JOHN W. SANDERS

1800 College Ave ♦ Quincy, IL 62301
(217) 228-5432 ext 3269 ♦ j.sanders48@quincy.edu
https://www.linkedin.com/in/johnwsanders/

EDUCATION

Ph.D. ♦ THEORETICAL & APPLIED MECHANICS
University of Illinois at Urbana-Champaign ♦ Champaign, IL ♦ August 2017

M.S. ♦ THEORETICAL & APPLIED MECHANICS
University of Illinois at Urbana-Champaign ♦ Champaign, IL ♦ August 2013

B.S. ♦ ENGINEERING PHYSICS and **MATHEMATICS**
Saint Louis University ♦ St. Louis, MO ♦ May 2011 ♦ GPA: 3.99 / 4.00 (*Summa Cum Laude*)

Sapienza University of Rome ♦ Rome, Italy
Visiting Scholar ♦ *Dept. of Structural & Geotechnical Engineering* ♦ Spring 2012

RESEARCH INTERESTS

Analytical Mechanics ♦ Applied Mathematics ♦ Applied Physics ♦ Computational Mechanics ♦ Fluid Mechanics ♦ Fracture Mechanics ♦ Hamilton-Jacobi Equations ♦ Navier-Stokes Equations ♦ Nonlinear Dynamics & Vibrations ♦ Numerical Methods ♦ Solid Mechanics ♦ Variational Calculus

ACADEMIC EXPERIENCE

QUINCY UNIVERSITY ♦ Quincy, IL
Engineering Program Director ♦ January 2026-present
Associate Professor ♦ *Mechanical Engineering* ♦ January 2026-present

THE CITADEL, THE MILITARY COLLEGE OF SOUTH CAROLINA ♦ Charleston, SC
Associate Professor ♦ *Mechanical Engineering* ♦ January 2023-December 2025

CALIFORNIA STATE UNIVERSITY, FULLERTON ♦ Fullerton, CA
Associate Professor ♦ *Mechanical Engineering* ♦ August 2022-January 2023
Assistant Professor ♦ *Mechanical Engineering* ♦ August 2017-August 2022

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN ♦ *Mechanical Science & Engineering*
Graduate Research Assistant ♦ May 2013-June 2017 ♦ Lab of Petros Sofronis
Graduate Teaching Fellow ♦ Summer 2014, Summer 2015, Summer 2016
Graduate Teaching Assistant ♦ Fall 2013, Spring 2015-Spring 2017
Graduate Research Assistant ♦ August 2011-May 2013 ♦ Lab of Harry Dankowicz

SAINT LOUIS UNIVERSITY ♦ St. Louis, MO ♦ *Physics* | *Aerospace & Mechanical Engineering*
Undergraduate Research Assistant ♦ November 2010-May 2011 ♦ Lab of Arif Malik
Undergraduate Teaching Assistant ♦ Spring 2010, Fall 2010
Academic Tutor ♦ August 2008-December 2010

INDUSTRY/INTERNSHIP EXPERIENCE

DRS TECHNOLOGIES / DRS MARLO COIL ♦ High Ridge, MO
Engineering Intern ♦ Summer 2010
Engineering Intern ♦ Summer 2009
Engineering Intern ♦ Summer 2008

MIDCOAST AVIATION ♦ Cahokia, IL
Consultant ♦ March 2010-April 2010

MENTORSHIP

QUINCY UNIVERSITY ♦ Quincy, IL
Academic Adviser ♦ Spring 2026-present

THE UNIVERSITY PHYSICS COMPETITION
Faculty Sponsor ♦ 2019-present
- Awards to date: 2 Silver Medals, 3 Bronze Medals, 9 Accomplished Competitors

THE CITADEL, THE MILITARY COLLEGE OF SOUTH CAROLINA ♦ Charleston, SC
Graduate Research Adviser ♦ *Mechanical Engineering* ♦ August 2024-December 2025
Undergraduate Research Adviser ♦ *Mechanical Engineering* ♦ January 2024-December 2025
Academic Adviser ♦ *Mechanical Engineering* ♦ Spring 2023-December 2025

