

Arnold Lumsdaine

lumsdainea@ornl.gov

ACADEMIC EXPERIENCE

- University of Tennessee, Knoxville, TN.** **2014-present**
Faculty Member, Bredesen Center for Interdisciplinary Research and Graduate Education.
- University of Tennessee, Knoxville, TN.** **2001-2007**
Associate Professor, Mechanical Engineering.
- University of Texas-Pan American, Edinburg, TX.** **1996-2001**
Assistant Professor, Mechanical Engineering. On leave of absence from August 1997–August 1998

PROFESSIONAL EXPERIENCE

- Oak Ridge National Laboratory, Oak Ridge, TN.** **2009-present**
- Senior R&D Engineer, Fusion Energy Division. Lead engineering role for design and analysis of high heat flux divertor components, high field electromagnetic coils, radio frequency launchers, high vacuum vessels, plasma facing systems, and other components in domestic and international collaborations related to fusion energy research projects.
- Agilent Technologies, Oak Ridge, TN (after acquisition of MTS Nano Instruments).** **2008-2009**
- Manager, Strategic Planning and Product Development. Responsible for developing and implementing business strategy, planning and managing the development of new products, maintaining intellectual property portfolio, overseeing research programs and academic partnerships, and developing finite element tools.
- MTS Nano Instruments, Oak Ridge, TN.** **2007-2008**
- R&D Manager. Responsible for establishing and managing research programs and personnel, maintaining intellectual property portfolio (including patent application and litigation support), launching and managing process for new product development, participating in international and domestic testing standards committees, attending academic conferences and investigating funding and partnership opportunities.
- Ford Motor Company, C3P Education and Training, Dearborn, MI.** **1997-1998**
- Senior Training Specialist. (On leave of absence from the University of Texas–Pan American). Trained Ford designers, CAE analysts, manufacturing engineers, product engineers, and managers in the I-DEAS CAD/CAM/CAE and Metaphase PDM software. Was responsible for developing course material. Training involved classroom instruction as well as on the job instruction.
- Ford Motor Company, Dearborn, MI.** **1992-1997**
- Continuing Education Consultant. Taught a continuing education course in vibrations for Ford Motor Company engineers. The sixteen-hour course was taught four times a year.
- Ford Motor Company, Dearborn, MI.** **1986-1994**
- Mechanical Engineering summer intern. Completed a variety of analysis, design, and programming projects.

EDUCATION

- Ph.D. in Mechanical Engineering, University of Michigan, Ann Arbor** **May 1996**
M.S.E. in Mechanical Engineering, University of Michigan, Ann Arbor **May 1991**
B.S.E. in Mechanical Engineering, University of Michigan, Ann Arbor **December 1989**

