

William S. Oates

Department of Mechanical Engineering
Florida A&M / Florida State University
2003 Levy Ave., Tallahassee, FL 32308

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EDUCATION

Georgia Institute of Technology, Atlanta, GA, 1999-2004

Ph.D. in Mechanical Engineering, 2004

Advisor: Dr. Christopher Lynch

Dissertation Title: Fracture of Ferroelectric Materials

M.S. in Mechanical Engineering, 2001

Advisor: Dr. Christopher Lynch

Thesis Title: Piezoelectric Pump Design and System Dynamic Model

Georgia Institute of Technology, Atlanta, GA, 1995-1998

B.S. in Mechanical Engineering, 1998

Georgia Southwestern State University, Americus, GA, 1992-1995

B.S. in Mathematics, 1998

PROFESSIONAL EMPLOYMENT

September 2012-present

Associate Professor

Florida A&M / Florida State University

Department of Mechanical Engineering

Tallahassee, FL 32310

August 2006-August 2012

Assistant Professor

Florida A&M / Florida State University

Department of Mechanical Engineering

Tallahassee, FL 32310

August 2004-August 2006

Post Doctoral Research Associate

Center for Research and Scientific Computation

North Carolina State University

Department of Mathematics

Raleigh, NC 27695

July 1998-July 1999

Product Design Engineer

Inflation Systems Incorporated (ISI)

Lagrange, GA 30240

DISTINCTIONS

- Invited Participant, National Academy of Engineering, Frontiers of Engineering Education Symposium, 2013
- Developing Scholar Award, Florida State University, 2013
- ASME Gary Anderson Early Achievement Award, 2012
- NSF CAREER Award, 2011
- FSU Guardian of the Flame Teaching Award, 2010
- DARPA Young Faculty Award, 2009
- ASEE Summer Faculty Fellowship Award, AFOSR (2009, 2010 & 2011)
- Student best paper awards: 2011 SPIE International Smart Structures and Materials Conference & 2010 SMASIS Smart Materials, Adaptive Structures, and Intelligent Systems
- Registered Professional Engineer, North Carolina, 2006

RESEARCH INTERESTS

Field-coupled mechanics and control of active materials, development of multifunctional systems and structures

RESEARCH FUNDING

“Nb₃Sn Superconductors for the LHC and for Accelerators Beyond the LHC” (co-PI with PI: David C. Larbalestier and Co-PIs: P. J. Lee, C. Tarantini), DOE, Jan. 2014-Dec. 2017, \$1,200,000.

“AOI 3 High-Temperature Sapphire Pressure Sensors for Harsh Environments”, co-PI with Mark Sheplak (Univ. FL), Dept. of Energy, Jan. 2014-Dec. 2017 \$1,000,000.

“Modeling and Experimental Characterization of Novel Photomechanical Fibers”, PI: W. Oates, co-PI Paravastu, AFOSR, September 2013-August 2017, \$583,000,

“CDS&E: Collaborative Research: Uncertainty Quantification of an Electromechanical Nonlinear Continuum Theory” NSF-CMMI, PI: W. Oates with Ralph Smith (NC State Univ.), September 2013-August 2016, \$207,000.

“Simulation of fluid-structure interactions for high Reynolds number compressible flow” ARO, co-PI with Sam Taira (FSU), June 2013—May 2015, \$444,000.

“Materials Driven by Light: Nonlinear Photomechanics of Liquid Crystal Elastomers” NSF CAREER, (February 2011-February 2016), \$400,000.

“High Temperature Sapphire Based Pressure Transducers,” FAA-COE, (February 2011-May 2014), \$179,000.

“Advanced Mobility and Manipulation of Legged Robots” ARL R-CTA, co-PI with Dr. Emmanuel Collins (FAMU-FSU) and Dr. Jonathan Clark (FAMU-FSU), (September 2010-August 2015), \$450,000.

“Field-coupled Mechanics and Nonlinear Control of Photo-responsive Adaptive Structures” DARPA Young Faculty Award, (September 2009-August 2011), \$300,000.

“Development and Implementation of High-Bandwidth Pulsed Microactuators for Sub- and Supersonic Applications,” co-PI with Dr. Farrukh Alvi, Air Force Office of Scientific Research, \$527,851, (January 2009 – May 2012).

“Development and Implementation of a Piezoelectric Microjet Flow Control System,” co-PI Dr. Farrukh Alvi (FAMU-FSU), Army Research Office, \$226,533 / 3 years (May 2008 – May 2011).

“Light Interactions of Azobenzene Elastomer Networks,” Wright Patterson AFRL, \$50,000 / 1 year (March 2010 – February 2011)

“STTR: Active-Distributed Boundary Layer Management Using Flow Sensory Actuators” collaboration with Drs. Sivaram Gogineni and Farrukh Alvi, Air Force Office of Scientific Research, \$100,000 / 9 months (July 2008 – April 2009).