CALIFORNIA STATE UNIVERSITY, FULLERTON ♦ Fullerton, CA
Graduate Research Adviser ♦ *Mechanical Engineering* ♦ May 2018-January 2022
Undergraduate Adviser ♦ *Mechanical Engineering* ♦ Spring 2020-January 2022

INTERNATIONAL INSTITUTE FOR CARBON-NEUTRAL ENERGY RESEARCH ♦ Champaign, IL
Research Mentor ♦ February 2016-March 2016

UNDERGRADUATE RESEARCH SUPERVISED

THE CITADEL, THE MILITARY COLLEGE OF SOUTH CAROLINA ♦ Charleston, SC
- **Joseph Gaglione** ♦ B.S. ♦ Mechanical Engineering ♦ Spring 2026
  - Project title: “Symplectic integrators for the Navier-Stokes equations”
- **Howard Cushman** ♦ B.S. ♦ Mechanical Engineering ♦ Spring 2026
  - Project title: “Symplectic integrators for the Navier-Stokes equations”
- **Robert Chapman** ♦ B.S. ♦ Mechanical Engineering ♦ Spring 2026
  - Project title: “Symplectic integrators for the Navier-Stokes equations”
- **Sutthikiat Sungkeetanon** ♦ B.S. ♦ Mechanical Engineering ♦ Spring 2025
  - Project title: “Symplectic integrators for the Navier-Stokes equations”
- **Tyler Kelly** ♦ B.S. ♦ Mechanical Engineering ♦ Spring 2025
  - Project title: “Symplectic integrators for the Navier-Stokes equations”

- **Eric Becker** ♦ B.S. ♦ Mechanical Engineering ♦ Spring 2025
  - Project title: "A study of the improved efficiency of the dual-oscillator algorithm for computing resonant frequencies"

CALIFORNIA STATE UNIVERSITY, FULLERTON ♦ Fullerton, CA
- **Serop Kelkelian** ♦ B.S. ♦ Mechanical Engineering ♦ Spring 2023
  - Project title: "A web-based application for visualizing tensor component transformations"

GRADUATE RESEARCH SUPERVISED

THE CITADEL, THE MILITARY COLLEGE OF SOUTH CAROLINA ♦ Charleston, SC
- **Blakeley Odom** ♦ M.S. ♦ Mechanical Engineering ♦ Spring 2025
  - Project title: "Symplectic integrators for the Navier-Stokes equations"

CALIFORNIA STATE UNIVERSITY, FULLERTON ♦ Fullerton, CA
- **Jo Wang Dickinson** ♦ M.S. ♦ Mechanical Engineering ♦ Spring 2022
  - Project title: "Autonomous shepherding by multiple agents with intermittent communication"
  - Winner: CSUF 2021 Outstanding Scholarly and Creative Activities Award
- **Negar Jamshidi** ♦ M.S. ♦ Mechanical Engineering ♦ Spring 2020
  - Thesis title: "Simulating void growth in high-temperature alloys: Effect of primary creep"
- **Niloofar Jamshidi** ♦ M.S. ♦ Mechanical Engineering ♦ Spring 2020
  - Thesis title: "Simulating void growth in high-temperature alloys: Effects of surface diffusion, grain boundary diffusion, and bulk secondary creep"

PEER-REVIEWED JOURNAL ARTICLES

R. L. Chapman, **T. M. Kelly**, **J. S. Gaglione**, **H. A. Cushman**, **S. Sungkeetanon**, B. MacGavin, A. C. DeVoria, N. J. Washuta, and **J. W. Sanders**, "Generalized symplectic integrators," *Journal of Computational and Nonlinear Dynamics*, vol. 21, pp. 071001, 2026

E. T. Becker, D. J. Inman, and **J. W. Sanders**, "On the improved efficiency of higher-order dynamics for computing resonant frequencies," *Journal of Computational and Nonlinear Dynamics*, vol. 20, pp. 081005, 2025

J. W. Sanders, **E. T. Becker**, and A. C. DeVoria, "Extension of Hamiltonian mechanics to non-conservative systems via higher-order dynamics," *Journal of Vibration and Acoustics*, vol. 146, pp. 061107, 2024