PUBLICATIONS

1. H. Hölbe, T. Sunn Pedersen, J. Geiger, S. Bozhenkov, R. König, Y. Feng, J. Lore, and A. Lumsdaine, "Access to Edge Scenarios for Testing a Scraper Element in Early Operation Phases of Wendelstein 7-X," Nuclear Fusion, in press.
2. A. Lumsdaine, J. Rapp, V. Varma, T. Bjorholm, C. Bradley, J. Caughman, R. Duckworth, R. Goulding, V. Graves, D. Giuliano, T. Lessard, D. McGinnis, and S. Meitner, "Pre-Conceptual Design Activities for the Materials Plasma Exposure Experiment," Fusion Engineering and Design, submitted September 2015.
3. J. Boscary, H. Greuner, G. Ehrke, B. Böswirth, Z. Wang, E. Clark, A. Lumsdaine, J. Tretter, D. McGinnis, J. Lore, and K. Ekici, "Prototyping Phase of the High Heat Flux Scraper Element of Wendelstein 7-X," Fusion Engineering and Design, submitted July 2015.
4. R. Duckworth, J. Demko, A. Lumsdaine, J. Rapp, T. Bjorholm, R. Goulding, J. Caughman, and W. McGinnis, "Cryogenic Considerations for Superconducting Magnet Design for the Material Plasma Exposure Experiment," IOP Conf. Series: Materials Science and Engineering, Vol. 101, 2015. doi:10.1088/1757-899X/101/1/012143
5. A. Lumsdaine, T. Bjorholm, J. Boscary, E. Clark, K. Ekici, J. Fellingner, J. Harris, H. Hölbe, J. Lore, D. McGinnis, G. Neilson, P. Titus, J. Tretter, and G. Wurden, "Overview of Design and Analysis Activities for the W7-X Scraper Element," IEEE Transactions on Plasma Science, submitted July 2015.
6. E. Clark, K. Ekici, A. Lumsdaine, C. Barbier, J. Harris, D. McGinnis, J. Lore, J. Boscary, and J. Tretter, "Turbulence Modeling Effects on Single- and Two-Phase Thermal-Fluid Simulations of the W7-X Actively Cooled Scraper Element," IEEE Transactions on Plasma Science, submitted July 2015.
7. J. Rapp, T.M. Biewer, T.S. Bigelow, J.B.O. Caughman, R.C. Duckworth, R.J. Ellis, D. Giuliano, R.H. Goulding, D.L. Hillis, R. Howard, T.L. Lessard, J.D. Lore, A. Lumsdaine, E. Martin, W.D. McGinnis, S.J. Meitner, L.W. Owen, H. Ray, G. Shaw, V. Varma and the MPEX team, "The Development of the Material Plasma Exposure eXperiment MPEX," IEEE Transactions on Plasma Science, submitted July 2015.
8. E. Clark, A. Lumsdaine, J. Boscary, K. Ekici, J. Harris, D. McGinnis, J. Lore, A. Peacock, and J. Tretter, "Multiphysics Analysis of the Wendelstein 7-X Actively Cooled Scraper Element," Fusion Science and Technology, Vol. 68, No. 3, pp. 635-639 2015.
9. P. Titus, H. Zhang, A. Lumsdaine, D. McGinnis, J. Lore, H. Neilson, T. Brown, J. Boscary, A. Peacock, and J. Fellingner, "Analysis of the Wendelstein 7-X Test Divertor Unite Scraper Element With Radiation Shields," Fusion Science and Technology, Vol. 68, No. 2, pp. 272-276, 2015.
10. C. Luttrell, E. Coffey, T. Bigelow, G. Hanson, A. Lumsdaine, A. Melin, D. Rasmussen, and C. Schaich, "Analysis of the ITER ECH Transmission Line Waveguide Coupling," Fusion Science and Technology, Vol. 86, No. 2, pp. 402-406, 2015.
11. E. Coffey, T. Bigelow, G. Hanson, A. Lumsdaine, C. Luttrell, D. Rasmussen, and C. Schaich, "Analysis of Cooling for the ITER ECH Waveguide Transmission Line," Fusion Science and Technology, Vol. 68, No. 2, pp 383-387, 2015.
12. A. Lumsdaine, J. Boscary, J. Fellingner, J. Harris, H. Hölbe, R. König, J. Lore, D. McGinnis, H. Neilson, P. Titus, J. Tretter, "Design of the Wendelstein 7-X Inertially Cooled Test Divertor Unit Scraper Element," Fusion Engineering and Design, Vol. 98-99, pp.1357-1361, 2015.
13. J. Boscary, J. Lore, A. Lumsdaine, M. Maier, D. McGinnis, A. Peacock, J. Tretter, "Development Activities of the High Heat Flux Scraper Element," Fusion Engineering and Design, Vol. 98-99, pp.1231-1234, 2015.
14. A. Lumsdaine, J. Boscary, E. Clark, K. Ekici, J. Harris, D. McGinnis, J. Lore, A. Peacock, J. Tipton, and J. Tretter, "Modeling and Analysis of the W7-X Divertor Scraper Element," IEEE Transactions on Plasma Science, Vol. 42, pp. 545-551, 2014.

