ERIC M. MOCKENSTURM

Specialized Professional Competence

Theoretical and applied mechanics, including non-linear structural mechanics, finite element analysis, and three-dimensional rigid body mechanics. Non-linear systems analysis and simulation. Elastic and dynamic stability of structures. Multi-scale modeling.

Background and Professional Honors

B.S. (Mechanical Engineering), University of Michigan, Ann Arbor
M.S. (Mechanical Engineering), University of Michigan, Ann Arbor
Ph.D. (Mechanical Engineering), University of California, Berkeley

Engineer,
Talas Engineering, Inc.
Owner,
Stable Focus Consulting, LLC
Professor of Mechanical Engineering,
Pennsylvania State University, University Park
Summer Research Faculty Fellow,
NASA Langley Research Center
Graduate Student Researcher/Instructor,
Department of Mechanical Engineering, University of California, Berkeley
Graduate Student Researcher,
Department of Mechanical Engineering, University of Michigan, Ann Arbor

Professional Activities & Memberships

Paper Reviewer:
ASME Journal of Applied Mechanics
ASME Journal of Vibration and Acoustics
Journal of Non-linear Mechanics
Journal of Sound and Vibration
ASME Journal of Mechanical Design
Nanotechnology
Journal of Intelligent Material Systems and Structures
Proposal Reviewer: National Science Foundation

Awards

National Science Foundation Graduate Research Fellowship
National Science Foundation Faculty Early Career Development (CAREER) Grant
Outstanding Graduate Student, University of Michigan
California Institute of Technology, Graduate Research Fellowship (declined)
SAE Doctoral Engineering Scholarship
NASA Summer Faculty Fellowship
Graduated *Summa Cum Laude*
Tau Beta Pi (engineering honor society)
Pi Tau Sigma (Mechanical Engineering Honor Society)
National Bank of Detroit Scholarship

Courses Taught

Design Methodology/Senior Design Project
Vibration of Mechanical Systems
Finite Elements in Mechanical Engineering
Elastic and Dynamic Stability of Structures
Foundations of Structural Dynamics and Vibrations
Advanced Dynamics

Selected Publications and Presentations

"A Method for Lens Distortion Correction of Algorithmically Altered Images," SAE Technical Paper 2025-01-8680, SAE International 2025 World Congress, Detroit, Michigan, April 2025 (with K. Pittman, T. Buckman, and K. White).

"Geometry and Chiral Symmetry Breaking of Ripple Junctions in 2D Materials," Journal of the Mechanics and Physics of Solids, 2019 (with P. Zhao, Y. Wang, B. Katz, V. Crespi, and S. Zhang).

"Theory of Electrocaloric Effect in a Shape-Changing Container: Gas in a Nanotube," *Physical Review Letters*, 2014 (with O. Shklyaev, M. Cole, and V. Crespi).

"Theory of Carbomorph Cycles," *Physical Review Letters*, 2013 (with O. Shklyaev and V. Crespi).

"Modeling Electrostatically Induced Collapse Transitions in Carbon Nanotubes," *Physical Review Letters*, 2011 (with O. Shklyaev and V. Crespi).

"Carbon Nanostructures as an Electromechanical Bicontinuum," *Physical Review Letters*, 2007 (with C. Nisoli, P. Lammert, and V. Crespi).

"Controlling Interfacial Chemistry During the Processing of Micron Scale Surgical Instruments," *Ceramic Transactions*, 2007 (with N. Antolino, G. Hayes, J. Adair, C. Muhlstein, and M. Frecker).

"Electro-Elastomers: Large Deformation Analysis of Silicone Membranes," *International Journal of Solids and Structures*, 2007 (with N. Goulbourne, and M. Frecker).

"Topology Optimization of 2D Continua for Minimum Compliance Using Parallel Computing," *Structural and Multidisciplinary Optimization*, 2006 (with A. Mahdavi, R. Balaji, and M. Frecker).

"A Motion Amplifier Using an Axially Driven Buckling Beam: II. Modeling And Analysis," *Nonlinear Dynamics*, 2006 (with J. Jiang).

"Dynamic Response of Dielectric Elastomers," *International Journal of Non-Linear Mechanics*, 2006 (with N. Goulbourne).

"A Motion Amplifier Using an Axially Driven Buckling Beam: I. Design And Experiments," *Nonlinear Dynamics*, 2006 (with J. Jiang).

"A Nonlinear Model for Dielectric Elastomer Membranes," Journal of Applied Mechanics, 2005 (with N. Goulbourne and M Frecker).

"Piece-Wise Linear Dynamic Systems with One-Way Clutches," *Journal of Vibration and Acoustics*, 2005 (with R. Balaji).

"Dynamic Analysis of a Front-End Accessory Drive with a Decoupler/Isolator," *International Journal of Vehicle Design*, 2005 (with R. Balaji).

"Nonlinear Vibration of Parametrically Excited, Viscoelastic, Axially Moving Strings," Journal of Applied Mechanics, 2005 (with J. Guo).

"Increasing The Mechanical Work Output of an Active Material Using a Nonlinear Motion Transmission Mechanism," *Journal of Intelligent Material Systems and Structures*, 2004 (with G. Lesieutre, J. Loverich, G. Koopmann).

"Modeling And Design Optimization of a Bimorph-Driven Rotary Motor," *Journal of Intelligent Material Systems And Structures*, 2003 (with J. Frank, G. Koopmann, G. Lesieutre, W. Chen, et al.).

"The Elastic Stability of Twisted Plates," *Journal of Applied Mechanics*, 2001.

"Free Response of Twisted Plates with Fixed Support Separation," *Journal of Vibration and Acoustics*, 2001 (with C.D. Mote, Jr.).

"Mechanics and Tribology of Flexible Media in Information Processing System," *CRC Handbook of Modern Tribology*, 2000 (with R. Benson).

"Steady Motions of Translating, Twisted Webs," *International Journal of Non-Linear Mechanics*, 1999 (with C.D. Mote, Jr.).

"Why Wide Webs Wrinkle," *Perspectives in Control*, 1998 (with C.D. Mote, Jr.).

"A Structural Model of the Forced Compression of The Fingertip Pulp," *Journal of Biomechanics*, 1998 (with E.R. Serina, C.D. Mote, Jr, and D. Rempel).

"Stability and Limit Cycles of Parametrically Excited, Axially Moving Strings," Journal of Vibration and Acoustics, 1996 (with N. Perkins and A. Ulsoy).