J. W. Sanders, A. C. DeVoria, N. J. Washuta, G. A. Elamin, K. L. Skenes, and J. C. Berlinghieri, "A canonical Hamiltonian formulation of the Navier-Stokes problem," *Journal of Fluid Mechanics*, vol. 984, pp. A27, 2024

J. W. Sanders and D. J. Inman, "Rapid computation of resonant frequencies for non-proportionally damped systems using dual oscillators," *Journal of Vibration and Acoustics*, vol. 145, pp. 031008, 2023

J. W. Sanders, "A dual-oscillator approach to complex-stiffness damping based on fourth-order dynamics," *Nonlinear Dynamics*, vol. 109, pp. 285-301, 2022

J. W. Sanders, **N. Jamshidi**, **N. Jamshidi**, M. Dadfarnia, S. Subramanian, H. Sehitoglu, J. Stubbins, and P. Sofronis, "Effects of diffusion and primary creep on intergranular cavitation at high temperatures," *International Journal of Fracture*, vol. 236, pp.125-141, 2022

J. W. Sanders, M. Dadfarnia, H. Sehitoglu, J. Stubbins, and P. Sofronis, "On the stress field ahead of a stationary crack tip during the transition from primary to secondary creep," *International Journal of Solids and Structures*, vol. 193-194, pp. 455-473, 2020

J. W. Sanders, M. Dadfarnia, J. Stubbins, and P. Sofronis, "On the fracture of high temperature alloys by creep cavitation under uniaxial or biaxial stress states," *Journal of the Mechanics and Physics of Solids*, vol. 98, pp. 49-62, 2017

J. W. Sanders, "An easy way to determine the sense of rotation of phase plane trajectories," *The Pi Mu Epsilon Journal*, vol. 13, no. 8, pp. 491-494, 2013

PEER-REVIEWED CONFERENCE PAPERS

R. L. Chapman, **T. M. Kelly**, **J. S. Gaglione**, **H. A. Cushman**, **S. Sungkeetanon**, B. MacGavin, A. C. DeVoria, N. J. Washuta, and **J. W. Sanders**, "Generalized symplectic integrators," in *Proceedings of the ASME 2025 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference,* Anaheim, CA, USA, August 17-20, 2025

J. W. Sanders, **E. T. Becker**, and A. C. DeVoria, "Extension of Hamiltonian mechanics to non-conservative systems," in *Proceedings of the ASME 2024 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference,* Washington, DC, USA, August 25-29, 2024

E. T. Becker, D. J. Inman, and **J. W. Sanders**, "On the improved efficiency of higher-order dynamics for computing resonant frequencies," in *Proceedings of the ASME 2024 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference,* Washington, DC, USA, August 25-29, 2024

J. W. Sanders, **S. Kelkelian**, M. Wieser, and G. Bischof, "Visualizing tensor component transformations using virtual reality and web-based applications," in *Proceedings of the ASEE 2022 Annual Conference & Exposition,* Minneapolis, MN, USA, June 26-29, 2022

J. W. Sanders, **N. Jamshidi**, **N. Jamshidi**, M. Dadfarnia, S. Subramanian, and J. Stubbins, "Simulation of intergranular void growth under the combined effects of surface diffusion, grain boundary diffusion, and bulk creep," in *Proceedings of the TMS 2021 Annual Meeting & Exhibition*, March 15-18, 2021

H. Weiss and **J. W. Sanders**, "A curriculum-spanning review video library to improve retention of prerequisite course material," in *Proceedings of the ASEE 2020 Annual Conference & Exposition,* ASEE's Virtual Conference, June 22-26, 2020 (Winner: Best Paper, Mechanical Engineering Division)

J. W. Sanders, "Could chalk hopping be caused by reverse chatter?" in *Proceedings of the ASME 2018 Dynamic Systems and Control Conference,* Atlanta, GA, USA, September 30-October 3, 2018

