

Julie E. Steinbrenner

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ECME 126 | 1111 Engineering Drive
University of Colorado | Boulder, Colorado

Education	Doctor of Philosophy in Mechanical Engineering Stanford University Thesis: Two-Phase Flow Phenomena in Fuel Cell Microchannels Advisor: Dr. Kenneth E. Goodson	March 2011 <i>Stanford, California</i>
	Master of Science in Mechanical Engineering Stanford University GPA 3.9/4.0	January 2005 <i>Stanford, California</i>
	Bachelor of Science in Mechanical Engineering Valparaiso University Summa Cum Laude Christ College Associate, Interdisciplinary Honors College, French minor	May 2003 <i>Valparaiso, Indiana</i>
Current Position	Wolenski/Roller Faculty Fellow Instructor Adjunct Professor <i>Mechanical Engineering Department, University of Colorado</i>	December 2017 - present August 2013 – present August 2012 – May 2013 <i>Boulder, Colorado</i>
	<ul style="list-style-type: none">▪ Employ active learning techniques, including team-based design/build/test projects, analysis projects, in-class workshops, hands-on laboratories, and peer instruction facilitated by concept-focused clicker questions▪ Prepare students for success after college by emphasizing career preparations, building connections with industry, developing professional skills▪ Develop curriculum focused on practical application of fundamental conceptual understanding, and best practices for engineering analysis and decision-making	
	Graduate Courses: MCEN 5042: Graduate Heat Transfer	Fall 2013, 2014; Spring 2016
	Project-based design courses: ENEN 4600: Interdisciplinary Energy Engineering Projects MCEN 4045/4085: ME Design Projects GEEN 1400: First Year Design Projects	Fall 2015, 2016 Fall 2012 – Spring 2019 Spring 2014
	Undergraduate courses: MCEN 2000: Mechanical Engineering as a Profession MCEN 3012: Thermodynamics MCEN 3032: Thermodynamics II MCEN 3022: Heat Transfer MCEN 3021: Fluid Mechanics MCEN 4228: Thermofluids Laboratory	Fall 2016, 2017, 2018 Spring 2016 Spring 2014 Spring 2013; Summer 2014, 2016, 2017, 2018 Fall 2013 Spring 2017, 2018, 2019
Leadership Positions	External Relations Committee Chair <i>Department of Mechanical Engineering, University of Colorado</i>	Summer 2017 – present <i>Boulder, Colorado</i>
	<ul style="list-style-type: none">▪ Lead and coordinate marketing efforts to attract diverse students and facilitate industry collaboration▪ Developed alumni engagement programs which bring over 100 alumni to campus	

annually to engage with over 600 students during two annual events.

Leadership Positions (cont.) **Director** August 2014 – Summer 2017
Energy Engineering Minor, University of Colorado Boulder, Colorado

- Administrate interdisciplinary Energy Minor program for approximately 60 students with 5 different engineering majors
- Conduct bi-annual meetings with Industry Advisory Panel consisting of 10 energy industry professionals, and lead meetings with faculty curriculum committee

Other Teaching Experience **Physics Instructor,** Summer 2011
Summer Math And Science Honors (SMASH) Academy
Level Playing Field Institute San Francisco, California

- Taught a 6-week summer honors program for 23 high-achieving seniors from under-resourced high schools
- Developed curriculum, lecture materials, laboratory activities, and evaluation metrics for physics course focused on fundamental kinematics concepts and thermodynamic principles related to energy
- Co-developed a projects-based course in renewable and sustainable community development culminating in small group projects on energy efficiency analysis

Teaching Assistant

Department of Mechanical Engineering, Stanford University Stanford, California
Undergraduate Statics Fall 2008

- Taught and assisted with laboratory sessions to enhance undergraduate student comprehension of fundamental principles of statics, including force balances, vector geometry, ethics, and design
- Held office hours to assist students with homework problems, wrote and graded exam questions
- Developed and presented a lecture to 150 students

Fundamentals of Heat Conduction Winter 2008

- Designed and taught problem sessions for 30 graduate students in a technical heat transfer course
- Held office hours to assist students with homework problems
- Wrote homework and exam questions, graded homework and exams

