

Professional Affiliations

- American Society of Mechanical Engineers (ASME) – *Member*
- American Electrophoresis Society (AES) – *Member, Councilor*
- Biomedical Engineering Society (BMES) – *Member*
- ElectroOptics Research Institute and Nanotechnology Center (Univ. of Louisville)
- Pi Tau Sigma, Mechanical Engineering Honor Society
- Tau Beta Phi Engineering Honor Society
- Kappa Sigma Fraternity – *Assistant Alumni Advisor, Purdue University*

Conferences and Workshops Attended

- Attendee of the Midwestern University Fluid Mechanics Retreat (MUFMECH), Rochester, Indiana, held annually in April (2012-2016).
- 2014 Celebration of Teaching and Learning “Igniting the Spark: Motivating Student Learning”, Feb. 7, 2014.
- National Science Foundation Workshop: “Science: Becoming the Messenger”, Louisville, KY, March 5, 2013.
- Workshop for Developing and Sustaining Productive Graduate Research Groups in Engineering, National Science Foundation, Arlington, VA, July 11-12, 2011.
- DARPA N/MEMS S&T Fundamentals All-Center Review, Bloomington, MN, June 24-26, 2008.
- 1st Annual Methods in Bioengineering Conference; Short Course: An introduction to microtechnology and microfluidics for biology and medicine, Boston, MA, July 17-19, 2006.

Awards and Recognition

- First Place, NSF REU poster competition, RP Accolla, DJ Allen, and SJ Williams, “Application of microfluidic techniques for an isomotive dielectrophoresis (isoDEP) platform,” *ASME/IMECE*, Track 19-2, IMECE2016-68895.
- Runner-up, Biomicrofluidics/AES Art in Science, A Mishra, KN Clayton, TR Maltais, TM Walter, T Kinzer-Ursem, A Wei, SJ Williams, and ST Wereley, “A bacteria flower,” *AICHE* 2016.
- “UofL researchers team up with NASA to study fundamentals of physics,” *Insider Louisville*, Boris Ladwig, May 20, 2016.
- “UofL Today with Mark Hebert” radio broadcast on 93.9 FM, aired 11/23/2015.
- UofL Today, “UofL research is out of this world,” August 10, 2015 (Video).
- UofL Today, “UofL project to take place on the International Space Station,” July 29, 2014.
 - Additionally featured articles include: *The Tiger Magazine* (Winter 2015), *USA Today* (07/30/14), *84WHAS* (07/29/14), *WFPL* (07/30/14), *WKYT* (07/29/14), *Louisville Business First* (07/28/14), *The Lane Report* (07/28/14), *Kentucky.com* (07/29/14)
- 2013-2014 Faculty Favorite
- 2011-2012 Faculty Favorite
- Purdue University Press Release, “Laser, electric fields combined for new ‘lab-on-chip’ technologies,” written by Emil Venere. July 5, 2011.
 - Featured in *Purdue Engineering Impact Magazine*, Fall 2011