“Magnetostrictive Transducer Development: Modeling, Nonlinear Control Design, and Experimental Implementation,” Etrema Products, Inc. (ONR subcontract), \$95,000 / 2 years (August 2006 – August 2008).

“Biosynthesis of Aerodynamic Microsystems and Structures” collaboration with Dr. Jonathan Clark (FAMU-FSU), Florida Center for Advanced Aero Propulsion, \$109,000 (October 2008 – December 2010).

“Acoustic Stimulation and Directional Self-Assembly of Biological Nanocomposites” collaboration with Drs. Ongi Englander and Anant Paravastu (FAMU-FSU), Florida Center for Advanced Aero Propulsion, \$102,000 (October 2008 – December 2009).

“Field-Coupled Mechanics of Electroactive Polymers” Florida State University: Council on Research & Creativity, \$13,000, Summer 2008.

“Development of Piezoelectric Microjets for Subsonic and Supersonic Flow Control,” Florida State University: First Year Assistant Professor Award, \$16,000, Summer 2007.

DOCTORAL COMMITTEE CHAIR

Wei Gao, started 2014,

Sadiyah Sabah Chowdhury, started fall 2014

Paul Miles, started fall 2013

Justin Collins, started summer 2011

Michael Hays, PhD, summer 2013

Liang Cheng, PhD, fall 2012

Hongbo Wang, PhD, spring 2012

MASTERS COMMITTEE CHAIR

Harman Bal, started fall 2013, (co-advised)

Peter Woerner, started fall 2013

Jesse Diaz, MS spring 2013

Parker Harwood, MS spring 2013

Joshua Webb, MS spring 2013, (co-advised)

Joseph Chason, MS spring 2013

Matt Worden, MS spring 2013
Emiliano Pantner, MS spring 2012
Erica Cosmutto, MS spring 2012
Jeffrey Morton, MS spring 2012
Joshua Hogue, MS spring 2011
Fei Liu, MS fall 2008

DOCTORAL COMMITTEE MEMBER

Miller, B. D., graduate. (2013).
Barrios, M. N., graduate. (2011).
Jun, J. Y., graduate. (2011).
Bembridge, graduate. (2011).
Kim, H. J., graduate. (2011).
Coyle, E. J., graduate. (2010).
Davy, C. A., graduate. (2010).
Solomon, J. T., graduate. (2010).
Yu, W., graduate. (2010).
Deng, J., graduate. (2008).
Chen, T., doctoral candidate.
Gupta, N., doctoral candidate.
Henke, S. F., doctoral candidate.
Kreth, P. A., doctoral candidate.
Obitayo, W. O., doctoral candidate.
Reese, B. M., doctoral candidate.
Reger, R. W., doctoral candidate.
Vanderlaan, M. H., doctoral candidate.

DOCTORAL COMMITTEE UNIVERSITY REPRESENTATIVE

He, Y., graduate. (2013).
Tsai, Chao-Hsi, graduate. (2010).
Tsai, Szu-Yuan, graduate. (2010).
Benjamin, S., doctoral candidate.
Khanmohamadi, O., doctoral candidate.
Leonard, S. R., doctoral candidate.
Takeh, A., doctoral candidate.
Nyanteh, Y. D., doctoral candidate. (2013).
Hendricks, S. M., doctoral student.
Jahan, M. D., doctoral student.

MASTER'S COMMITTEE MEMBER

Hurd, J., graduate. (2013).
Allampalli, S. P., graduate. (2013).
Collins, M. A., graduate. (2013).
Freeborn-Scott, C. R., graduate. (2012).

Foster, C. H., graduate. (2011).
Sheth, M. K., graduate. (2011).
Kissoon, N. N., graduate. (2011).
Andrews, B. S., graduate. (2010).
Labrador, D. E., graduate. (2010).
Badaru, A. A., graduate. (2010).
Erb, A. M., graduate. (2009).
Pfaller, J. B., graduate. (2009).
Lu, L., graduate. (2008).
Li, Z., student.
Holt, F. V., student. (2011).
Redcay, C. J., student. (2011).