15. J. Lore, T. Andreeva, J. Boscary, S. Bozhenkov, J. Geiger, J. Harris, H. Hoelbe, A. Lumsdaine, D. McGinnis, A. Peacock, and J. Tipton, "Design and Analysis of Divertor Scraper Elements for the W7-X Stellarator," IEEE Transactions on Plasma Science, Vol. 42, pp. 539-544, 2014.
16. H.-S. Bosch, R.C.Wolf, T. Andreeva, J.Baldzuhn, D. Birus, T. Bluhm, T. Bräuer, H. Braune, V. Bykov, A. Cardella, F. Durodié, M. Endler, V. Erckmann, G. Gantenbein, D. Hartmann, D. Hathiramani, P. Heimann, B. Heinemann, C. Hennig, M. Hirsch, D. Holtum, J. Jagielski, J. Jelonnek, W. Kasperek, T. Klinger, R. König, P. Kornejew, H. Kroiss, J.G. Krom, G. Kühner, H. Laqua, H.P. Laqua, C. Lechte, M. Lewerentz, J. Maier, P. McNeely, A. Messiaen, G. Michel, J. Ongena, A. Peacock, T.S. Pedersen, R. Riedl, H. Riemann, P. Rong, N. Rust, J. Schacht, F. Schauer, R. Schroeder, B. Schweer, A. Spring, A. Stäbler, M. Thumm, Y. Turkin, L. Wegener, A. Werner, D. Zhang, M. Zilker, A. Lumsdaine, et al, "Technical Challenges in the Construction of the Steady-State Stellarator Wendelstein 7-X," Nuclear Fusion, Vol. 53, 2013.
17. J Geiger, R C Wolf, C Beidler, A Cardella, E Chlechowicz, V Erckmann, G Gantenbein, D Hathiramani, M Hirsch, W Kasperek, J Kißlinger, R Konig, P Kornejew, H P Laqua, C Lechte, J Lore, A Lumsdaine, H Maaßberg, N B Marushchenko, G Michel, M Otte, A Peacock, T Sunn Pedersen, M Thumm, Y Turkin, A Werner, D Zhang, "Aspects of Steady-State Operation of the Wendelstein 7-X Stellarator," Plasma Physics and Controlled Fusion, Vol. 55, 2013.
18. A. Lumsdaine, J. Tipton, J. Lore, D. McGinnis, J. Canik, J. Harris, A. Peacock, J. Boscary, J. Tretter, T. Andreeva, "Design and Analysis of the W7-X Divertor Scraper Element," Fusion Engineering and Design, Vol. 88, pp. 1773-1777, 2013.
19. C. Wong, M. Abdou, Y. Katoh, R. Kurtz, A. Lumsdaine, E. Marriott, B. Merrill, N. Morley, B. Pint, M. Sawan, S. Smolentsev, B. Williams, S. Willms, and M. Youssef, "Progress on DCLL Blanket Concept," Fusion Science and Technology, Vol. 64, No. 3, pp. 632-630, 2013.
20. J. Lore, T. Andreeva, J. Boscary, J. Canik, J. Geiger, J. Harris, A. Lumsdaine, D. McGinnis, A. Peacock, and J. Tipton, "Heat Flux and Design Calculations for the W7-X Divertor Scraper Element," Proceedings of the 24th IAEA Fusion Energy Conference, San Diego, CA, October 2012.
21. J. Rapp, T. Biewer, J. Canik, R. Goulding, D. Hillis, J. Lore, L. Owen, M. Peng, J. Caughman, S. Diem, A. Lumsdaine, S. Milora, D. McGinnis, S. Meitner, and G. Chen, "An Advanced Plasma-Material Test Station for R&D on Materials in a Fusion Environment," Proceedings of the 24th IAEA Fusion Energy Conference, San Diego, CA, October 2012.
22. A. Lumsdaine, J. Tipton, and M. Peng, "Thermal Fluid Multiphysics Optimization of Spherical Tokamak Centerpost," Fusion Engineering and Design, Vol. 87, No. 7-8, pp. 1190-1194, 2012.
23. A. Lumsdaine and M. Peng, "Structural Analysis of an Optimally Designed Spherical Tokamak Centerpost," IEEE Transactions on Plasma Science, Vol. 40, No. 9, pp. 2290-2295, 2012.
24. M. Peng, J. Canik, S. Diem, S. Milora, J. M. Park, A. Sontag, P. J. Fogarty, A. Lumsdaine, M. Murakami, T. Burgess, M. Cole, Y. Katoh, K. Korsah, B. Patton, J. Wagner, G. Yoder, III, R. Stambaugh, G. Staebler, M. Kotschenreuther, P. Valanju, S. Mahajan, and M. Sawan "Fusion Nuclear Science Facility (FNSF) Before Upgrade to Component Test Facility (CTF)," Fusion Science and Technology, Vol. 60, no. 2, 2011.
25. M. Peng, J. Park, J. Canik, S. Diem, A. Sontag, A. Lumsdaine, Y. Katoh, R. Burgess, K. Korsah, B. Patton, J. Wagner, P. Fogarty, and M. Sawan, "Fusion Nuclear Science Facility (FNSF) Motivation and Required Capabilities," Proceedings of the IEEE/NPSS 24th Symposium on Fusion Engineering (SOFE), Chicago, IL, June 2011.
26. E. Herbert, W. Oliver, A. Lumsdaine, and G. Pharr, "Measuring the Constitutive Behavior of Viscoelastic Solids in the Time and Frequency Domain Using Flat Punch Nanoindentation," Journal of Materials Research, Vol. 24, No. 3, pp. 626-637, 2009.
27. S.-J. Tang and A. Lumsdaine, "Analysis of Constrained Damping Layers, Including Normal-Strain Effects," AIAA Journal, Vol. 46, No. 12, pp. 2998-3011, 2008.
28. J. Drenckhan, A. Lumsdaine, and M. Parsons, "Topology Optimization of a Piezoelectric Actuator on an Elastic Beam," Journal of Intelligent Material Systems and Structures, Vol. 19, No. 4, pp. 445-455, 2008.

