

DONALD J. LEO

Associate Professor
Mechanical Engineering Department
Virginia Polytechnic Institute and State University



Education:

1990-1995

University of Buffalo
Mechanical and Aerospace Engineering
Doctor of Philosophy, 1995
Dissertation Title: Convex Controller Design for Linear Mechanical Systems

University of Buffalo
Mechanical and Aerospace Engineering
Master of Science, 1992
Thesis Title: Active Control of a Slewing Frame

1986-1990

University of Illinois at Urbana-Champaign
Aeronautics and Astronautics Engineering
Bachelor of Science, 1990

Professional Employment:

June 2002 to Present

Associate Professor
Virginia Polytechnic Institute and State University
Mechanical Engineering Department
Blacksburg, VA

August 1998 to June 2002

Assistant Professor
Virginia Polytechnic Institute and State University
Mechanical Engineering Department
Blacksburg, VA

January 1997 to July 1998

Assistant Professor
University of Toledo
Department of Mechanical, Industrial, and Manufacturing Engineering
Toledo, OH

January, 1995 to December, 1996

Project Engineer
CSA Engineering, Inc.
Palo Alto, CA

Awards and Honors:

- Recipient of the 2001 NSF Career Award
- AFOSR Summer Faculty Research Fellow (Kirtland AFB) – 1997 and 1998
- ‘Dean’s List’ of Virginia Tech Professors for the last four semesters

Research Interests:

- Dynamics and control of active material systems.

Research Funding History

- Over \$2M in funded research from various federal agencies and private firms. Federal research sponsors include NSF, AFOSR, and DARPA; private sponsors include Daimler-Chrysler and smaller firms such as CSA Engineering, Inc. and Dynamic Structures and Materials, LLC.

Selected Research Projects:

- “CAREER: Chemoelectric and electromechanical energy conversion in ionic polymer material systems,” National Science Foundation, \$325,000 / 5 years.
- “Piezohydraulic actuation systems for exoskeletal devices,” Oak Ridge National Labs / DARPA, \$156,937 / 1 year.
- “Electroactive Polymer Membranes for In-Situ Dynamic Mechanical Analysis,” National Science Foundation, \$223,339 / 3 years.

Teaching Responsibilities:

- ME 5505: Advanced Control Engineering – State-space methods
- ME 5506: Advanced Control Engineering – Digital control systems
- ME 5984: Active Material Systems: Analysis and Design
- ME 2024: Engineering Design and Economics

Academic Advising:

- Currently advising the research of two Ph.D. candidates and five Masters students.
- Graduated one Ph.D. student and seven Masters students while at Virginia Tech.
- Graduated three Masters students while a faculty member at The University of Toledo.

Professional Service:

- Chosen as the Technical Chair (2003) and General Chair (2004) for the ASME Adaptive Structures and Materials Symposium.
- Member of the SPIE Program Committee on Passive Damping and Isolation
- Member of the SPIE Program Committee on Active Materials, Behavior and Mechanics
- Member of the ASME Technical Committee on Adaptive Structures and Materials
- Served as a proposal reviewer for the National Science Foundation and the Air Force Office of Scientific Research

Journal Publications

1. Chandresekaran, S., Lindner, D., Leo, D.J., "Effect of feedback control on the power consumption of induced strain actuators," to appear in the *Journal of Intelligent Material Systems and Structures*.
2. Lane, S. A., Griffin, S., Leo, D.J., "Active Structural Acoustic Control of a Launch Vehicle Fairing using Monolithic Piezoceramic Actuators," to appear in the *Journal of Intelligent Material Systems and Structures*.
3. Shahinpoor, M., Kim, K., Leo, D.J., 2002, "Ionic Poly-Metal Composites as Multifunctional Material," to appear in the *Polymer Composites Journal*.
4. Newbury, K., Leo, D.J., 2002, "Electromechanical Modeling and Characterization of Ionic Polymer Benders," to appear the *Journal of Intelligent Material Systems and Structures*.
5. Mallavarapu, K.*, Leo, D.J., 2001, "Feedback control of the bending response of ionic polymer actuators," *Journal of Intelligent Material Systems and Structures*, vol. 12, pp. 143-155.
6. Malowicki, M.*, Leo, D.J., 2001, "Active vibration isolation using an induced strain actuator with applications to automotive seat suspensions," *Shock and Vibration*, vol. 8, no. 5, pp. 271-286.
7. McEver, M.A.*, Leo, D.J., 2001, "Autonomous vibration suppression using on-line pole-zero identification," *ASME Journal of Vibration and Acoustics*, vol. 123, no. 4, pp. 487-495.
8. Green, K.*, Leo, D.J., 2000, "Piezoelectric-actuated vibroacoustic absorbers for interior noise control," *Journal of Intelligent Material Systems and Structures*, vol. 11, no. 11, pp. 910—920.
9. Nasser, K.*, Leo, D.J., 2000, "Efficiency of frequency-rectified piezohydraulic and piezopneumatic actuation," *Journal of Intelligent Material Systems and Structures*, vol. 11, no. 10, pp. 798-810.
10. Leo, D.J., Austin, E., and Beattie, C., 2001, "Constrained substructure approach to optimal strain energy analysis," *ASME Journal of Vibration and Acoustics*, vol. 123, no. 3, pp. 340-346.
11. Newbury, K.M.*, Leo, D.J., 2001, "Structural dynamics of stiffened plates with piezoceramic sensors and actuators," *AIAA Journal*, vol. 39, no. 5, pp. 942-950.
12. Leo, D.J., Limpert*, D., 2000, "Self-sensing technique for active acoustic attenuation," *Journal of Sound and Vibration*, vol. 235, no. 5, pp. 863—873.
13. Leo, D.J., 2000, "Energy analysis of piezoelectric-actuated structures driven by linear amplifiers," *Journal of Intelligent Material Systems and Structures*, vol. 10, no. 1, pp. 36-45.
14. Leo, D.J., 1999, "Maximizing the power output of air-acoustic actuator arrays," *Journal of Intelligent Material Systems and Structure*, vol. 9, no. 7, pp. 534-545.
15. Leo, D.J., Inman, D.J., 1999, "A quadratic programming approach to the design of active-passive vibration isolation systems," *Journal of Sound and Vibration*, vol. 220, no. 5, pp. 807-825.
16. Leo, D.J., Inman, D.J., 1997, "Convex controller design for vibration induced by uncertain excitation," *Journal of Wind Engineering and Industrial Aerodynamics*, vol. 69-71, pp. 105-119.
17. Banks, H.T., Inman, D.J., Leo, D.J., Wang, Y., 1996, "An experimentally validated damage detection theory in smart structures," *Journal of Sound and Vibration*, vol. 191, no. 5, pp. 859-880.

18. Dosch, J.J., Leo, D.J., Inman, D.J., 1995, "Modeling and control for vibration suppression of a flexible active structure," *Journal of Guidance, Control, and Dynamics*, vol. 18, pp. 340-346.
19. Crassidis, J.L., Leo, D.J., Mook, D.J., Inman, D.J., 1994, "Robust identification and vibration suppression of a flexible structure," *Journal of Guidance, Control, and Dynamics*, vol. 17, pp. 921-928.
20. Leo, D.J., Inman, D.J., 1993a, "Pointing control and vibration suppression of a slewing flexible frame," *Journal of Guidance, Control, and Dynamics*, vol. 17, pp. 529-536.
21. Leo, D.J., Inman, D.J., 1993b, "Modeling and control simulations of a slewing frame containing active members," *Smart Materials and Structures Journal*, vol. 2, pp. 82-95.