

Thomas M. Adams

Education

- 1998 **Georgia Institute of Technology**, Atlanta, GA
Ph.D. Mechanical Engineering
Dissertation: "Turbulent Convection in Microchannels"
- 1991 **Georgia Institute of Technology**, Atlanta, GA
MS, Mechanical Engineering
- 1990 **Rose-Hulman Institute of Technology**, Terre Haute, IN
BS Mechanical Engineering, Magna Cum Laude
Philosophy Minor

Appointments and employment

- 2019-present **Rose-Hulman Institute of Technology**, Terre Haute, IN
Herman A. Moench Distinguished Professor
- 2011-present **Rose-Hulman Institute of Technology**, Terre Haute, IN
Professor, Mechanical Engineering
- 2014 **Pontificia Universidad Católica del Perú**, Lima, Perú
Visiting Professor of Mechanical Engineering
- Rose-Hulman Institute of Technology**, Terre Haute, IN
- 2005-2011 *Associate Professor, Mechanical Engineering*
- 1999-2005 *Assistant Professor, Mechanical Engineering*
- Georgia Institute of Technology**, Atlanta, GA
- 1999 *Adjunct Professor*
- 1998 *Instructor*
- 1994-1998 *Graduate Teaching Assistant*
- 1992 **Georgia Environmental Organization**, Atlanta, GA
Public Outreach
- 1990-1991 **Georgia Institute of Technology**, Atlanta, GA
Graduate Teaching Assistant
- 1989 **Aspinwall and Carter Engineering**, Savannah, GA
Engineering Technician, Survey team party chief
- 1988 **Southeastern Surveying**, Hilton Head, SC
Rodman

Teaching

Rose-Hulman Institute of Technology

Statics and Mechanics of Materials I, Conservation and Accounting Principles, Fluid & Thermal Systems, Fluid Systems, Thermodynamics II, Applications of Thermodynamics, Heat Transfer, Mechanical Measurements Laboratory, Measurement Systems, Renewable Energy, Introduction to MEMS – Fabrication and Applications, Thermal Design, Advanced MEMS - Modeling and Packaging, Advanced Topics in MEMS, Microfluidics, and Advanced Thermodynamics.

Pontificia Universidad Católica del Perú

Introduction to micro-technology

Georgia Institute of Technology

Mechanics of Solids I, Thermodynamics I, Thermodynamics II, Thermal Systems Analysis, Experimental Methodology Lab, and Thermal Systems Design

Research

Entropy generation minimization in internal forced convection

Extended and reformulated existing methods for minimizing entropy generation in forced internal convection to apply to cases in which heat transfer and duct geometry are constant. Applications include both laminar and turbulent flow in smooth ducts and ducts that include augmented heat transfer surfaces.

Relative capture area as a measure of performance for wind turbines

Reinterpreted the power coefficient for wind turbines as the relative capture area and examined the implications for its use as a measure of performance.

Modeling and characterization of MEMS hot-arm actuators

Collaborated with undergraduate college students and high school students on modeling and experimentally verifying a multi-energy domain lumped element model for hot arm MEMS actuators.

“Shock-plugs” in compressible flow

Postulated the existence of and performed first-order analysis of “shock-plugs,” standing normal shocks of finite thickness. Collaborated with undergraduate and graduate students to refine the model and potentially experimentally detect shock-plugs’ presence.

Relating equivalent sand-grain roughness to Hazen-Williams roughness parameter

Developed a semi-empirical model to relate equivalent sand-grain roughness as used in finding the D’Arcy friction factor to the dimensionless roughness parameter used in the Hazen-Williams equation for flow velocity in pipe flow

Relating measured surface roughness parameters to equivalent sand-grain roughness

Collaborated with undergraduate students on developing and experimentally

validating an algorithm to relate various measured surface roughness parameters to the equivalent sand-grain roughness required for friction factor calculations.

Surface tension driven flow in microchannels

Developed macroscopic conservation law based physical models for the surface tension driven flow of liquids in microchannels.

Combined Electro-osmotic and Pressure-Driven Flow in Microchannels

Developed D'Arcy friction factor/mechanical energy formulations for liquid flow in microchannels due to the combined effect of electro-osmosis and applied pressure gradients.