UNDERGRADUATE ADVISING

Adriane Guettler, REU 2014, electroactive polymers
Dennice Roberts, Physics Honors student, 2014
Madeline Austin, control of electroactive polymers, (WIMSE, 2013)
Hannah Klein, advanced thin film electrodes for dielectric elastomers, (WIMSE, current)
Basak Simal, thermomechanics of dielectric elastomers (WIMSE, 2012-2013)
Dan Liefkort, photomechanical material testing (former)
Victoria Rogers, stiffness controlled robotic structures (former)
Jessica Long, photomechanical aerodynamic structures (former)
Brooke Kahn, scalable dielectric elastomers (former)
Yanira Torres, photomechanical elastomers (former)
Frederick Holt, piezohydraulic device development (former)
Christopher Schultz, active supersonic microjets (former)
Joshua Hogue, piezohydraulic actuation (former)
Michael Hays, micro air vehicle flow characterization (former)
Chris Redcay, pulsed microjets, materials characterization (former)

TEACHING RESPONSIBILITIES

- EML 3011c Mechanics and Materials I
- EML 5930 Linear Elasticity
- EML 4536 Design using FEM
- EGM 5611 Continuum Mechanics
- EML 5930 Solid Mechanics and Electromagnetics of Continuous Media

PROFESSIONAL SERVICE AND OUTREACH

- Florida State University Lead for the Florida Energy Systems Consortium (FESC),
Fall 2013—current
- Florida State University Materials and Energy Faculty Search Committee
Member, 2012-2013
- ASME SMASIS Active Materials Symposium co-chair, 2013—current
- ASME Smart Materials and Structures Technical Branch Treasurer, Fall 2012—Fall
2013

- Mechanical Engineering Department Secretary, Fall 2009—Spring 2013
- Mechanics and Materials Program Coordinator, Department of Mechanical Engineering (FAMU-FSU), 2010—current
- Challenger Learning Center “Engineering for Kids” outreach program, in collaboration with Pi Tau Sigma, 2012—current
- Graduate seminar coordinator, Department of Mechanical Engineering (FAMU-FSU), August 2007-June 2008
- Saturday afternoon program: “Magnificent Materials and Exotic Engineering—ME2” at the Mary Brogan Art and Science Museum, Tallahassee, FL, 2007—2011
- Co-organized the 4th Annual Florida Society for Materials Simulation workshop, School of Computational Science, FSU
- Mentor for the Industrial Mathematical and Statistical Modeling workshop for graduate students, Department of Mathematics at North Carolina State University, summer 2005
- ASME member, American Society of Mechanical Engineers, 1998-present
- MRS member, Materials Research Society, 2006—present
- ASEE member, American Society of Engineering Education, 2008—present
- FIRST robotics mentor for high school students at Broughton High School, Raleigh, NC, 2005
- Review journal articles for the Journal of Mechanics and Physics of Solids, International Journal of Solids and Structures, International Journal of Fracture; Engineering Fracture Mechanics; Journal of Intelligent Material Systems and Structures; ASME Journal of Dynamic Systems, Measurement, and Control; ASME Journal of Applied Mechanics; Smart Materials and Structures, and Journal of Electroceramics

BOOK CHAPTER

1. W. Oates and J. Bin, “Non-equilibrium thermodynamics and electromagnetics of azobenzene liquid crystal polymer networks” Shape Memory Polymers for Aerospace Applications: Novel Synthesis, Modeling, Characterization and Design, eds. G. P. Tandon, A. McClung, and J. Baur, (*accepted*), 2014.

JOURNAL PUBLICATIONS

1. Bin, J., Oates, W., Hussaini, M.Y., “An analysis of the discontinuous spectral element method for elastic wave propagation in a heterogeneous material,” *Computational Mechanics*, (*under review*), 2013.
2. Oates, W., “A Quantum-informed Continuum Model for Ferroelectric Materials,” *Smart Mater. Struct.* (*accepted*), 2014.
3. Uzun, A., Solomon, J., Foster, C., Oates, W., Hussaini, M.Y., Alvi, F., “Flow Physics of a Pulsed Microjet Actuator for High-Speed Flow Control,” *AIAA J.*, (*in press*), 2013, doi: 10.2514/1.J052525.
4. Worden, M., Wang, H., Paravastu, A., Oates, W., “Macro and Molecular Scale Experimental Characterization of the Photomechanics of Azobenzene Polymer Networks,” *Smart Mater. Struct.* v. 22, p. 094013, 2013.
5. Hu, Z., Smith, R., N. Burch, Oates, W., Hays, M., “A Modeling and Uncertainty Quantification Framework for a Flexible Structure with Macro-Fiber Composite