Teaching-Related Interests and Training

- Tutored high school and undergraduate engineering students
- Peer Mentor for freshmen engineering students, Valparaiso University
- Relevant coursework: science course design (1 quarter), Stanford University

Research Experience **Research Staff Member** 2011 – 2012
Palo Alto Research Center Palo Alto, California

- Experimentally analyzed particle-laden flows and phase-change phenomena in multi-scale environments applicable to printing technologies using various prototyping techniques and high-speed imaging, PIV, and shadowgraphy
- Developed Flow-3D general moving object (GMO) simulations of flow fields and particle dynamics in low-Reynolds number flows

Research
Experience
(continued)

Charles H. Kruger Stanford Graduate Fellow, Research Assistant 2003 – 2011
Microscale Heat Transfer Laboratory, Stanford University *Stanford, California*

- Developed two and three-dimensional techniques for white light and fluorescent visualization of two-phase flow regimes in rectangular microchannels relevant to fuel cell applications for comparison with numerical models of stratified films
- Designed and implemented control and measurement system for two phase air-water flow in microchannels

Scientific Chateaubriand Fellow 2007
Commissariat à l’Energie Atomique (CEA), Fuel Cell Laboratory *Grenoble, France*

- Developed and implemented techniques for local measurement of current density in the membrane electrode assembly of a proton exchange membrane fuel cell
- Developed tools for and performed characterization of anisotropic electrical properties of fuel cell components under variable mechanical strain

Research and Development Intern Summer 2003
Seagate Technologies, Inc. *Longmont, Colorado*

- Designed and constructed a test apparatus and LabVIEW control software to measure torque on actuator assembly of disk drive, with key design requirements including ease of use, accuracy, versatility for drives of various geometries

Research Stagiare Fall 2002
IMP-CNRS (French National Research Center) *Odeillo, France*

- Performed preliminary research for the development of an optical temperature measurement system for molten silicon under concentrated solar irradiation

NSF Undergraduate Research Student Summer 2002
Paul Scherrer Institut, Solar Technology Laboratory *Villigen, Switzerland*

- Experimentally determined the effect of carbon reactivity and reactant configuration on products obtained during carbothermic ZnO decomposition at temperatures near 2000K using a 45-kW solar concentrator
- Developed Fortran and MATLAB models to predict the temperature distribution within a solar reactor cavity using radiosity and Monte Carlo radiation modeling

Multi-disciplinary Undergraduate Research in Turbulence 2000 - 2002
Team Member and Summer Research Student
Valparaiso University *Valparaiso, Indiana*

- Coordinated research activities and responsibilities among six engineering and meteorology students as research team leader
- Wrote Visual Basic program for high sample rate measurement of wind velocity using hot wire anemometers at the Atmospheric Boundary Layer Experiment facility in Whitewater, Kansas
- Prepared water flume for turbulent boundary layer testing, including development of an in-situ calibration rig to obtain velocity profiles in the turbulent boundary layer of water using hot-film probes

Engineering
Education
Research

D. Kotys-Schwartz, D. Knight, **J.E. Steinbrenner**, A Qualitative Investigation of Success and Challenges with Team Roles in Capstone Design, *2018 Capstone Design Conference*, June 4-6, 2018, Rochester, NY.