Effect of ultrasound on solid microparticles

Worked at Rose-Hulman Ventures with a team of students on a project sponsored by Southwest Michigan First (SWMF) Life Science Fund. The project entailed experimental work aimed at assessing the feasibility of using ultrasound in the destruction of solid microparticles with applications in the medical field.

Titanium-nickel shape memory alloy MEMS heat engine

Investigated plausibility of creating a thin film titanium nickel (TiNi) shape memory alloy MEMS heat engine. Research includes design, physical and numerical modeling, and prototype development. Research is part of the ongoing efforts of the Rose-Hulman MEMS group and their continued work with undergraduate MEMS education at RHIT.

Effect of noncondensable gas desorption in turbulent microchannel flow

Developed computer models to predict void fraction, pressure drop, fluid velocity, temperature and heat transfer enhancement of water flow in microchannels due to the desorption of noncondensable gases. Also performed experiments to physically quantify the effect of the desorption of dissolved air in water on forced convection in microchannels. Experiments were performed under the guidance of the experimental thermal-hydraulics group at the Westinghouse Savannah River Site. Data were used to supplement the database pertinent to the cooling of a proposed design of the rod bundle of the Accelerator Production of Tritium (APT) project developed at Los Alamos National Laboratory.

Turbulent convection in microchannels

Designed and constructed an experimental test loop to measure single-phase heat transfer coefficients and friction factors in circular and non-circular channels with hydraulic diameters less than 2 mm. Research was motivated by the need to cool high power density resistive magnets developed by the High Magnetic Laboratory at Florida State University.

Graduate theses advised

- 2016 Thompson, M., "Shock-plugs in Quasi-one-dimensional Compressible Flow" Master's thesis, Rose-Hulman Institute of Technology
- 2013 Bomar, A. J., "A Model for the Application of Folded Fin Heat Sink Technology to an IGBT Cooling System" Master's thesis, Rose-Hulman Institute of Technology

- 2009 Armes, C. M., "Development of a Finite Element Model of a Generator Control Unit/Relay Box Mount for Normal Mode Vibration" Master's thesis, Rose-Hulman Institute of Technology
- 2008 Bobrowski, Sebastian, "Design and Fabrication of Piezoelectric MEMS Device Using a PZT Thin Film" Master's thesis, Rose-Hulman Institute of Technology
- 2007 Deckert, Martin, "Design of a MEMS Power Generating Device Using a Shape Memory Alloy and Piezoelectric Thin Film" Master's thesis, Rose-Hulman Institute of Technology
- 2005 Grüniger, Albert, "Power Scaling for a Diffusion Cooled Coaxial CO₂-Laser" Master's thesis, Rose-Hulman Institute of Technology
- 2004 Wang, Zhefu, "Design, Modeling and Fabrication of a TiNi MEMS Heat Engine" Master's thesis, Rose-Hulman Institute of Technology. This research was partially supported by the Rose-Hulman Graduate Studies Program as the winner of the annual graduate student proposal writing competition
- 2004 Arigapudi, Amith, "Characterization of Touch Mode Capacitive Pressure Sensors" Master's thesis, Rose-Hulman Institute of Technology

Books

- 2010 Adams, T. M., Layton, R. A., *Introductory MEMS: Fabrication and Applications*. Springer.
- 2006 Adams, T. M., "Economic Optimization of Heat Transfer Systems", chapter in *Heat Transfer Calculations*, Myer Kutz, Ed., McGraw-Hill

Publications and presentations:

- 2023 Adams, T. M., Nash, A. L., Muñoz Cámara, J., and Solano Fernández, J. P., "[Alternate Formulation for Entropy Minimization in Forced Internal Convection](#)," In *Proceedings of the 9th World Congress on Mechanical, Chemical, and Material Engineering (MCM'23)*, London, United Kingdom, August 6-8, 2023 (Recipient of Best Paper Award)
- 2022 White, F. M. and Adams, T. M., "[Boundary-Layer Flow](#)," *AccessScience*, McGraw-Hill Education
- 2022 White, F. M. and Adams, T. M., "[Fluid Mechanics](#)," *AccessScience*, McGraw-Hill Education, August 2021
- 2022 Adams, T. M. and Hagist, W. M., "[Hydraulics](#)," *AccessScience*, McGraw-Hill Education
- 2021 White, F. M. and Adams, T. M., "[Bernoulli's Theorem](#)," *AccessScience*, McGraw-Hill Education
- 2021 Adams, T.M. and Mertz, B.E. (2021). "[Horizontal Axis Wind Turbine Power Coefficient as Relative Capture Area](#)," *Journal of Fluid Flow, Heat and Mass Transfer (JFFHMT)*, 8, 254-261.
- 2021 White, F. M. and Adams, T. M., "[Laminar Flow](#)," *AccessScience*, McGraw-Hill Education
- 2021 Adams, T. M., "[On Generalist Scholarship: A hierarchical View of Research](#)," *Physics of Fluids*, 33 (9) 091401.
- 2021 Adams, T. M. and Mertz, B. E., "[A Re-examination of Power Coefficient as a Measure of Performance for Horizontal Axis Wind Turbines](#)," In *Proceedings of 8th International Conference on Heat Transfer and Fluid Flow*, Virtual Conference, August 2-4, 2021

- 2021 Adams, T. M., "[Eductionism: Anti-reductionism for a Better Life](#)," Rose Talks , Terre Haute, IN, March 21, 2021
- 2020 Adams, T. M., "[Generalist Scholarship and Engineering Education](#)," Keynote address, *International Conference on Fluid Flow and Thermal Science*, Virtual Conference, September 9-10, 2020
- 2020 Bomar, A. J. and Adams, T.M., "[A Robust Analytic Model of Folded Fin Cold Plates for Automotive Power Electronics Cooling](#)," In *Proceedings of 5th Thermal and Fluids Engineering Conference*, New Orleans, LA, April 5-8, 2020
- 2019 Adams, T. M., "Microscale Thermal Fluids: Still Plenty of Room at the Bottom," Keynote address, *6th International Conference on Heat Transfer and Fluid Flow*, Lisbon, Portugal, August 15-17, 2019
- 2019 Adams, T. M., "Reflections of a Former White Boy: Thoughts on Privilege in America," Rose-Hulman Lightening Talks 24, Terre Haute, IN, April 30, 2019
- 2018 T. M. Adams, J. T. Collins, J. Fernando, S. M. Griffin, R. L. Kreft, H. Kuok, A. E. McFarland, and E. J. Wasylewski, "[Role of Dimensionless Parameters in Modelling MEMS Hot-arm Actuators](#)," In *Proceedings of 5th International Conference on Heat Transfer and Fluid Flow*, Madrid, Spain, August 16-18, 2018. (Recipient of Best Paper Award)
- 2017 Adams, T. M. "[Dimensional Analysis of a Hot-arm Actuator](#)," In *Proceedings of 4th International Conference on Heat Transfer and Fluid Flow*, Rome, Italy, June 8-10, 2017
- 2016 Adams, T. M. "On the Scholarship of Generalization," Keynote address, *3rd International Conference on Heat Transfer and Fluid Flow*, Budapest, Hungary, August 22-23, 2016
- 2016 Adams, T. M. "[Improved Method for Converting Equivalent Sand-grain Roughness to Hazen-Williams Coefficient](#)," In *Proceedings of 3rd International Conference on Heat Transfer and Fluid Flow*, Budapest, Hungary, August 22-23, 2016
- 2015 Adams, T., Chang, E., Stevens, B., and Thompson, M., "[Analysis of Shock-plugs in Quasi-one-dimensional Compressible Flow](#)," In *Proceedings of 2nd International Conference on Heat Transfer and Fluid Flow*, Barcelona, Spain, July 20-21, 2015. (Received Best Paper Award)
- 2014 Adams, T. M., "Breve introducción a sistemas micro-electro-mecánicos (MEMS)," *II Jornada 2014, Superación y trabajo en equipo, P.P. Ingeniería Mecánica, Mecánica Eléctrica y Mecatrónica*, Universidad Católica Santa María, Arequipa, Perú, June 19-20, 2014.
- 2014 Adams, T. M., "[A brief introduction to micro-electro-mechanical systems \(MEMS\)](#)," *Coloquios de física 2014-1*, Pontificia Universidad Católica del Perú, San Miguel, Lima, Perú, June 13, 2014.
- 2013 Adams, T.M. (2013), "[Why Engineering Is Like Playing the Doors on Solo Ukulele](#)," *TEDx RoseHulman*, Terre Haute, IN, October 5, 2013.
- 2012 Adams, T., C. Grant, and Watson, H., "[A Simple Algorithm to Relate Measured Surface Roughness to Equivalent Sand-grain Roughness](#)," *International Journal of Mechanical Engineering and Mechatronics (ICMEM)*, **1** (1) 66-71.
- 2012 Grant, C., Adams, T., and Watson, H., "A Simple Algorithm to Relate Measured Surface Roughness to Equivalent Sand-grain Roughness," In *Proceedings of International Conference on Mechanical Engineering and Mechatronics*, Ottawa, Ontario, Canada, August 15-17, 2012.