- (MFC) Actuators Operating in Hysteretic Regimes", *J. Intell. Mater. Sys. Struct. (in press)*, 2013.
6. Bin, J., Oates, W.S., Hussaini, M.Y., "Fluid-Structure Interactions of Fast Response Photomechanical Liquid Crystal Polymer Networks", *J. Fluids Struct.*, v. 37, pp. 34-61, 2013.
 7. Hays, M., Morton, J., Dickinson, B., Chakravarty, U., Oates, W., "Aerodynamic Control of Micro Air Vehicle Wings Using Electroactive Membrane Wings", *J. Intell. Mater. Sys. Struct.*, v. 24(7), pp. 862-878, 2013.
 8. Hogue, J., Kumar, R., Oates, W., Alvi, F., "A Supersonic Broadband Microjet Actuator Using Piezohydraulic Actuation" *J. Intell. Mater. Sys. Struct.*, v. 23(17), pp. 2003-2016 2012.
 9. Cheng, L., Torres, Y., Lee, K.-M., McClung, A., Baur, J., White, T., and Oates, W., "Photomechanical Bending Mechanics of Polydomain Azobenzene Liquid Crystal Polymer Network Films", *J. Appl. Phys.*, v. 112, p. 013513, 2012.
 10. Oates, W., Wang, H. and Sierakowski, R., "Unusual Field-Coupled Nonlinear Continuum Mechanics of Smart Materials," *J. Intell. Mater. Sys. Struct.* v. 23(5), pp. 487-504, 2012.
 11. Wang, H., Lee, K.-M., White, T., Oates, W., "Trans-cis and Trans-cis-trans Microstructure Evolution of Azobenzene Liquid Crystal Polymer Networks", *Macromol. Theor. Simul.*, v. 21(5), pp. 285-301, 2012.
 12. Hays, M., Wang, H., Oates, W., "Nonlinear Bending Mechanics of Hygroscopic Liquid Crystal Polymer Networks," *ASME J. Appl. Mech.*, v. 79(2), p. 021009, 2012.
 13. Kumar, V., Hays, M., Fernandez, E., Oates, W., and Alvi, F., "Flow Sensory Actuators for MAVs," *Smart. Mater. Struct.*, v. 20, p. 105033, 2011.
 14. Cheng, L., Englander, O., Paravastu, A., Oates, W., "An Effective Continuum Approach for Modeling Non-equilibrium Structural Evolution of Protein Nanofiber Networks," *J. Chem. Phys.*, 135(5), 055102 (15pp.), 2011.
 15. Oates, W.S., Zrostlik, R., Eichorn, S., Smith, R. "A Nonlinear Optimal Control Design Using Narrowband Perturbation Feedback for Magnetostrictive Actuators," *J. Intell. Mater. Syst. Struct.* v. 21(16), pp. 1681-1693, (2010).
 16. W. Oates and H. Wang, "A New Approach to Modeling Liquid Crystal Elastomers Using Phase Field Methods," *Modeling Simul. Mater. Sci. Eng.*, vol. 17, p. 064004 (21pp.), (2009).
 17. Oates, W. and Liu, F. "Piezohydraulic Actuator Development for Microjet Flow Control", *J. Mech. Des.* vol. 131 (9), p. 091001 (9pp.), (2009).
 18. Oates, W.S., Evans, P.G., Smith, R.C., Dapino, M. "Experimental Implementation of a Hybrid Nonlinear Control Design for Magnetostrictive Transducers," *J. Dyn. Syst.-T. ASME*, v. 131, p. 41004 (2009).
 19. Oates, W.S., Smith, R.C., "Optimal Tracking Control Using Magnetostrictive Actuators Operating in Nonlinear and Hysteretic Regimes," *J. Dyn. Syst.-T. ASME*, v. 131, p. 31001 (2009).
 20. Gruverman, A., J. Cross, and W. Oates, "Peculiar Effect on Mechanical Stress on Polarization Stability in Micrometer-scale Ferroelectric Capacitors," *Appl. Phys. Lett.*, v. 93, p. 242902, (2008).

21. Oates, W.S., Smith, R.C., "Nonlinear Optimal Control Techniques for Vibration Attenuation Using Magnetostrictive Actuators," *J. Intell. Mater. Syst. Struct.*, v. 19(2), pp. 193-209, (2008).
22. Westram, I., Oates, W.S., Lupascu, D.C., Rödel, J., Lynch, C.S., "Mechanism of Electric Fatigue Crack Growth in PZT," *Acta. Mater.*, v. 55, pp. 301-312, (2007).
23. Oates, W.S., "Heterogeneity Influence on Electric Field Induced Piezoelectric Microfracture," *J. Int. Mat. Sys. Struct.*, v. 16 [9], (2005), p. 733-741.
24. Oates, W.S., Lynch, C.S., Lupascu, D.C., Kounga, A. "Anisotropic Fracture Behavior in Ferroelectric Relaxor PZN-4.5%PT Single Crystals," *J. Am. Cer. Soc.*, v. 88 [7], (2005), p. 1838-1844.
25. Liu, T., Oates, W.S., Wan, S., Lynch, C.S., "Fracture at partial electrodes in PZN-0.045PT single crystals" *J. Int. Mat. Sys. Struct.*, v. 16 [4], (2005), p. 373-379.
26. Oates, W.S., Lynch, C.S. "New Approach to Solving Crack Tip Stress Fields in Piezoelectric Materials," *J. Int. Mat. Sys. Struct.*, v. 15 [7], (2004), p. 557-563.
27. Oates, W.S., Lynch, C.S., Lupascu, D.C., Kounga, A., Aulbach, E., Rödel, J. "Subcritical Crack Growth in Lead Zirconate Titanate," *J. Am. Cer. Soc.*, v. 87 [7], (2004), p. 1362-1364.
28. Lynch, C.S., Oates, W.S., "Orthotropic Rescaling for Crack Tip Fields in Linear Piezoelectric Materials," *Int. J. Solids Structures*, v. 41 [11-12], (2004), p. 2899-2917.
29. Oates, W.S., Lynch, C.S. "Piezoelectric Hydraulic Pump System Dynamic Model" *J. Int. Mat. Sys. Struct.*, v. 12 [11], (2001), p. 737-744.