Awards and Recognition as a Graduate Student

- Excellent Paper Award, ASME 2009 Micro/Nanoscale Heat and Mass Transfer International Conference (MNHMT2009), SJ Williams, A Kumar, and ST Wereley, “Micro and nano particle manipulation using optically modulated electrokinetic flows,” Shanghai, China, Dec. 18-21, 2009.
- 3rd Place, Best Poster Competition, ASME Society-Wide Micro/Nano Technology Forum (2009), JS Kwon, A Kumar, SJ Williams, and ST Wereley, “Rapid electrokinetic patterning of colloidal particles with optical landscapes,” Lake Buena Vista, FL, Nov. 13-19, 2009.
- 2nd Place, Gold Division, Burton D. Morgan Business Plan Competition. SJ Williams, H-S Chuang, and A Kumar. Liquid Qinetics. Purdue University, West Lafayette, Indiana, Feb. 24, 2009.
- 1st Place Poster, Engineering Sciences, SJ Williams, A Kumar, and ST Wereley, “Rapid electrokinetic patterning of colloids using optical landscapes,” 2009 Graduate Student Poster Competition sponsored by Sigma Xi, Purdue University, West Lafayette, Indiana, Feb. 2009.
- Purdue University Press Release, “New holographic method could be used for lab-on-a-chip technologies,” written by Emil Venere. Dec. 2, 2008.
- Outstanding Video, Gallery of Fluid Motion at Amer. Phys. Soc./Div. Fluid Dyn. Annual Meeting, SJ Williams, A Kumar, and ST Wereley, “Optically induced electrokinetic patterning and manipulation of particles,” San Antonio, TX, Nov. 2008.
 - Most downloaded video from eCommons@Cornell for the month of December, 2008. (<http://hdl.handle.net/1813/11399>)
- Young Researcher Poster Award Winner at Proc. 12th International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS 2008), “Rapid electrokinetic patterning of colloids using optical landscapes,” San Diego, USA, Oct. 12-16, 2008.
- Best Poster Award at the 2nd Annual Birck Nanotechnology Research Review, SJ Williams, A Kumar, and ST Wereley, “Rapid electrokinetic patterning of colloidal particles with optical landscapes,” April 14, 2008.
- Kappa Sigma Fraternity, Chi Chapter 2007 Man of the Year, Purdue University, Spring 2007.
- Acknowledged in “Microfabricated thermal conductivity detector for the micro-ChemLabTM,” *Sensors and Actuators B*, Vol. 121, 414-422. (2007).
- National Science Foundation Graduate Research Fellowship, Spring 2006.
- Laura Winkelman Fellowship for Doctoral Studies in the School of Mechanical Engineering, Purdue University, Summer 2005.
- Lewis S. Streng Scholarship Award for High Honors, JB Speed School of Engineering, University of Louisville, Spring 2005.
- Graduate Student Academic Achievement Award, Mechanical Engineering, University of Louisville, Spring 2005.

Awards as an Undergraduate Student

- Alumni Departmental Award, Mechanical Engineering, University of Louisville, Spring 2004.
- Highest cumulative GPA of Fraternities and Sororities, University of Louisville, Spring 2004.

- R&D 100 Award, SnifferStar™ Chemical Sensor; Team Member, Sandia National Laboratories, 2003.
- Junior Academic Achievement Award for Mechanical Engineering, University of Louisville, Spring 2003.
- Sophomore Academic Achievement Award for Mechanical Engineering, University of Louisville, Spring 2002.
- Dean's Scholar, University of Louisville, Fall 2000 – Summer 2005.
- President's Scholarship, University of Louisville, Fall 2000 – Summer 2005.

SCHOLARSHIP OF DISCOVERY, INTEGRATION AND APPLICATION

Research Specialties

Microfluidics, experimental fluid mechanics, flow visualization, colloid research, MEMS and bio-MEMS, optical and opto-electronic devices, AC electrokinetic methods including dielectrophoresis, electrothermal hydrodynamics and AC electro-osmotic flow, electrical and optical manipulation of particles and fluids, development of microfluidic diagnostic techniques.

Publications

Book Chapters

1. A Survant and **SJ Williams**, "Electrokinetic sorting of colloids," Encyclopedia of Surface and Colloid Science, Ed. Ponisseril Somasundaran, Taylor and Francis (2014).
2. H-S Chuang, A Kumar, **SJ Williams**, and ST Wereley, "Optoelectrically-enabled multiscale manipulation," Encyclopedia of Nanotechnology, Ed. Bharat Bhushan, Springer (2012).
3. A Kumar, **SJ Williams**, NG Green, and ST Wereley, "Opto-electronic manipulation of particles," Microfluidics and Nanofluidics Handbook, Eds. Sushanta K. Mitra and Suman Chakraborty, Springer (2011).
4. **SJ Williams**, "AC dielectrophoresis lab-on-chip devices," Encyclopedia of Microfluidics and Nanofluidics, Ed. Dongqing Li, Springer, New York (2008).
5. **SJ Williams**, "Dielectrophoretic motion of particles and cells," Encyclopedia of Microfluidics and Nanofluidics, Ed. Dongqing Li, Springer, New York (2008).