29. J.F. Lyon, B.E. Nelson, R.D. Benson, L.A. Berry, M.J. Cole, P.J. Fogarty, K.D. Freudenberg, P.L. Goranson, J.H. Harris, P. Heitzenroeder, A.D. Lumsdaine, M.A. Madhukar, G.H. Neilson, T.E. Shannon, and D.A. Spong, "Recent Advances in Design and R&D for the Quasi-Poloidal Stellarator Experiment," Fusion Engineering and Design, Vol. 82, No. 5-14, pp. 575-582, October 2007.
30. A. Elalfy, A. Lumsdaine, M. Parsons, T. Thundat, "Energy Harvesting Using Microcantilevers," Proceedings of the SPIE 14th Annual Symposium on Smart Structures and Materials, San Diego, CA, February 2007.
31. M. Damu and A. Lumsdaine, "Determination of Optimal Orientations and Volume Fractions of Nanotubes in a Polymer for Vibration Damping," Proceedings of the Adaptive Structures and Material Systems Symposium of the 2006 ASME International Mechanical Engineering Congress and Exposition, Chicago, IL, November 2006.
32. S.-J. Tang and A. Lumsdaine, "Analysis and Optimization of Partial Constrained Damping Layers," Proceedings of the Adaptive Structures and Material Systems Symposium of the 2006 ASME International Mechanical Engineering Congress and Exposition, Chicago, IL, November 2006.
33. A. Lumsdaine, F. Speckhart, R. Sawhney, K. Kahn, M. Keyhani, G. Robson, M. Parang, "The MS-MBA Dual Degree Program: An Integrated Engineering and Business Approach to Product Development," Proceedings of the ASEE Annual Meeting, Chicago, IL, June 2006.
34. M. Parsons and A. Lumsdaine, "Active Vibration Control with Optimized Piezoelectric Topologies," Proceedings of the SPIE 13th Annual Symposium on Smart Structures and Materials, San Diego, CA, February 2006.
35. M. Damu and A. Lumsdaine, "Topology Optimization of Carbon Nanotube Reinforced Damping Layers," Proceedings of the Adaptive Structures and Material Systems Symposium of the 2005 ASME International Mechanical Engineering Congress and Exposition, Orlando, FL, November 2005.
36. B. Nelson, R. Benson, L. Berry, A. Brooks, M. Cole, P. Fogarty, K. Freudenberg, P. Goranson, T. Hargrove, P. Heitzenroeder, S. Hirshman, G. Jones, G. Lovett, A. Lumsdaine, J. Lyon, M. Madhukar, P. Mioduszewski, G. Neilson, M. Parang, T. Shannon, D. Spong, D. Strickler, and D. Williamson, "Engineering Design Status of the Quasi-Poloidal Stellarator (QPS)," Proceedings of the 21st IEEE/NPSS Symposium of Fusion Engineering, Knoxville, TN, September 2005.
37. F. Speckhart, D. Fant, M. Parang, A. Lumsdaine, G. Robson, and K. Kahn, "The Combined MS-MBA Program: An Integrated Engineering and Business Approach to Product Development," submitted to the ASEE Southeast Section Annual Conference, Chattanooga, TN, April, 2005.
38. M. Damu, A. Lumsdaine and M. Parsons, "Optimization of Carbon Nanotube Reinforced Composite Laminated Structures for Vibration Damping," Proceedings of the SPIE 12th Annual Symposium on Smart Structures and Materials, San Diego, CA, March 2005.
39. M. Parsons, A. Lumsdaine, and J. Jiang, "Topology Optimization Of Active Control Vibration Damping Layers," Proceedings of the SPIE 12th Annual Symposium on Smart Structures and Materials, San Diego, CA, March 2005.
40. Hamel, W., Kim, S., Zhou, R., Lumsdaine, A., Brown, K., Sridharan, S., and Ganti, K., "Design and Testing of a Prototype Transmission-based Robot Servoactuator," Proceedings of the 2004 IEEE International Conference on Robotics and Automation, New Orleans, LA, September 2004.
41. J. Boulet, A. Lumsdaine, and J. Wasserman, "The Transition from Textbook Problems to Realistic Problems," Proceedings of the ASEE Annual Meeting, Salt Lake City, UT, June 2004.
42. R. Pai, A. Lumsdaine, and M. Parsons, "Design and Fabrication of Optimal Constrained Layer Damping Topologies," Proceedings of the SPIE 11th Annual Symposium on Smart Structures and Materials, San Diego, CA, 2004.
43. W. Hamel, S. Kim, R. Zhou, and A. Lumsdaine, "Dynamic Modeling and Analysis of a Transmission-based Robot Servoactuator," Proceedings of the 2003 IEEE International Conference on Robotics and Automation, Taipei, Taiwan, September 2003.
44. A. Lumsdaine and R. Pai, "Design of Constrained Layer Damping Topologies," Proceedings of the Adaptive Structures and Material Systems Symposium of the 2003 ASME International Mechanical Engineering Congress and Exposition, Washington, D.C., 2003.