CONFERENCE PROCEEDINGS

1. Oates, W. and Bin, J., "Nonlinear Dynamics and Thermodynamics of Azobenzene Polymer Networks," (*invited paper*) SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring, 2013.
2. Oates, W., "A Quantum Informed Continuum Model for Ferroelectric and Flexoelectric Materials," (*invited paper*) SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring, 2013.
3. Oates, W., Hays, M., Miles, P., Smith, R., "Uncertainty Quantification and Stochastic Based Viscoelastic Modeling of Finite Deformation Elastomers," SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring, 2013.
4. Newton, J., Hays, M., Clark, J., Oates, W. "Design and characterization of a soft electroactive adaptive structure for legged robotic motion," Proc. SMASIS: Smart Materials, Adaptive Structures and Intelligent Systems, (2012).
5. Hu, Z, Smith, R., Burch, N., Hays, M., Oates, W. "Homogenized energy model and Markov Chain Monte Carlo simulations for macro fiber composites operating in broadband regimes," Proc. SMASIS: Smart Materials, Adaptive Structures and Intelligent Systems, (2012).
6. Worden, M., Wang, H., Paravastu, A., Oates, W. "NMR characterization of photomechanics and thermomechanics of azobenzene polymer networks," Proc. SMASIS: Smart Materials, Adaptive Structures and Intelligent Systems, (2012).
7. Hays, M, Hart, A., Oates, W., Ukeiley, L. "The study of fluid structure interactions on an electrative membrane wing," Proc. SMASIS: Smart Materials, Adaptive Structures and Intelligent Systems, (2012).

8. Oates W.S., Wang H., "Quadrupole effects on modeling piezoelectric and ferroelectric materials," SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring, pp. 834205-834205-10, 2012.
9. Cheng L., Lee K., McClung A., Baur J., White T.J., Oates W.S., "Optimizing the photomechanical performance of glassy azobenzene liquid crystal polymer networks," SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring. pp. 83420C-83420C-12. 2012.
10. Bin, J, Hussaini, M.Y., Oates, W., "Fluid Structural Interactions of Flapping Photomechanical Liquid Crystal Polymer Networks," Proc. SMASIS: Smart Materials, Adaptive Structures and Intelligent Systems, (2011).
11. Morton, J., Haldane, D., Hays, M., Clark, J., Oates, W., "Field Driven Stiffness Control of Legged Robotic Structures Using Dielectric Elastomers," Proc. SMASIS: Smart Materials, Adaptive Structures, and Intelligent Systems (2011).
12. Hays, M., Morton, J., Oates, W., Dickinson, B., "Aerodynamic Control of Micro Air Vehicle Wings Using Electroactive Membranes," Proc. SMASIS: Smart Materials, Adaptive Structures, and Intelligent Systems (2011).
13. Cheng, L., Torres, Y., Oates, W., "Nonlinear structural Mechanics and Dynamics of Azobenzene Polymer Network Films", Proc. SPIE: Smart materials and Structures, San Diego, CA, March 2011.
14. Wang, H., Oates, W., "Light Induced Stress Rate Effects in Azobenzene Liquid Crystal Polymer Networks," Proc. SPIE: Smart Materials and Structures, San Diego, CA., March 2011 [*best student paper award*].
15. Hogue, J., Solomon, J., Hays, M. Alvi, F., Oates, W., "Broadband Pulsed Flow Using Piezoelectric Microjets," Proc. SPIE: Smart Materials and Structures, (2010).
16. Oates, W.S., "New Unifying Concepts for Modeling Smart Materials," Proc. SPIE: Smart Materials and Structures, (2010).
17. Wang, H., Oates, W., "A Phase Field Model of Photo-induced Trans-Cis-Trans Bending of Liquid Crystal Elastomer Films," Proc. SMASIS: Smart Materials, Adaptive Structures, and Intelligent Systems (2010). [*best student paper award*].
18. Hays, M., Wang, H., Oates, W., "Force Characterization of Hygroscopic Liquid Crystal Elastomers," Proc. SMASIS: Smart Materials, Adaptive Structures, and Intelligent Systems (2010).
19. Torres, Y., T. White, McClung, A., Oates, W., "Photoresponsive Azobenzene Liquid Crystal Polymer Networks: In Situ Photogenerated Stress Measurements," Proc. SMASIS: Smart Materials, Adaptive Structures, and Intelligent Systems (2010).
20. Cheng, L., Englander, O., Oates, W., Paravastu, A., "Structural Control Concepts in Protein Nanofiber Networks," Proc. FCAAP: Florida Center for Advanced Aero Propulsion Conference, Orlando, FL, August 2009.
21. Hogue, J., Brosche, M., Oates, W., Clark, J., "Development of a Piezoelectric Supersonic Microactuator for Broadband Flow Control," Proc. FCAAP: Florida Center for Advanced Aero Propulsion Conference, Orlando, FL, August 2009.
22. Liu, F., Hogue, J., Solomon, J., Oates, W.S., Alvi, F., "Piezoelectric Controlled Pulsed Microjet Actuation," Proc. SMASIS: Smart Materials, Adaptive Structures and Intelligent Systems, (2009).

