Zhao, “Stress analysis of tapered sandwich panels with isotropic or laminated composite facings”, December 2002. Co-authored 1 refereed journal paper and 1 conference paper. Placement: Ph.D. student at Northwestern University, Evanston, Illinois.

Postdoctoral Researchers

1. Dr. Takkee Lee, “Water impact analysis of composite materials for WIG craft”, Summer 2006.

Undergraduate Advising and Supervision

Honors Thesis Advising

1. Luke Saindon, “Project URSA: Sounding rocket thrust control system” Mechanical Engineering, May 2012.
2. Ben Lakin, Mechanical Engineering, “Modeling a snowmobile engine control unit in Simulink”, May 2007.
3. Jonathan Susee, Engineering Physics, “Sensor Package for Lake and Stream Hydrology”, May 2004.

Supervision of Undergraduate Student on Research Projects

1. Mary Girard
2. Katherine Verplanck
3. Gregory Bogan

4. Brian Baillargeon
5. Jacob L. Pelletier
6. Simon Weiss (NSF REU program)

Academic advising

Served as academic advisor for 22 Mechanical Engineering undergraduate students from 2005-2009.

SERVICE

National/International Technical Committees

Member - International Scientific Committee, Multiscale and Functionally Graded Materials Conference 2006, Hawaii, Oct 15-18, 2006.

Conferences Organized/Co-organized

Co-organized the 15th International Conference on Adaptive Structures and Technologies (ICAST 2004) with Daniel J. Inman (Virginia Tech), Bar Harbor, Maine, October 24-27, 2004.

Mini-symposia Organized

- Organized the mini-symposium on Design of Material Composition Distribution, Multiscale and Functionally Graded Materials Conference 2006, Honolulu, Hawaii, Oct 15-18, 2006.
- Organized the mini-symposium on Recent Advances in Functionally Graded Materials, 8th U.S. National Congress on Computational Mechanics, Austin, TX, July 25-27, 2005.

Conference Sessions Chaired

- Chair for two sessions at the Multiscale and Functionally Graded Materials Conference, Honolulu, Hawaii, Oct 15-18, 2006.
- Co-chair for two sessions at the 8th U.S. National Congress on Computational Mechanics, Austin, Texas, July 25-27, 2005
- Co-chair for a session at the 15th International Conference on Adaptive Structures and Technologies (ICAST 2004), Bar Harbor, Maine, October 24-27, 2004.
- Co-chair for a session at 14th U.S. National Congress of Theoretical and Applied Mechanics, Blacksburg, Virginia, June 23-28, 2002.
- Co-chair for two sessions at the 6th U.S. National Congress on Computational Mechanics, July 31-Aug 4, 2001, Dearborn, Michigan.

Proposal and Panel Reviews

- Served on National Science Foundation Review Panel, 2007.
- Reviewed a proposal for the Indo-US Science and Technology Forum, 2007.
- Reviewed a proposal for the U.S. Army Research Office, 2006.
- Site visitor and panelist for a major NSF Engineering Research Center proposal, 2005.
- Reviewed a proposal for the U.S. Civilian Research and Development Foundation (CRDF), 2005.
- Served on National Science Foundation Review Panel, 2005.
- Reviewed a proposal for the Chemical and Transport Systems (CTS) program, National Science Foundation, 2004.
- Reviewed a proposal for the Air Force Office of Scientific Research, 2003.
- Served on National Science Foundation Review Panel, 2002.

Journal and Conference Papers Reviews

Reviewer for the following journals,

- AIAA Journal
- Arabian Journal for Science and Engineering
- ASCE Journal of Engineering Mechanics
- ASME Journal of Applied Mechanics
- Composite Structures
- European Journal of Mechanics-A/Solids
- International Journal of Mechanical Sciences
- International Journal of Solids and Structures
- Journal of Engineering Mathematics
- Journal of Intelligent Material Systems and Structures
- Journal of Sound and Vibration
- Journal of Thermal Stresses
- Journal of Vibration and Control
- Materials
- Mathematical Problems in Engineering
- Mathematics and Mechanics of Solids
- Meccanica
- Proceedings of the Royal Society of London. Series A, Mathematical and Physical Sciences
- The Shock and Vibration Digest

Departmental and College Service

- Graduate Coordinator, 1/2008 – 5/2011
- Organized the weekly MEE Graduate Seminar series, 1/2008 - 5/2011

- Mechanical Engineering Chair search committee, 2006-2007
- Chair of the Ad-hoc Computer Committee (College of Engineering), 2006.
- Electrical Engineering Faculty Search Committee, 2006.
- Mechanical Engineering Faculty Search Committee, 2003 and 2005.
- Mechanical Engineering Curriculum Committee, 2002-date.
- Bridge Professorship selection committee, 2007.
- Chaired a working committee to look into the possibility of combining some of the Control Systems courses offered the College of Engineering into a single course or to develop modulus to serve multiple departments, 2008.
- Taught 2-hr review sessions of Dynamics for the Fundamentals of Engineering exam. Spring 2003-2006 and Fall 2006.

Service to the University of Maine

- Graduate Board Executive Committee, College of Engineering representative, 1/2008-5/2011.
- Graduate Board, 1/2008-5/2011

Membership in Professional Societies

- American Society of Mechanical Engineering
- American Academy of Mechanics
- American Geophysical Union