- 2011 Adams, T. M., "Formative Classroom Assessment Techniques," *Five Years of Learning Together, CPSE 2011 Teaching Workshop*, Rose-Hulman Institute of Technology, August 18-19, 2011.
- 2011 Adams, T. M. and Raghunandan, A., "Modified Bernoulli Equation for Use with Combined Electro-Osmotic and Pressure-Driven Microflows," In *Proceedings of Canadian Congress of Applied Mechanics (CANCAM) 2011*, Vancouver, BC, Canada, June 5-9, 2011.
- 2010 Adams, T. M. and Dee, K. C., "Classroom Assessment Techniques," *Designing Effective Learning Environments, CPSE 2010 Teaching Workshop*, Rose-Hulman Institute of Technology, August 16-17, 2010.
- 2010 Adams, T. M., Bomar, A. J., and Kirkpatrick, S., "Lumped Element Model for a MEMS Hot Arm Actuator," In *Proceedings of the CSME Forum 2010*, Victoria, BC, Canada, June 7-10, 2010.
- 2010 Adams, T. M., Layton, R. L., and Taylor, C. M., "[Raising Expectations for the Quality of Graphical Elements in Reports and Presentations](#)," In *Proceedings of the 2010 National Capstone Design Conference*, Boulder, CO.
- 2010 Layton, R. L. and Adams, T. M., "[On Teaching the Operating Principles of Piezoresistive Sensors](#)", In *Proceedings of the 2010 American Society for Engineering Education Annual Conference & Exposition*, Louisville, KY.
- 2008 Adams, T. and White, A., "[Macroscopic Conservation Equation Based Model for Surface Tension Driven Flow](#)," In *Proceedings of 7th Annual International Conference on Advances in Fluid Mechanics*, The New Forest, UK, May 21-23, 2008.
- 2006 Deckert, M., Kirkpatrick, S., Adams, T., Wheeler, E. and Siahmakoun, A., (2006), "SMA Energy-Scavenger MEMS Device," In *Proceedings of SEM 2006*, St Louis, MO, June 4-7, 2006.
- 2006 Siahmakoun, A., Adams, T. Wheeler, E. and Kirkpatrick, S., "Undergraduate MEMS-Nano Courses for Everyone," *MRS 2006 Conference*, San Francisco, CA, April 17-21, 2006.
- 2005 Adams, T. M., Kirkpatrick, S. R., Wang, Z. and Siahmakoun, A., "NiTi Shape Memory Alloy Thin Films Deposited by Co-evaporation", *Materials Letters*, **59** (10), 1161-1164.
- 2004 Wang, Z., Kirkpatrick, S. R., Adams, T. M. and Siahmakoun, A., "TiNi MEMS Heat Engine," In *Proceedings of SEM X International Congress & Exposition*, Costa Mesa, CA
- 2004 Siahmakoun, A., Kirkpatrick, S. and Adams, T., "Shaped memory alloy TiNi heat actuator," *Nano and Microsystems Technology and Metrology*, Redstone Arsenal, AL, Nov. 17-18, 2004
- 2004 Adams, T. M. (2004), "[An Undergraduate MEMS Course for Everyone](#)", In *Proceedings of the 2004 American Society for Engineering Education Annual Conference & Exposition*, Salt Lake City, UT. (Received Best Paper Award)
- 1999 Adams, T. M., Dowling, M. F., Abdel-Khalik, S. I., and Jeter, S. M., "[Applicability of Traditional Turbulent Single-Phase Forced Convection Correlations to Non-Circular Microchannels](#)," *International Journal of Heat and Mass Transfer*, **42**, 4411-4415.
- 1999 Adams, T. M., Ghiaasiaan, S. M., and Abdel-Khalik, S. I., "[Enhancement of Liquid Forced Convection Heat Transfer in Microchannels Due to the Desorption of Dissolved Noncondensables](#)," *International Journal of Heat and Mass Transfer*, **42**, 3563-3573.