23. Wang, H., Oates, W.S., "A Phase Field Analysis of Thermomechanically Coupled Liquid Crystal Elastomers," Proc. SMASIS: Smart Materials, Adaptive Structures and Intelligent Systems, (2009).
24. Wang, H., Oates, W.S., "A Computational Model for Domain Structure Evolution of Nematic Liquid Crystal Elastomers," Proc. SPIE: Smart Materials and Structures, (2009).
25. Oates, W.S., Peng, X. "A Multi-axial Ferroelastic Switching Model Using the Homogenized Energy Approach," Proc. SPIE: Smart Materials and Structures, (2009).
26. Liu, F. and Oates, W., "Piezohydraulic Actuation for Next Generation Microjet Flow Control", Proc. Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS), Oct. 2008.
27. Oates, W.S. "Reverse Polarization Switching in Ferroelectric Lead Zirconate Titanate (PZT) Thin Films," Proc. SPIE: Smart Materials and Structures, (2008).
28. Oates, W.S. "Multiscale Constitutive Model Development and Finite Element Implementation for Magnetostrictive Materials," proceedings of the ASME IMECE (2007), Seattle, WA, accepted.
29. Oates, W.S., Evans, P., Smith, R., and Dapino, M. "Experimental Implementation of a Nonlinear Control Method for Magnetic Transducers," Proceedings of the 2007 American Control Conference, accepted.
30. Oates, W.S., Smith, R., "Nonlinear Perturbation Control for Magnetic Transducers," IEEE Conference on Decision and Control (2007), accepted.
31. Oates, W.S., Evans, P, Smith, R.C., Dapino, M. J., "Open Loop Nonlinear Optimal Tracking Control of a Magnetostrictive Terfenol-D Actuator," Proc. SPIE: Smart Materials and Structures (2006).
32. Oates, W.S., Smith, R., "Multi-axial Homogenized Energy Model for Ferroelectric Materials," proceedings of the ASME IMECE (2006), Chicago, IL.
33. Oates, W.S., Gruverman, A., "Polarization Switching in (111) Oriented PZT Thin Films," proceedings of the ASME IMECE (2006), Chicago, IL.
34. Oates, W.S., Smith, R. C., "Nonlinear Perturbation Control for Magnetic Transducers," 45th IEEE Conference on Decision and Control, (2006), pp. 2441-2446.
35. Oates, W.S., Smith, R. C., "Nonlinear Optimal Tracking Control of a Piezoelectric Nanopositioning Stage," Proc. SPIE: Smart Materials and Structures (2006).
36. Oates, W.S., Smith, R.C., "Nonlinear Open Loop Optimal Tracking Using Magnetostrictive Transducers," proceedings of the ASME IMECE (2005), Orlando, FL.
37. Oates, W.S., Smith, R.C., "Nonlinear Optimal Control of Plate Structures Using Magnetostrictive Materials," proc. SPIE: Smart Materials and Structures (2005).
38. Oates, W.S., Webber, K.G., Lynch, C.S., Njiwa, A.K., Lupascu, D.C., "Local Fracture Properties in Ferroelectric Relaxor PZN-4.5%PT Single Crystals," proc. SPIE: Smart Materials and Structures, v. 5761, (2005), pp.299-304.
39. Oates, W.S., Malbec, A., Herdic S., Lynch, C.S., "Phase Field Modeling of Domain Structures in Ferroelectric Materials," proc. SPIE: Smart materials and Structures, v. 5387, (2004), pp. 314-325.
40. Oates, W.S., Lynch, C.S., "New Approach to Solving Crack Tip Stress Fields in Piezoelectric Materials," proc. SPIE: Smart Materials and Structures (invited to appear in J. Mat. Sys. Struct.), v. 5053, (2003), pp. 376-386.