45. A. Lumsdaine and N. Ratchukool, "Multimedia Tutorials for Drawing Shear Force and Bending Moment Diagrams," Proceedings of the ASEE Annual Meeting, Nashville, TN, 2003.
46. R. Jendruko, R. Bennet, T. Boulet, J. Iannelli, A. Lumsdaine and J. Wasserman, "The Use of Asynchronous Web Modules for Review and Just-in-time Learning of Mechanics," Proceedings of the ASEE Annual Meeting, Nashville, TN, 2003.
47. J. Drenckhan and A. Lumsdaine, "Design of a Piezoelectric Actuator Using Topology Optimization," Proceedings of the SPIE 10th Annual Symposium on Smart Structures and Materials, San Diego, CA, 2003.
48. A. Lumsdaine, "Topology Optimization of Constrained Damping Layer Treatments," Proceedings of the Adaptive Structures and Material Systems Symposium, 2002 ASME International Mechanical Engineering Congress and Exposition, New Orleans, LA, 2002.
49. D. Delgado, A. Fuentes, R. Jones, and A. Lumsdaine, "Quantitative Determination of the Stability of Implant Bone Interface Using Resonance Frequency Analysis," Proceedings of the ASME International Mechanical Engineering Congress and Exposition, 2002 ASME International Mechanical Engineering Congress and Exposition, New Orleans, LA, 2002.
50. A. Lumsdaine, "Modeling of Active Constrained Layer Damping Structures Using a Commercial Finite Element Code," Proceedings of the ASME International Mechanical Engineering Congress and Exposition, 2001 ASME International Mechanical Engineering Congress and Exposition, New York, NY, 2001.
51. A. Garcia, A. Lumsdaine, and Y. Yao, "Comparison of Static and Dynamic Stiffness for Beams Undergoing Flexural and Torsional Loading with an Intermediate Mass", Proceedings of the ASME Noise Control and Acoustics Division, pp. 461-469, 2000 ASME International Mechanical Engineering Congress and Exposition, Orlando, FL, 2000.
52. A. Lumsdaine, A. Garcia, and Y. Yao, "Shape Optimization of Isotropic Composite Beams Undergoing Harmonic Flexural and Torsional Loading," Proceedings of the ASME Noise Control and Acoustics Division, pp. 237-245, 1999 ASME International Mechanical Engineering Congress and Exposition, Nashville, TN, 1999.
53. A. Garcia, A. Lumsdaine, and Y. Yao, "Optimization of an Automotive Structure Subject to Harmonic Excitation," Proceedings of the ASME Noise Control and Acoustics Division, pp. 217-222, 1999 ASME International Mechanical Engineering Congress and Exposition, Nashville, TN, 1999.
54. A. Lumsdaine and R.A. Scott, "Shape Optimization of Unconstrained Viscoelastic Layers Using Continuum Finite Elements," Journal of Sound and Vibration, Vol. 216, No. 1, pp. 29-52, 1998.
55. A. Lumsdaine and R.A. Scott, "Parameter Studies in the Optimal Design of Unconstrained Beam Damping Layer Treatments," Proceedings of the ASME Noise Control and Acoustics Division, pp. 117-125, 1997 ASME International Mechanical Engineering Congress and Exposition, Dallas, TX, 1997. Awarded "Best Paper" for the Noise Control and Acoustics Division (of 50 papers).
56. A. Lumsdaine and R.A. Scott, "Optimal Design of Constrained Plate Damping Layers Using Continuum Finite Elements," Proceedings of the ASME Noise Control and Acoustics Division, pp. 159-168, 1996 ASME International Mechanical Engineering Congress and Exposition, Atlanta, GA, 1996.
57. A. Lumsdaine and R.A. Scott, "Optimal Design of Unconstrained Damping Layers Using Continuum Finite Elements," Proceedings of NOISE-CON 96, National Conference on Noise Control Engineering, pp. 509-514, Bellevue, WA, 1996.
58. A. Lumsdaine and R.A. Scott, "Shape Optimization of Unconstrained Beam and Plate Damping Layers," Proceedings of the ASME 14th Biennial Conference on Mechanical Vibration and Noise, Vol. 84-3, Pt. C, pp. 15-22, Boston, MA, 1995.

Presentations/Posters (contributor or co-author)