- 1999 Adams, T. M., Ghiaasiaan, S. M., and Abdel-Khalik, S. I., "[Effect of Dissolved Noncondensables on Hydrodynamics of Microchannels Subject to Liquid Forced Convection](#)," *Journal of Enhanced Heat Transfer*, **6**, 395-403.
- 1999 Adams, T. M., Ghiaasiaan, S. M. and Abdel-Khalik, S. I., "Effect of Dissolved Noncondensables on Liquid Forced Convection in Microchannels," In *Proceedings of the 33rd National Heat Transfer Conference*, Albuquerque, NM (Recipient of Best Paper Award)
- 1998 Adams, T. M., Abdel-Khalik, S. I., Jeter, and Qureshi, Z. H., "[An Experimental Investigation of Single-Phase Forced Convection in Microchannels](#)," *International Journal of Heat and Mass Transfer*, **41**, 851-857.
- 1997 Adams, T. M., Abdel-Khalik, S. I., Jeter, and Qureshi, Z. H., "An Experimental Investigation of Single-Phase Forced Convection in Microchannels," In *Proceedings of the 32nd National Heat Transfer Conference*, Baltimore, MD

Patent:

- 2008 Kirkpatrick, S. R., Siahmakoun, A., Adams, T. M., Wang, Z, *A Shape Memory Alloy MEMS Heat Engine*, (Patent [7,444,812](#))

Workshop/short course participation:

- 2021 Webinar: Ultra-White Paints for Full Daytime Sub-Ambient Radiative Cooling, sponsored by Indiana Society of Professional Engineers, November 11, 2021
- 2020 Virtual Workshop on COVID-19: Challenges in Research and Education, sponsored by the American Society of Thermal and Fluids Engineers (ASTFE)
- 2013 Workshop on Sustainability, American Society for Engineering Education (ASEE) Annual Conference and Exposition 2013
- 2013 Indiana Collegiate Press Association Convention (ICPA) convention, April 13, 2013, Bloomington, IN
- 2012 American Institute of Aeronautics and Astronautics (AIAA) 43rd AIAA Thermophysics Conference
- 2011 Five Years of Learning Together, Center for the Practice and Scholarship of Education (CPSE) 2011 Teaching Workshop, Rose-Hulman Institute of Technology, August 18-19, 2011
- 2010 Designing Effective Learning Environments, Center for the Practice and Scholarship of Education (CPSE) 2010 Teaching Workshop, Rose-Hulman Institute of Technology CPSE, August 16-17, 2010
- 2009 Energy Harvesting Short Course, IEEE 15th Annual Conference on Solid-State Sensors, Actuators and Microsystems, Denver CO June 21-25, 2009
- 2008 Faculty advisor, Nelis, M. R. and Park, G. (2008, November). *Use of a Collocated Sensor/Actuator for Vibration Suppression and Structural Health Monitoring*. Poster session presented at 2008 Science and Energy Research Challenge (SERCh), Oakridge National Laboratory, TN.
- 2006 NanoBio Fluidic MEMS Workshop, Georgia Institute of Technology, June 26-29, 2006 Atlanta, GA
- 2005 Microscale Thermal Engineering, ASME (American Society of Mechanical Engineers) 5th annual MEMS Technology Seminar, April 17-20, 2005, Minneapolis, MN