J. W. Sanders, "Demystifying tensors: A friendly approach for students of all disciplines," in *Proceedings of the ASEE 2018 Annual Conference & Exposition,* Salt Lake City, UT, USA, June 24-27, 2018 (Winner: Best Paper, Mathematics Division)

J. W. Sanders, G. Herman, and M. West, "Scaling-up project-based learning for a large introductory mechanics course using mobile phone data capture and peer feedback," in *Proceedings of the ASEE 2016 Annual Conference & Exposition,* New Orleans, LA, USA, June 26-29, 2016

J. W. Sanders, H. Dankowicz, and W. Lacarbonara, "Design and analysis of a microelectromechanical device capable of testing theoretical models of impact at the microscale," in *Proceedings of the ASME 2012 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference,* Chicago, IL, USA, August 12-15, 2012

A. Malik, **J. W. Sanders**, R. Grandhi, and M. Zipf, "Reliability-based optimal cluster mill pass scheduling," in *Proceedings of the ASME 2011 International Mechanical Engineering Congress & Exposition, Denver, CO, USA, November 11-17*, 2011

ARTICLES APPEARING ON PRE-PRINT SERVERS

S. Sungkeetanon, **J. S. Gaglione**, **R. L. Chapman**, **T. M. Kelly**, **H. A. Cushman**, **B. H. Odom**, B. MacGavin, G. A. Elamin, N. J. Washuta, J. E. Crosmer, A. C. DeVoria, and **J. W. Sanders**, "Unconditionally stable symplectic integrators for the Navier-Stokes equations and other dissipative systems," arXiv:2411.13569, 2024

J. W. Sanders, A. C. DeVoria, N. J. Washuta, G. A. Elamin, K. L. Skenes, and J. C. Berlinghieri, "A canonical Hamiltonian formulation of the Navier-Stokes problem," arXiv:2310.07085, 2023

J. W. Sanders, "Intrinsic variational structure of higher-derivative formulations of classical mechanics," arXiv:2301.10175, 2023

J. W. Sanders, "Fourth-order dynamics of the damped harmonic oscillator," arXiv:2109.06034, 2021

INVITED TALKS

"Modal analysis of non-proportionally damped dynamical systems without simultaneous diagonalization," Engineering Graduate Seminar, Saint Louis University, September 26, 2022

"Simulation of intergranular void growth under the combined effects of surface diffusion, grain boundary diffusion, and bulk creep," *TMS 2021 Annual Meeting & Exhibition*, March 15-18, 2021

CONTRIBUTED TALKS

"Generalized symplectic integrators," *ASME 2025 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Anaheim, CA, USA, August 17-20, 2025

"An unconditionally stable symplectic integrator for nonlinear dissipative systems," *NODYCON 2025*, Hoboken, NJ, USA, June 22-25, 2025

"Extension of Hamiltonian mechanics to non-conservative systems," *ASME 2024 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Washington, DC, USA, August 25-29, 2024

"On the improved efficiency of higher-order dynamics for computing resonant frequencies," *ASME 2024 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Washington, DC, USA, August 25-29, 2024

"A tale of two theories: Using ideas from quantum gravity physics to predict resonant frequencies in engineering structures faster and more efficiently than ever before," Pollak Library Faculty Noontime Talk Series, California State University, Fullerton, October 11, 2022

"Visualizing tensor component transformations using virtual reality and web-based applications," *ASEE 2022 Annual Conference & Exposition,* Minneapolis, MN, USA, June 26-29, 2022

"Quantifying crack-tip stress concentrations in high-temperature superalloys using Abaqus Unified FEA with a UMAT user-defined material subroutine," SIMULIA Regional User Meeting, Santa Clara, CA, USA, June 22, 2022

"Could chalk hopping be caused by reverse chatter?" *ASME 2018 Dynamic Systems and Control Conference,* Atlanta, GA, USA, September 30-October 3, 2018

"Demystifying tensors: A friendly approach for students of all disciplines," *ASEE 2018 Annual Conference & Exposition,* Salt Lake City, UT, USA, June 24-27, 2018

"Scaling-up project-based learning for a large introductory mechanics course using mobile phone data capture and peer feedback," *ASEE 2016 Annual Conference & Exposition,* New Orleans, LA, USA, June 26-29, 2016