41. Oates, W.S., Lynch, C.S., "Orthotropy Rescaling for the Fracture Problem in Anisotropic Piezoelectric Materials," *proc. ASME IMECE*, (2002), v. 67, p. 97-102.
42. Mauck, L.D., Oates, W.S., Lynch, C.S., "Piezoelectric Hydraulic Pump Performance," *proc. SPIE: Smart Materials and Structures*, (2001), v. 4332, pp. 246-253.
43. Oates, W.S., Mauck, L.D., Lynch, C.S., "System Dynamics Modeling of a Piezoelectric Hydraulic Pump," *proc. SPIE: Smart Materials and Structures*, (2001), v. 4693, pp. 598-606.
44. Mauck, L.D., Oates, W.S., Lynch, C.S., "Piezoelectric Hydraulic Pump Performance," *proc. SPIE: Smart Materials and Structures*, (2001), v. 4332, pp. 246-353.
45. Oates, W.S., Mauck, L.D., Lynch, C.S., "PZT Piston Driven Hydraulic Pump Development," *proc. 2000 12th IEEE International Symposium on Applications of Ferroelectrics*.

RESEARCH RELATED PRESENTATIONS

1. Invited talk (2013), SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring, "Nonlinear Dynamics and Thermodynamics of Azobenzene Polymer Networks."
2. Invited talk (2013), SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring, "A Quantum Informed Continuum Model for Ferroelectric and Flexoelectric Materials."
3. 2012 SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring, "Uncertainty Quantification and Stochastic Based Viscoelastic Modeling of Finite Deformation Elastomers."
4. 2012 SMASIS: Smart Materials, Adaptive Structures and Intelligent Systems "NMR characterization of photomechanics and thermomechanics of azobenzene polymer networks", Stone Mountain, Ga.
5. Invited talk: (2012) "Recent Advances in Electroactive and Photoactive Polymers and Structures for Micro Air Vehicle Flow Control", Sandia National Laboratories, Albuquerque, NM.
6. Invited talk: (2012) "Advances in Adaptive Materials and Structures using Electrostatic Fields and Light", SISSA: International School for Advanced Studies, Trieste, Italy.
7. Invited talk: (2012) "Higher Order Coupling in Ferroelectric Materials," CIMTEC Smart Materials, Structures, and Systems Conference, Montecatini Terme, Italy.
8. Invited talk: (2012) "Controlling Adaptive Materials with Electrons and Photons", California Institute of Technology
9. Invited talk: (2011) Florida State University, Department of Chemistry, "Photomechanics of Liquid Crystal Polymer Networks"
10. Invited talk: (2011) The Ohio State University, Department of Mechanical and Aerospace Engineering, "Fueling Materials by Light"
11. ILCEC International Liquid Crystal Elastomer Conference (2011) Lisbon, Portugal "Photomechanical Efficiency of Azobenzene Liquid Crystal Polymer Networks"
12. Invited talk: (2011) Eglin AFRL/REEF "Materials Fueled by Light: An Analysis of Glassy Photoresponsive Azobenzene Polymers"