- 2003 Microfluidics Short Course, American Society of Mechanical Engineers (ASME) 3rd Annual MEMS Technology Seminar, May 19-21, 2003, Los Angeles, California
- 2002 MEMS Workshop, Microfabrication Applications Laboratory, July 8, 2002, University of Illinois at Chicago, Chicago, IL
- 2002 Analysis and Design of Microchannel Heat Exchangers Short Course at the International Compressor Engineering Conference and Refrigeration and Air Conditioning Conference, July 16-19, 2002, Purdue University, West Lafayette, IN
- 2002 Sharing the Learning Space, An IHETS All-Partners Conference, April 03, 2002, Indiana University, Bloomington, IN
- 2001 MEMS (Micro Electro-Mechanical Systems) workshop presented by IntelliSense Corporation, February 8-9, 2001, Rose-Hulman Institute of Technology, Terre Haute, IN
- 2000 NSF Engineering Education Scholars Workshop co-sponsored by University of New Hampshire, Syracuse University and Howard University, Jul 30-Aug 2, 2000, University of New Hampshire, Durham, NH
- 2000 Workshop on Process Education™ presented by Pacific Crest, Feb 28-Mar 1, 2000, Rose-Hulman Institute of Technology, Terre Haute, IN

Proposals/grants:

- 2015 Rose-Hulman Summer Professional Development Grant for "'Shock-plugs' in Quasi-One-Dimensional Compressible Flow." \$5000 funding awarded in 2015
- 2004 National Science Foundation MRI/RUI: Acquisition of an X-ray Diffraction System for Improvement in the Quality of Research and Education in Materials Related Sciences and Engineering: Co-investigator with E. Kirkpatrick and T. Hudson. \$129,965 funding awarded in 2004.
- 2002 Keck Foundation – Grant for the Development of a MEMS Course and Lab for Undergraduate Students: Collaboration with other Rose-Hulman faculty members. \$400,000 funding awarded in 2002.

Other professional development:

Creation of online textbook content

- 2013 McGraw-Hill Higher Education: Created forty videos to accompany McGraw-Hill's Schaum's Outline series for Fluid Mechanics and Thermodynamics titles.

Continuing education course

- 2012 Developed and taught continuing education course on fluid mechanics for professional engineers as part of the Evonik Degussa Professional Engineering Recertification Seminar, Feb 29, 2012, West Lafayette, IN

Consulting

- 2007 Rose-Hulman Ventures
Effect of Ultrasound on Solid Microparticles: Worked at with a team of students on a project sponsored by Southwest Michigan First (SWMF) Life Science Fund. The project entailed experimental work aimed at assessing the feasibility of using ultrasound in the destruction of solid microparticles with applications in the medical field.

2000 Collaboration with Dr. Sam V. Shelton of Georgia Institute of Technology
Created models of compressible flow of steam through a vent pipe and to provide estimates of pressure, temperature and Mach numbers in a power plant setting. Information was for use in a product liability case.

Textbook reviews

- 2021 Reviewer for the textbook *Fundamentals of Thermodynamics* by Michael J. Moran, Howard N. Shapiro, Daisie D. Boettner, and Margaret B. Bailey
- 2021 Reviewer for the textbook *Essentials of Heat Transfer* by Massoud Kaviany
- 2002-2003 Reviewer for the textbook *Fundamentals of Thermal and Fluid Systems* by Y. Çengel and R. Turner, comments and suggestions for which are incorporated in the later editions of the text
- 2002 Reviewer for chapters for the second edition of the heat transfer textbook *Heat Transfer, A Practical Approach* by Y. Çengel

Professional service:

Scientific committees, publication reviews

- 2021 Reviewer, *Surface and Interface Analysis*
- 2021 Reviewer, *Academia Letters*
- 2020 Scientific committee, 7th International Conference on Heat Transfer and Fluid Flow, Prague, Czech Republic, August 16-18, 2020
- 2019 Scientific committee, 6th International Conference on Heat Transfer and Fluid Flow, Lisbon, Portugal, August 15-17, 2019
- 2018 Scientific committee, 5th International Conference on Heat Transfer and Fluid Flow, Madrid, Spain, August 16-18, 2018
- 2017 Scientific committee, 4th International Conference on Heat Transfer and Fluid Flow, Rome, Italy, June 8-10, 2017
- 2016 Scientific committee, 3rd International Conference on Heat Transfer and Fluid Flow, Budapest, Hungary, August 22-23, 2016
- 2013 Reviewer, *Computers in Education*
- 2010 Reviewer, *Langmuir*
- 2010 Reviewer, National Capstone Design Conference, Boulder, CO
- 2003 Reviewer, *Heat Transfer Engineering Journal*
- 2002 Reviewer, American Society of Mechanical Engineers (ASME) Summer Heat Transfer Conference (2003), Las Vegas, NV, Microchannel Heat Transfer Session
- 2002 Reviewer, International Mechanical Engineering Congress and Exposition (IMECE-2002), MEMS and Nanotechnology Symposium
- 2001 Reviewer, International Mechanical Engineering Congress and Exposition (IMECE-2001), Heat Transfer in Multiphase Systems Session
- 2000 Reviewer, ICONE 8 - 8th International Conference on Nuclear Engineering