- A. Lumsdaine, J. Boscary, J. Fellingner, J. Harris, H. Hölbe, R. König, D. McGinnis, J. Lore, H. Neilson, A. Peacock, P. Titus, J. Tretter, “Instrumentation and Analysis of the W7-X Intertially Cooled Test Divertor Unit Scraper Element Design,” presented at the 2014 Technology of Fusion Energy Conference (TOFE) in Anaheim, CA, November 12, 2014.
- A. Lumsdaine, G. Hanson, T. Bigelow, C. Schaich, C. Luttrell, E. Coffey, A. Melin, and E. Popov, “Thermal and Structural Analysis of ECH Waveguide Components,” presented at the 21st International Conference on Nuclear Engineering (ICONE) in Chengdu, China, August 1, 2013.
- A. Lumsdaine, J. Lore, D. McGinnis, J. Harris, J. Tipton, J. Canik, A. Peacock, J. Boscary, and J. Tretter, “Multiphysics Thermal-Fluid Analysis of the W7-X Divertor Scraper Element,” presented at the 21st International Conference on Nuclear Engineering (ICONE) in Chengdu, China, July 31, 2013.
- A. Lumsdaine, J. Boscary, E. Buckman, K. Ekici, J. Harris, D. McGinnis, J. Lore, A. Peacock, and J. Tretter, “Wendelstein 7-X High Heat-Flux Divertor Scraper Element,” invited presentation at the 25th Symposium on Fusion Engineering (SOFE 25) in San Francisco, CA, June 13, 2013.
- A. Lumsdaine, C. Barbier, T. Bigelow, E. Coffey, J. Hansen, G. Hanson, C. Luttrell, A. Melin, E. Popov, D. Rasmussen, and C. Schaich, “Multiphysics Modeling of Components for the ITER ECH Waveguide,” presented at the 25th Symposium on Fusion Engineering (SOFE 25) in San Francisco, CA, June 13, 2013.
- A. Lumsdaine, “Making a Star on Earth – the Future of Fusion Energy,” Graduate Seminar at Michigan Technological University on October 18, 2012.
- A. Lumsdaine, J. Tipton, J. Lore, J. Canik, J. Harris, A. Peacock, J. Boscary, and D. McGinnis, “Design and Analysis of the W7-X Divertor Scraper Element” presented at the 20th International Conference on Nuclear Engineering (ICONE) in Anaheim, CA, July 31, 2012.
- A. Lumsdaine, C. Barbier, T. Bigelow, and C. Schaich, “Multiphysics Analysis of ECH Waveguide Components” at the 20th International Conference on Nuclear Engineering (ICONE) in Anaheim, CA, July 31, 2012.
- A. Lumsdaine, J. Lore, D. McGinnis, J. Tipton, J. Canik, J. Harris, A. Peacock, J. Boscary, J. Tretter, and T. Andreeva, “Design and Analysis of the W7-X Divertor Scraper Element” presented at the 27th Symposium on Fusion Technology (SOFT) in Liege, Belgium, September 24, 2012.
- A. Lumsdaine, “Making a Star on Earth – the Future of Fusion Energy,” Keynote Talk for the University of Evansville Math, Engineering, and Science Undergraduate Research Conference (MESCON) on March 24, 2012.
- A. Lumsdaine, J. Tipton, and M. Peng, “Design Optimization of ST Centerpost for Fusion Nuclear Science Facility,” presented at the Joint Meeting of 5th IAEA Technical Meeting on Spherical Tori 16th International Workshop on Spherical Torus (ISTW2011) in Toki, Japan, September 30, 2011.
- A. Lumsdaine and M. Peng, “Thermal Fluid Multiphysics Optimization of Spherical Tokamak Centerpost” co-authored by Martin Peng, presented at the 2011 International Symposium on Fusion Nuclear Technology (ISFNT) in Portland, OR, September 13, 2011.
- A. Lumsdaine, T. Brown, M. Cole, P.J. Fogarty, J. Harris, P. Heitzenroeder, K. Logan, G. McGinnis, H. Neilson, T. Rummel, and L. Wegener, “United States Contribution to Wendelstein 7-X,” presented at the 2011 Symposium on Fusion Engineering (SOFE) in Chicago, IL, June 29, 2011.
- A. Lumsdaine and M. Peng, “Structural Analysis of an Optimally Designed Spherical Tokamak Centerpost,” presented at the 2011 Symposium on Fusion Engineering (SOFE) in Chicago, IL, June 27, 2011.
- A. Lumsdaine and M. Peng, “Optimal Design of Active Cooling for High Duty Cycle Spherical Tokamak Centerpost,” presented at the 2011 International Conference on Emerging Nuclear Energy Systems (ICENES) in San Francisco, CA, May 16, 2011.