"Design and analysis of a microelectromechanical device capable of testing theoretical models of impact at the microscale," *ASME 2012 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference,* Chicago, IL, USA, August 12-15, 2012

GRANTS AND FUNDED PROJECTS

J. W. Sanders (PI), A. DeVoria (Co-PI), J. C. Berlinghieri (Co-PI), **R. Chapman**, **H. Cushman**, **J. Gaglione**, **T. Kelly**, **S. Sungkeetanon**, and **B. Odom**, "More accurate weather predictions via symplectic integrators for the Navier-Stokes equations," *Climatological Research Studies Grant*, The Lt. Col. James B. Near, Jr., USAF, '77, Center for Climate Studies at The Citadel, the Military College of South Carolina, November 15, 2024-May 15, 2026 ($12,000)

J. W. Sanders (PI), A. DeVoria (Co-PI), N. Washuta (Co-PI), G. Elamin (Co-PI), K. Skenes (Co-PI), J. C. Berlinghieri (Co-PI), P. Niksiar (Co-PI), J. Righter (Co-PI), D. Ragan (Co-PI), J. Crosmer (Co-PI), and **E. T. Becker**, "Toward more accurate and reliable weather predictions via progress on the Navier-Stokes problem," *Climatological Research Studies Grant*, The Lt. Col. James B. Near, Jr., USAF, '77, Center for Climate Studies at The Citadel, the Military College of South Carolina, December 15, 2023-May 15, 2025 ($12,000)

COURSES TAUGHT

* Denotes courses proposed and developed by me

QUINCY UNIVERSITY

- ***ENM 200 | Foundations of Mechanical Engineering:** Introduction to fundamental concepts and applications of mechanical engineering. Topics covered include graphics, thermodynamics, measurement, design, fluid properties, and materials.
- ***ENM 215 | Introductory Dynamics:** Newtonian mechanics of particles and rigid bodies. Newton's laws of motion, and first-principles derivations of the work-energy theorem, impulse-momentum theorem, and linear/angular momentum balance for rigid bodies. Applications covered include projectile motion, roller coaster track design, gear systems, rolling motion, steering mechanisms, orbital motion, and gyroscopic motion.
- ***ENM 350 | Analytical Mechanics:** Variational calculus with applications to problems of constrained optimization, including geodesics and the isoperimetric problem. D'Alembert's

principle, the Euler-Lagrange equation, Hamilton's principle of stationary action, Hamilton's canonical equations, Noether's theorem, Liouville's theorem, and the Hamilton-Jacobi equation. Cursory discussion of relationships to relativity and quantum mechanics.

- **PHY 223 | Principles of Physics I:** Introduction to classical mechanics and waves for science and pre-engineering majors. Includes laboratory.
- **PHY 224 | Principles of Physics II:** Electricity, magnetism, and optics. Includes laboratory.