Refereed Publications

1. DJ Allen, RP Accolla, and **SJ Williams**, "Isomotive dielectrophoresis (isoDEP) for parallel analysis of individual particles," *Electrophoresis* (revision submitted).
2. A Mishra, TR Maltais, TM Walter, A Wei, **SJ Williams**, and ST Wereley, "Trapping and viability of swimming bacteria in an optoelectric trap," *Lab on a Chip*, 16, 1039-1046 (2016).
3. A Mishra, K Clayton, V Velasco, **SJ Williams**, and ST Wereley, "Dynamic optoelectric trapping and deposition of multiwalled carbon nanotubes," *Microsystems & Nanoengineering*, 2, 16005 (2016).
4. V Velasco, M Gruenthal, E Zusstone, JMD Thomas, RS Keynton, RE Berson, and **SJ Williams**, "An orbital shear platform for in vitro real-time endothelium characterization," *Biotechnology and Bioengineering* 113, 1336-1344 (2016).

- Featured on the cover of *Biotechnology and Bioengineering*, June 2016, No. 6
5. A Mishra, J Khor, KN Clayton, **SJ Williams**, X Pan, T Kinzer-Ursem, and ST Wereley, “Optoelectric patterning: Effect of electrode material and thickness on laser-induced AC electrothermal flow,” *Electrophoresis*, 37, 658-665 (2016).
 6. AH Work, Jr., and **SJ Williams**, “Characterization of 2D colloid aggregations created by optically-induced electrohydrodynamics,” *Electrophoresis*, 36, 1674-1680 (2015).
 - Featured on the cover of *Electrophoresis*, July 2015, No. 15
 7. **SJ Williams** and NG Green, “Electrothermal pumping with interdigitated electrodes and resistive heaters,” *Electrophoresis*, 36, 1681-1689 (2015).
 8. AH Work, Jr., and **SJ Williams**, “Characterization of 2D colloids assembled by optically-induced electrohydrodynamics,” *Soft Matter*, 11, 4266-4272 (2015).
 9. **SJ Williams**, N Romero, L Parkes, DJ Jackson, and JF Naber, “Demonstration of inexpensive three-dimensional dielectrophoretic microfluidic devices using milled copperclad substrates,” *Journal of Electrostatics*, 75, 49-53 (2015).
 10. K-C Wang, A Kumar, **SJ Williams**, NG Green, KC Kim, and H-S Chuang, “An optoelectrokinetic technique for programmable particle manipulation and bead-based biosignal enhancement,” *Lab on a Chip*, 14, 3958-3967 (2014).
 - Featured on the back cover of *Lab on a Chip*, November 2014, No. 18
 11. NR Wood, AI Wolsiefer, RW Cohn, and **SJ Williams**, “Dielectrophoretic trapping of nanoparticles with an electrokinetic nanoprobe,” *Electrophoresis*, 34, 1922-1931 (2013).
 - Featured on the front cover of *Electrophoresis*, July 2013, No. 13
 12. **SJ Williams**, “Enhanced electrothermal pumping with thin film resistive heaters,” *Electrophoresis*, 34, 1400-1408 (2013).
 13. V Velasco and **SJ Williams**, “Electrokinetic concentration, patterning, and sorting of colloids with thin film heaters,” *J. Colloid and Interface Science*, 394, 598-603 (2013).
 14. V Velasco, AH Work, Jr., and **SJ Williams**, “Electrokinetic concentration and patterning of colloids with a scanning laser,” *Electrophoresis*, 33(13), 1931-1937 (2012).
 15. A Kumar, **SJ Williams**, H-S Chuang, NG Green, and ST Wereley, “Hybrid opto-electric manipulation in microfluidics – opportunities and challenges,” *Lab on a Chip*, 11, 2135-2148 (2011).
 - Featured on the front cover of *Lab on a Chip*, July 2011
 16. A Kumar, C Cierpka, **SJ Williams**, CJ Kahler, and ST Wereley, “3D3C velocimetry measurements of an electrothermal microvortex using wavefront deformation PTV and a single camera,” *Microfluidics and Nanofluidics*, 10, 355-365 (2011).
 17. A Kumar, JS Kwon, **SJ Williams**, NG Green, N Yip, and ST Wereley, “Optically modulated electrokinetic manipulation and concentration of colloidal particles near an electrode surface,” *Langmuir*, 26, 5262-5272 (2010).
 18. **SJ Williams**, C Park, and ST Wereley, “Advances and applications on microfluidic velocimetry techniques,” *Microfluidics and Nanofluidics*, 8, 709-726 (2010).
 19. **SJ Williams**, P Chamrathy, and ST Wereley, “Comparison of experiments and simulation of Joule heating in AC electrokinetic chips,” *Journal of Fluids Engineering*, 132, 021103 (2010).