Publications

- A. Makowiecki, **J. Steinbrenner**, N. Wimer, J. Daily, P. Hamlington, and G. Rieker, Influence of Moisture Content on Pre- and Post-ignition Behavior of Douglas Fir, *Proceedings of the Combustion Institute* (indexed, rigorously peer reviewed), in review.
- J.E. Steinbrenner**, E.S. Lee, C.H. Hidrovo, J.K. Eaton, K.E. Goodson, Impact of channel geometry on two-phase flow in fuel cell microchannels, *J. Power Sources*. June 2011; vol.196, no.11, p.5012-5020.
- A. Rogacs, **J.E. Steinbrenner**, J.A. Rowlette, J.M. Weisse, X.L. Zheng, K.E. Goodson. Characterization of wettability of thin nanostructured films in the presence of evaporation. *J. Colloid Interface Science*. September 2010; vol.349, no.1, p.354-360.
- C. Fang, **J.E. Steinbrenner**, F.-M. Wang, K.E. Goodson. Impact of wall hydrophobicity on condensation flow and heat transfer in silicon microchannels. *J. Micromechanics Microengineering*. April 2010; vol.20, no.4, 045018.
- J.E. Steinbrenner**, C.H. Hidrovo, F.-M. Wang, E.S. Lee, S. Vigneron, T.A. Kramer, C.H. Cheng, J.K. Eaton, K.E. Goodson. Measurement and Modeling of Liquid Film Thickness Evolution in Stratified Two-Phase Microchannel Flows. *Applied Thermal Engineering*. July 2007; vol.27, no.10, p.1722-7.
- F.-M. Wang, **J.E. Steinbrenner**, C.H. Hidrovo, T.A. Kramer, E.S. Lee, S. Vigneron, J.K. Eaton, K.E. Goodson. Investigation of Two-Phase Transport Phenomena in Microchannels Using a Microfabricated Experimental Structure. *Applied Thermal Engineering*, July 2007; vol.27, no.10, p.1728-1733.
- C.H. Hidrovo, T.A. Kramer, E.N. Wang, S. Vigneron, **J.E. Steinbrenner**, J.M. Koo, F.M. Wang, D.W. Fogg, R.D. Flynn, E.S. Lee, C.H. Cheng, T.W. Kenny, J.K. Eaton, K.E. Goodson. Two-Phase Microfluidics for Semiconductor Circuits and Fuel Cells. *ICMM2005: 3rd International Conference on Microchannels and Minichannels*, June 13-15, 2005, Toronto, Ontario, Canada (keynote paper). *Heat Transfer Engineering*, May 2006; v.27, no.4, p.53-63.
- A.P. Freid, P.K. Johnson, M. Musella, R. Müller, **J.E. Steinbrenner**, R.D. Palumbo. Solar Blind Pyrometer Temperature Measurements in High Temperature Solar Thermal Reactors: A Method for Correcting the System-Sensor Cavity Reflection Error. *J. Solar Energy Engineering*. Feb. 2005; vol.127, no.1, p.86-93.

Honors

- Wolenski/Roller Faculty Fellowship, 2017-present
- Outstanding Service Award for Department of Mechanical Engineering, 2018
- Outstanding Undergraduate Educator for Department of Mechanical Engineering, 2017
- Outstanding Graduate Educator for Department of Mechanical Engineering, 2016
- Chateaubriand Scientific Fellowship, 2007
- Charles H. Kruger Stanford Graduate Fellowship in Science and Engineering, 2004-2007
- Best Poster Award, HeatSET, 2005
- Stanford Graduate Engineering Fellowship, 2004
- Edgar J. Luecke Z* Award for Leadership and Service, 2002
- Alumni Association Distinguished Student Award, 2002
- Outstanding Leadership and Service Award, 2002
- Bruce and Linda Eastmond Award for Outstanding Senior Engineering Student, 2002
- Herman C. Hesse Award for Outstanding Freshman Engineering Student, 1999
- Merit Scholarships: Valparaiso University Founders, Robert C. Byrd, and National Merit

Patents United States Patent 9,819,134, *Tool for stripping and crimping a wire*, November 14, 2017.
United States Patent 9,211,703, *Temperature dependent shape elements for void control in ink jet printers*, December 15, 2015.

Community Involved Invited Reviewer: Scientific Reports
University of Colorado – Boulder Lutheran Campus Ministry Board, 2012 – present.
El Camino Colorado mentor, 2014-present.
Faculty Student Mentorship Program mentor, present.
Tau Beta Pi – Engineering Honor Society, 2000-2002: Vice-President of Valparaiso Chapter, 2001-2002
Society of Women Engineers – VU Student Chapter, 1998-2002. President, 1999/2000. Treasurer, 1998
Dean's Student Advisory Committee for the Valparaiso University College of Engineering, 1999-2002

Languages English (native), French (proficient)