Review panels

- 2013 Research Initiation Grants in Engineering Education (RIGEE), National Science Foundation Panel

2002 Rater, Rose-Hulman student RosE-Portfolios

2001 Rater, Rose-Hulman student RosE-Portfolios

External promotion and tenure reviews

2022 External reviewer for promotion, Valparaiso University

2021 External reviewer for promotion, University of New Haven

2020 External reviewer for promotion and tenure, University of Kentucky (Paducah Campus)

2014 External reviewer for promotion and tenure, The Petroleum Institute, Abu Dhabi, United Arab Emirates

2010 External reviewer for promotion and tenure, Rowan University

Internal institutional service:

Thesis/project committees, Rose-Hulman

2019 Thesis committee member, Mechanical Engineering master's degree student Joseph Hubach for the thesis entitled "Solar Tracking Using a Parallel Manipulator Mechanism to Achieve Two-Axis Position Tracking"

2013 Project committee member, Engineering Management degree master's degree student John Hollingshead for his project entitled "Approaches to Developing and Managing an Engineering Firm in the Energy Services Industry"

2012 Thesis committee member, Mechanical Engineering master's degree student Julie Fisher for the thesis entitled "Detecting Subsurface Layers Using Thermal Wave Techniques"

2009 Thesis committee member, Optical Engineering master's degree student Ryan Snyder for the thesis entitled "The Design and Characterization of MEMS Interferometric Sensing"

2005 Thesis committee member, Biomedical Engineering master's degree student Saylan Lukas for the thesis entitled "Selective Protein Adsorption on Microtextured P-type and N-type Silicon Wafers"

2004 Thesis committee member, Optical Engineering master's degree student Christina Bauer for the thesis entitled "Optical Tweezers"

2003 Thesis committee member, Mechanical Engineering master's degree student James Laser for the thesis entitled "Particulate Containment Device for Industrial Paving Equipment"

Institute committees, commissions, and task forces, Rose-Hulman

2022-2023 Member, Culture of Integrity Implementation Committee

2020-2021 Member Safety, Security, and Traffic Committee

2017-2020 Member Promotion, Tenure, and Retention Committee (Secretary, 2019-2020)

2015-2017 Faculty Representative to the Board of Trustees for Academic Affairs

2014-2015 Chair, Service Awards Committee

2012-2013 Chair, Service Awards Committee

2012-2013 Member International Programs and Global Studies Committee

2008-2013 Member, Performing Arts Committee

2008-2012 ME Department representative, Faculty Affairs Committee
2010-2011 Member, Search Committee for Vice President of Academic Affairs
2010-2011 Member, Online Learning Feasibility Study Commission
2009-2010 Member, Search Committee for Vice President of Academic Affairs
2009 Faculty representative, Interim Presidential Search Committee
2007-2008 Faculty representative, Academic Governance Study Commission
2003-2004 Secretary, Rules and Discipline Committee
2003-2004 Member Performing Arts Committee
1999-2002 Member Graduate Studies Committee
1999-2000 Member Performing Arts Committee

Mechanical Engineering Department service, Rose-Hulman

2022-2023 Member, Administrative Assistant Hiring Committee
2022-2023 Chair, Faculty Development Committee
2022-2023 Member, Diversity, Equity, and Inclusion Committee
2018-2020 Member, International Studies Committee
2015-2017 Chair, Committee for the Improved Assessment of Teaching
2015-2017 Chair, Faculty Development Committee
2012-2013 Member, Faculty Development Committee
2009-2013 Member, ME Graduate Studies Committee
2010-2011 Member, Faculty Development Committee