13. Invited talk: (2010) DARPA Young Faculty Award Annual Review "Photo-responsive Adaptive Structures".
14. Invited talk: (2010) NASA Glenn "Unified Smart Material Concepts: Modeling, Device Development, and Nonlinear Control".
15. 2010 Materials Research Society "Polarized Light Induced Deformation of Azobenzene Liquid Crystal Elastomers".
16. 2010 CIMTEC 5th Forum on New Materials "Nonequilibrium Mechanics of Liquid Crystal Elastomers".
17. 2010 SIAM Conference on Mathematical Aspects of Materials Science "A Phase Field Approach to Modeling Nonequilibrium Behavior of Liquid Crystal Elastomers".
18. 2010 SPIE: Smart Materials and Structures "A Unified Model for Smart Materials".
19. 2010 Wright Patterson AFRL Minorities Leaders Review Meeting, "Next Generation Photo-responsive Adaptive Structures".
20. Invited talk: (2009) Eglin AFRL/REEF "Some Unifying Concepts for Smart Materials: Modeling and Applications"
21. Invited talk: (2009) Eglin AFRL/REEF workshop on micro air vehicles "Field-Coupled Mechanics and Applications of Smart Materials"
22. Invited talk: (2009) Florida Center for Advanced Aero-Propulsion Conference, Orlando, FL, "Challenges and Opportunities in Modeling, Device Development, and Control of Adaptive Structures"
23. 2009 International Liquid Crystal Elastomer Conference, Kent, OH, "Finite Deformation Effects on the Mesoscale Mechanics of Liquid Crystal Elastomers"
24. 2009 ASME Conference on Smart Materials, Adaptive Structures, and Intelligent Systems, Oxnard, CA, "A Phase Field Analysis of Thermomechanically Coupled Liquid Crystal Elastomers"
25. 2009 ASME Conference on Smart Materials, Adaptive Structures, and Intelligent Systems, Oxnard, CA, "Piezoelectric Controlled Pulsed Microjet Actuation"
26. 2009 Eglin AFRL/REEF "Some Unifying Concepts for Smart Materials: Modeling and Applications"
27. 2009 Eglin AFRL/REEF workshop on micro air vehicles "Field-Coupled Mechanics and Applications of Smart Materials"
28. 2009 Florida Center for Advanced Aero-Propulsion Conference, Orlando, FL, "Challenges and Opportunities in Modeling, Device Development, and Control of Adaptive Structures"
29. 2008 MRS Conference, Boston, MA, "Field-Coupled Mechanics of Domain Structure Evolution in Ferroelectric Thin Film Capacitors"
30. 2008 ASME Conference on Smart Materials, Adaptive Structures, and Intelligent Systems, Ellicott City, MD, "Piezohydraulic Actuation for Next Generation Microjet Flow Control"
31. Invited talk: 2007. "Modeling and Control of Ferroic Materials: From Nanoscale Domain Structures to Macroscale Devices" University of Florida, Dept. of Materials Science and Engineering, Gainesville, FL.
32. 2007 American Control Conference, New York, NY, "Experimental Implementation of a Nonlinear Control Method for Magnetic Transducers"

33. 2007 ASME International Mechanical Engineering Congress and R&D Expo, Seattle, WA, "Multiscale Constitutive Model Development and Finite Element Implementation for Magnetostrictive Materials"
34. 2006 ASME International Mechanical Engineering Congress and R&D Expo, "Polarization Switching in (111) Oriented PZT Thin Films" and "Multi-axial Homogenized Energy Model for Ferroelectric Materials"
35. 2006 ISAF: International Symposium for Applied Ferroelectrics, "Computational Modeling of Domain Structures in Ferroelectric Thin Films" oral presentation and "A Multiaxial Homogenized Energy Model for Ferroelectric Materials" poster presentation
36. 2006 SPIE International Smart Structures and Materials Conference, "Nonlinear Optimal Tracking Control of a Piezoelectric Nanopositioning Stage"
37. Invited talk: 2005 "High Performance Smart Material Systems: Multi-scale Constitutive Modeling and Nonlinear Control " North Carolina State University, Dept. of Mechanical Engineering, Raleigh, NC.
38. 2005 ASME International Mechanical Engineering Congress and R&D Expo, "Nonlinear Tracking Control of Magnetostrictive Actuators"
39. 2005 SPIE International Smart Structures and Materials Conference, "Anisotropic Fracture of Single Crystal Relaxor PZN-4.5%PT," and "Nonlinear Optimal Control of Plate Structures Using Magnetostrictive Materials"
40. 2004 SPIE International Smart Structures and Materials Conference, "Phase Field Modeling of Domain Structures in Ferroelectric Materials"
41. 2004 Statistical and Applied Mathematical Sciences Institute (SAMSI) workshop on Multi-scale Model Development and Control Design, poster presentation, "Characterization and Modeling of Domain Engineered Relaxor Single Crystals"
42. 2003 ASME International Mechanical Engineering Congress and R&D Expo, "Subcritical Crack Growth of Ferroelectric Materials", "Development of Stress Gradient Enhanced Composite Piezoelectric Actuators" and "Relaxor Ferroelectric Single Crystal Behavior and Phase Field Modeling"
43. 2003 Gordon Conference on Solid State Studies in Ceramics, poster presentation on "Subcritical Crack Growth of Ferroelectric Materials"
44. 2003 SPIE International Smart Structures and Materials Conference, "New Approach to Solving Crack Tip Stress Fields in Piezoelectric Materials"
45. 2002 ASME International Mechanical Engineering Congress and R&D Expo, "Orthotropy Rescaling for the Fracture Problem in Anisotropic Piezoelectric Materials"
46. 2002 SPIE International Smart Structures and Materials Conference, "System Dynamic Modeling of a Piezoelectric Pump"