THE CITADEL, THE MILITARY COLLEGE OF SOUTH CAROLINA

- **ENGR 101 | Intro to Engineering:** Engineering students will broaden their understanding of the various engineering disciplines and sub-disciplines and develop a greater commitment to one engineering major. Various projects, conducted within a collaborative learning environment, focus on creative engineering solutions through technical analysis, critical thinking, teamwork, communication skills, and professionalism. Students will explore practical problem solving, career paths, ethical canons, professional licensure, and other topics key to academic success. Required of Civil, Computer, Construction, Electrical, and Mechanical Engineering freshmen.
- ***FSEM 101 | Logic & Inference:** Detectives use forensic evidence to reconstruct a crime and identify the culprit(s). Physicians and therapists observe a patient's symptoms to formulate a diagnosis and treatment plan. Scientists perform experiments to identify the laws of nature. Mathematicians prove general theorems that apply to anything that can be quantified. Engineers and computer scientists design products to fulfill societal needs while working within given constraints. Statisticians analyze data and draw conclusions. All of these examples have one thing in common. Logic, or how we infer what is true (or not true) based on available data, is at the heart of almost every discipline. In this course, you will learn about the different types of logic used in various professions and how to apply them. Students of every major, and students who are still undecided on their major, are all equally welcome in this course. No matter what you decide to do, this course is designed to help you succeed.
- **MECH 101 | Intro to Mechanical Engineering:** The engineering design process is demonstrated through use of practical problem solving methods for mechanical projects. Course subjects include mechanical engineering career paths, ethical canons of the engineering profession, and requirements for professional licensure. Course assignments, conducted within a collaborative learning environment, focus on creative engineering solutions through technical analysis, teamwork, communication skills, and professionalism. As a foundation for sustained success in mechanical engineering, additional course topics include: lifelong learning, time management, community and professional service, and career development.
- **MECH 202 | Engineering Computer Applications:** Foundations of computing to include software tools and engineering processes for mechanical engineers. Topics may include: spreadsheet basics (Excel), structured programming (MATLAB), and programmable microcontrollers (Arduino). Introductions to teaming and creativity.
- **CIVL 304 | Mechanics of Materials:** Elastic properties of structural materials; internal stresses and strains; principal stresses and strains including Mohr's Circle; axial; torsion; flexure; shear; bolted joints; combined stresses; shear and moment diagrams; beam deflections.
- **MECH 360 | Mechanical Engineering System Design:** This course provides experience in the integration of math, science, and engineering principles leading to a comprehensive engineering design project. Open-ended, client-based design problems emphasize a multidisciplinary approach to total system design providing multiple paths to a number of feasible and acceptable solutions which meet the stated performance requirements. Design teams are required to develop product specifications, generate alternatives through modeling, make practical engineering approximations to include probabilistic approaches, perform appropriate analysis to support the technical feasibility of the design, and make decisions leading to an optimal system design.

- **MECH 365 | Computational Methods in Engineering:** An introduction to numerical methods for engineers. Applications include: fluid mechanics, gas dynamics, heat and mass transfer, thermodynamics, vibrations, automatic control systems, and kinematics. Topics include: sources of errors in computing, mathematical bases of numerical methods, and implementation of numerical techniques using MATLAB.
- **MECH 478 | Lightweight Structures:** Applies the principles of mechanics to the structural analysis of mechanical and aerospace components. Covers stress tensors, shear flow in open and closed sections, beam columns, asymmetrical bending, Castigliano's theorem, statically indeterminate structures, thin-walled pressure vessels, introduction to elasticity.
- **MECH 499 | Advanced Independent Study in Mechanical Engineering:** The student, on an individual or small group basis, pursues advanced study of a research topic in mechanical engineering. The scope of the course is tailored to the desires of the student in consultation with the faculty advisor. The student is required to define and analyze the problem, study the fundamentals involved, organize the approach, determine the procedure, achieve a solution, and submit a written report.
- **MECH 606 | Fatigue and Fracture:** Stationary crack under static loading, energy balance, crack initiation and growth, dynamic crack growth, and fatigue of metals, ceramics, polymers, and composites.
- **MECH 697 | Special Topics in Mechanical Engineering:** Special topics in mechanical engineering will be offered to graduate students occasionally when the interest of the students and the availability of an instructor dictate.
- **MECH 702 | Theory of Elasticity:** Plane stress and plane strain; two-dimensional problems in rectangular and polar coordinates; strain energy methods; complex variables in two-dimensional problems; the general equations of three-dimensional elasticity.
- **MECH 703 | Theory of Plasticity:** Stress and strain tensors; elastic stress-strain relations, criteria of yielding; plastic stress-strain relations; elastoplastic problems of spheres and cylinders; the plane elastoplastic problem; the slip-line field.