Advising, Rose-Hulman

1999-present Academic advisor, Mechanical Engineering majors. Approximately 26 students annually
2000-present Faculty advisor, Kappa Chapter of Theta Xi Fraternity
2013-present Faculty advisor, *The Rose Thorn* newspaper
2006-present Faculty advisor and instructor, Rose-Hulman Yoga Club
2008-2017 Faculty advisor, Rose-Hulman Swing Dance Club
2004-2012 Faculty advisor, Rose-Hulman Ballroom Dancing Club
2003-2006 Faculty advisor, Sigma Lambda Chapter of Pi Tau Sigma

Other institutional service

2023 External Consultant, Department of Physics, Optical Engineering, and Engineering Physics Department Head Search
2019 Leader book club discussion group, *Creating Wicked Students: Designing Courses for a Complex World*
2018 Panelist, "Crucial Conversations," Rose-Hulman Leadership Education & Development (LEAD) Program
2017 Faculty-led trip to Peru. Led an eight-day educational trip to Peru for eight RHIT Spanish language students.
2016-2017 Faculty member, Operation Catapult

- 2011-2013 Op-ed contributor, *The Rose Thorn* newspaper
- 2009-2013 Faculty member, Operation Catapult
- 2012-2013 Playwright, Rose-Hulman Drama Club 24 Hour Play Festival
- 2006-2010 Playwright, Rose-Hulman Drama Club 24 Hour Play Festival
- 2008 Host, Rose-Hulman Student Activity Board Mother's Weekend event
- 2006-2007 Faculty member, Operation Catapult
- 2005, 2006 Performer, *Engineers in Concert*, Rose-Hulman Fine Arts series, Solo guitar performances
- 2006 Host, Rose-Hulman Student Activity Board Mother's Weekend event
- 2000-2004 Faculty member, Operation Catapult
- 2004 Host, Rose-Hulman Student Activity Board Mother's Weekend event
- 2003 Contributor, Rose Women's Club Rose Community Art Show, Origami exhibit
- 2003 Performer, *Engineers in Concert*, Rose-Hulman Fine Arts series, Solo guitar performance
- 2001 Contributor, Rose Women's Club Rose Community Art Show, Origami exhibit
- 2000, 2001 Performer, *Engineers in Concert*, Rose-Hulman Fine Arts series, Solo guitar performances

Honors and awards:

- 2023 Best paper award for "Alternate Formulation for Entropy Minimization in Forced Internal Convection," 10th International Conference on Heat Transfer and Fluid Flow, London, England, 2023
- 2019-present Herman A. Moench Distinguished Professor, Rose-Hulman Institute of Technology
- 2019 Board of Trustees Outstanding Scholar Award, Rose-Hulman Institute of Technology
- 2018 Best paper award for "Role of Dimensionless Parameters in Modelling MEMS Hot-arm Actuators," 5th International Conference on Heat Transfer and Fluid Flow, Madrid, Spain, 2018
- 2015 Best paper award, "Analysis of Shock-plugs in Quasi-one-dimensional Compressible Flow," 2nd International Conference on Heat Transfer and Fluid Flow, Barcelona, Spain, 2015
- 2005 Dean's Outstanding Teacher Award, Rose-Hulman Institute of Technology
- 2004 Best paper award, "An Undergraduate MEMS Course for Everyone," 2004 American Society for Engineering Education Annual Conference & Exposition, Salt Lake City, UT, June 20-23, 2004
- 2001 Delta Delta Delta Faculty Member of the Month, Mar-Apr 2001
- 2000 Favorite Faculty Member - Operation Catapult, Rose-Hulman Institute of Technology
- 1999 Best paper award for "Effect of Dissolved Noncondensables on Liquid Forced Convection in Microchannels", 1999 ASME AIChE National Heat Transfer Conference, Albuquerque, NM
- 1990 Edward MacClean Award for Engineering Science and Mechanics, Rose-Hulman Institute of Technology
- Member, Pi Tau Sigma (Mechanical Engineering Honorary Fraternity)

Member, Pi Mu Epsilon (Mathematics Honorary Fraternity)