- A. Lumsdaine, J. Tipton, M. Sawan, E. Marriott, M. Dagher, and C. Wong, “Thermal Transfer of Helium Cooled, Roughened Surfaces for Fusion Test Blanket,” presented at the 2010 Technology of Fusion Energy Conference (TOFE) in Las Vegas, NV, November 10, 2010.
- E.G. Herbert, W.C. Oliver, A. Lumsdaine, and G.M. Pharr, “Nanoindentation and the Mechanical Characterization of Viscoelastic Solids,” presented at the 2009 SEM Annual Conference & Exposition on Experimental and Applied Mechanics, Albuquerque, NM, June 3, 2009.
- E.G. Herbert, A. Lumsdaine, R.B. Peters, and W.C. Oliver, “In Situ Examination of Nanoscale Deformation of Thin Film Bridges within a Scanning Electron Microscope,” 2008 MRS Fall Meeting – Symposium EE: Nano- and Microscale Materials – Mechanical Properties and Behavior under Extreme Environments, Boston, MA, December 1, 2008.
- E.G. Herbert, W.C. Oliver, A. Lumsdaine, and G.M. Pharr, “Measuring the Constitutive Behavior of Viscoelastic Solids in the Time and Frequency Domain using Flat Punch Nanoindentation,” Society of Engineering Science 45th Annual Technical Meeting, Urbana-Champaign, IL, October 15, 2008.
- C. Su, R.B. Peters, A. Lumsdaine, W.C. Oliver, G.M. Pharr, “In Situ SEM Mechanical Testing,” 2008 Gordon Research Conference – Thin Films and Small Scale Mechanical Behavior, Waterville, ME, July 30, 2008.
- E. G. Herbert, W. C. Oliver, A. Lumsdaine, G. M. Pharr, Nanoindentation and the Dynamic Characterization of Viscoelastic Solids, Mechanics of Time Dependent Materials Conference, Monterey, CA, April 3, 2008.
- E.G. Herbert, W.C. Oliver, A. Lumsdaine, G.M. Pharr, “Comparing Viscoelastic Functions Measured by Nanoindentation and Transformations from the Frequency Domain to the Time Domain,” 2008 MRS Spring Meeting – Symposium U: Mechanics of Nanoscale Materials, San Francisco, CA, March 27, 2008.
- A. Lumsdaine, A Chaudhri, M. Parang, B. Nelson, S. Sridharan, and S. Tang, “Structural Integrity of Quasi-Poloidal Stellarator (QPS) Magnetic Coils,” 21st IEEE/NPSS Symposium on Fusion Engineering, Oak Ridge, TN, September 28, 2005.

EXTERNAL FUNDING

- Oak Ridge National Laboratory, Co-PI** **October 2002 - August 2007**
“Quasi-Poloidal Stellarator”–contract for \$1,500,000 to conduct design, analysis, and manufacturing for fusion reactor magnetic coils.
- NSF Partnership for Innovation, PI** **September 2005 - August 2007**
“Innovating, Inventing, and Commercializing Engineering Technologies”–grant for \$600,000 to develop entrepreneurship and commercialization content into the engineering curriculum. Project involved 20 public and private partners, and twelve faculty across three colleges (engineering, business, and law).
- NSF Civil and Mechanical Systems Division, PI** **August 2003 - July 2007**
“Topology Optimization of Active and Passive Damping Materials”–grant for \$222,116 to design optimal topologies for vibration damping.
- Black and Decker, Co-PI** **January 2004 - December 2004**
“Vibration Control / Elimination – Reciprocating Saws”–grant for \$10,000 to examine various concepts for the reduction of vibration levels on a Reciprocating Saw.
- Innovative Technology Center, University of Tennessee, Co-PI** **October 2002 - January 2004**
“An Asynchronous Mechanics Module to Transition from Textbooks to Realistic Problems”–grant for \$15,000 to develop instructional modules in statics, dynamics, and solid mechanics.
- DOE – National Energy Technology Laboratory, Co-PI** **October 2001 – January 2004**
“Transmission-Based Electrical Servoactuators”–contract for \$400,000 to design and develop transmission-based actuators for telerobotics applications.
- DOE – National Energy Technology Laboratory, Co-PI** **October 2001 – March 2003**
“Human Machine Cooperative Telerobotics”–contract for \$155,000 to design and develop a sensor head for telerobotics applications.
- NSF CCLI Educational Materials Development, Co-PI** **June 2001 - April 2004**
“Implementation of Pedagogies for Interactive Computer and Web-Based Undergraduate Learning”–grant for \$324,190 to develop instructional modules for engineering graphics, statics, and dynamics.
- NASA Faculty Awards for Research, PI** **September 1999 - August 2002**
“Optimal Design of Hybrid Passive Viscoelastic and Active Piezoelectric Damping Layers”–grant for \$300,000 with NASA Marshall Space Flight Center to perform shape optimization studies on hybrid damping layers.
- DOD Infrastructure Support for HBCU/MI, PI** **June 2000 - November 2001**
“Implementation of UNIX Based Laboratory for Interactive Learning”–grant for \$187,000.
- Sun Microsystems, PI** **June 2000 - November 2001**
“UNIX-Based Hardware for Teaching and Research”–Grant for \$103,860.
- ITI Foundation, Co-PI** **July 2000 - August 2001**
“Evaluation of Dental Implant Osseointegration Using Vibration Modal Analysis”–grant for \$98,000.
- Ford Motor Company–Visteon, PI** **August 1998 - May 2000**
“Optimal Design of Cross Car Structures”–grant for \$26,000.