CALIFORNIA STATE UNIVERSITY, FULLERTON

- **EGME 205 | Digital Computation:** Computers and their numerical applications. Programming languages, MathCAD, spreadsheet, digital computation methods in statistics and solving algebraic equations. Applications of general-purpose software for engineering analysis.
- **EGME 308 | Engineering Analysis:** Fundamentals and engineering applications of Fourier transforms, Laplace transforms, complex analysis, vector analysis; engineering applications.
- **EGME 331 | Solid Mechanics:** Mechanical properties of materials. Stress and strain. Elastic, plastic and thermal deformation, and failure criteria. Stress-strain relationships, stress-strain transformation, principal stresses, Mohr's circle. Analysis and design of beams for bending. Buckling of columns. Pressure vessels.
- ***EGME 402 | Analytical Dynamics:** Newtonian and Lagrangian mechanics; three-dimensional kinematics and kinetics of particles and rigid bodies; constrained systems; the calculus of variations; numerical methods; applications to engineering and design problems.
- **EGME 410 | Introduction to the Finite Element Method:** Basic concepts of integral and matrix formulation of boundary value problems. One dimensional finite element formulation of heat transfer, truss beam and vibration problems. Applications of commercial finite element programs. Selection criteria for code, element, and hardware. CAD system interfaces.
- ***EGME 430 | Introduction to Continuum Mechanics:** Continuum theory of solids and fluids; tensors and indicial notation; stress and strain; balance of linear and angular momentum; Hooke's

law of linear elasticity; Newton's law of viscosity; applications to finite element analysis, computational fluid dynamics, and engineering design problems.

- **EGME 431 | Mechanical Vibrations:** Modeling and analysis of single and multiple degree-of-freedom systems. Response to forcing functions. Vibrations of machine elements. Design of vibration isolation systems. Balance of rotating machinery. Random excitation and response of mechanical structures.
- **EGME 438 | Analytical Methods in Engineering:** Ordinary and partial differential equations with constant and variable coefficients; orthogonal functions; conformal mapping; potential theory; engineering applications.
- **EGME 497 | Undergraduate Project:** Directed independent research or design project.
- **EGME 597 | Graduate Project:** Directed independent research or design project.
- **EGME 598 | Graduate Thesis:** Directed independent research project.

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

- **TAM 212 | Introductory Dynamics:** Kinematics and dynamics of the three-dimensional motion of particles; kinematics and dynamics of the plane motion of rigid bodies; methods of work/energy and impulse/momentum; moving reference frames.

PROFESSIONAL SERVICE

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

Session Chair ♦ IDETC-CIE / MSNDC ♦ 2024-2025
Session Chair ♦ IDETC-CIE / VIB ♦ 2023-2025

AMERICAN SOCIETY FOR ENGINEERING EDUCATION (ASEE)

Referee ♦ ASEE Southeastern Section Conference ♦ 2022-2025
Referee ♦ ASEE Annual Conference & Exposition ♦ 2018-present

UNIVERSITY SERVICE

QUINCY UNIVERSITY ♦ Quincy, IL

Program Development ♦ 2025-present

THE CITADEL, THE MILITARY COLLEGE OF SOUTH CAROLINA ♦ Charleston, SC

Faculty Senate ♦ 2023-2025
Institutional Review Board (IRB) ♦ 2023-2025
Artificial Intelligence (AI) Task Force (Office of the Provost) ♦ 2024-2025
Diversity and Inclusion Committee (School of Engineering) ♦ 2023-2025
Tenure and Promotion Committees ♦ 2023-2025
Near Center for Climate Studies ♦ *Climate Fellow* ♦ 2023-2025

CALIFORNIA STATE UNIVERSITY, FULLERTON ♦ Fullerton, CA

Diversity and Inclusion Committee ♦ 2018-2022
Diversity, Equity, and Inclusion Committee ♦ 2020-2022

Assessment and Continuous Improvement Committee ♦ 2018-2022
Department Faculty Search Committee ♦ 2018-2020

PROFESSIONAL SOCIETIES

- In solidarity with: **National Society of Black Engineers (NSBE)**, 2025-present
- In solidarity with: **Society of Women Engineers (SWE)**, 2025-present
- **Society for Experimental Mechanics (SEM)**, 2022-2025
- **The Minerals, Metals, and Materials Society (TMS)**, 2021-2025
- **American Society of Engineering Education (ASEE)**, 2017-present
- **American Society of Mechanical Engineers (ASME)**, 2012-present
- **Pi Mu Epsilon National Mathematics Honor Society (PME)**, 2011-present