STUDENTS ADVISED

PhD Students

- Shing-Jia Tang (graduated May 2007)
- Emily Clark (Expected graduation May 2017)

Master's Students

- Arnolando Garcia (graduated December 1999)
- Joachim Drenckhan (graduated May 2003)
- Rohan Pai (graduated December 2003)
- Sriram Sridharan (graduated May 2004)
- Mohan Damu (graduated December 2005)
- Harish Valluru (graduated December 2006)
- Ahmed Elalfy (graduated December 2006)
- Matthew Parsons (graduated May 2007)

Undergraduate Research Students

- Cormack Gordon (January 2002 – December 2003)
- Matthew Parsons (May 2003 – August 2004)
- Sara Piepenbring (May 2004 – April 2005)
- Stephen Young (May 2004 – August 2004)
- Kevin Shipp (May 2005 – May 2006)

Undergraduate Academic Advising

- Academic advisor for 50 Mechanical Engineering undergraduate students at the University of Tennessee.

INSTRUCTIONAL ACTIVITIES

Courses taught

- **University of Tennessee, Knoxville**
 - Undergraduate (number of times taught)
 - Aerospace Structures (1)
 - Mechanics of Materials (7)
 - Dynamics (1)
 - Senior Seminar (4)
 - Engineering Entrepreneurship (1)
 - Product Development, Selection, and Evaluation (1)
 - Graduate (number of times taught)
 - Design Optimization (2)
 - Smart Structures and Materials (2)
 - Computational Solid Mechanics – Finite Elements (2)
- **University of Texas-Pan American**
 - Undergraduate (number of times taught)
 - Introduction to Engineering (1)
 - Engineering Technology Lab (1)
 - Engineering Mechanics (2)
 - Mechanics of Materials (5)
 - Mechanics of Materials Lab (1)
 - Engineering Analysis (2)
 - Mechanical Vibrations (4)
 - Mechanical Systems Laboratory (4)
 - Graduate (number of times taught)
 - Finite Element Analysis (2)
 - Design Optimization (1)

Innovative Instructional Course Development

- Completed Innovative Technology Center Teaching with Technology grant with Jack Wasserman, Toby Boulet, and Richard Bennett. Project materials are available online at: <http://web.utk.edu/~alumsdai/twtmech/>
- Completed UT College of Engineering Technology Enhanced Course Material Preparation Grant for developing multimedia course materials for ME 321. Project materials are available at: <http://web.utk.edu/~wratchuk/introduction/>

PROFESSIONAL ACTIVITIES

- Member American Nuclear Society (2010-present)
 - Vice-Chair of Fusion Energy Division (2014-2016)
 - Member of Fusion Energy Division Executive Committee (2011-2014)
- Member American Society of Mechanical Engineers (1996-present)
 - Member of Adaptive Structures and Material Systems Technical Committee
- Member Materials Research Society (2007-present)
- Member Institute of Electrical and Electronics Engineers (2011-present)
- Member American Society for Engineering Education (1996-2007)
 - Member Mechanics Division
 - Member Entrepreneurship Division
- Technical Program Chair for 2012 ANS Topical Meeting on the Technology of Fusion Energy (TOFE)
- Co-chair for 2006 Adaptive Structures and Material Systems Symposium at the ASME International Mechanical Engineering Congress and Exposition (16 scheduled sessions).
- Chair and organizer for the student paper competition for the ASME Adaptive Structures and Materials Technical Committee at the SPIE Smart Structures and Material Conference. (2004-2006).
- Co-Chair for SPIE Damping and Isolation Conference of the SPIE International Symposium on Smart Structures and Materials, 2006.
- On program committee for the Damping and Isolation Conference of the SPIE International Symposium on Smart Structures and Materials, 2005-present.
- On program committee for the Modeling, Signal Processing, and Control Conference of the SPIE International Symposium on Smart Structures and Materials, 2006.
- Panel reviewer for NSF Engineering Education program on 9/25/03-9/26/03.
- Reviewer for Fusion Science and Technology
- Reviewer for Fusion Engineering and Design
- Reviewer for IEEE Transactions on Plasma Science
- Reviewer for Acta Materialia
- Reviewer for the International Journal of the Mechanical Sciences
- Reviewer for the International Journal of the Physical Sciences
- Reviewer for the Journal of Vibration and Acoustics (Transactions of the ASME)
- Reviewer for the International Journal of Heavy Vehicle Systems
- Reviewer for the Journal of Intelligent Material Systems and Structures
- Reviewer for Mechanics Research Communications
- Reviewer for Journal of Materials Research

HONORS AND AWARDS

- 2003-2004 ExxonMobil Professor Award (MABE department award)
- 2004-2005 Pi Tau Sigma Excellence in Teaching Award (MABE department award; selection made by student honors society)