20. **SJ Williams**, A Kumar, NG Green, and ST Wereley, "Optically induced electrokinetic concentration and separation of colloids," *Journal of Micromechanics and Microengineering*, 20, 015022 (2010).
 - Article chosen to appear in IOP Select (<http://www.iop.org/Select/>)
21. **SJ Williams**, A Kumar, NG Green, and ST Wereley, "A simple, optically induced electrokinetic method to concentrate and pattern nanoparticles," *Nanoscale*, 1, 133-137 (2009).
22. A Kumar, **SJ Williams**, and ST Wereley, "Experiments on opto-electrically generated vortices," *Microfluidics and Nanofluidics*, 6, 637-646 (2009).
23. **SJ Williams**, A Kumar, and ST Wereley, "Electrokinetic patterning of colloidal particles with optical landscapes," *Lab on a Chip*, 8, 1879-1882 (2008).

Full-Length Peer-Reviewed Conference Papers

1. A Mishra, R Thakur, **SJ Williams**, A Kumar, and ST Wereley, "Optoelectrokinetic trapping of gold nanoparticles," *2nd European Optical Society Conference on Optofluidics*, Paper #1569717107, Munich, Germany, May 13-15, 2013
2. J-S Kwon, V Velasco, **SJ Williams**, and ST Wereley, "Rapid electrokinetic patterning technique for manipulation of colloids and microorganisms, and its technical advancement," *2nd European Optical Society Conference on Optofluidics*, Paper #1569717213, Munich, Germany, May 13-15, 2013.
3. BR LaPrade, B Panchapakesan, and **SJ Williams** "Opto-mechanical actuation of carbon nanotube/polymer composite membranes for microfluidic pumping applications," *Proc. ASME/IMECE*, Paper #2012-86138, Houston, TX, Nov. 9-15, 2012.
4. AH Work, Jr., V Velasco, and **SJ Williams** "Electrokinetic manipulation of colloids with a scanning laser," *Proc. ASME/IMECE*, Paper #2012-87491, Houston, TX, Nov. 9-15, 2012.
5. J Sunding, V Velasco and **SJ Williams** "Electrothermal pumping with thin film resistive heaters," *Proc. ASME/IMECE*, Paper #2011-64725, Denver, CO, Nov. 11-17, 2011.
6. **SJ Williams**, V Velasco, J-S Kwon, SP Ravindranath, J Irudayaraj, and ST Wereley, "Rapid concentration and manipulation of colloids and microorganisms through double layer polarization electrokinetics," *Proc. 15th International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS2011)*, Seattle, WA, Oct. 2-6, 2011 (Poster).
7. **SJ Williams**, A Kumar, and ST Wereley, "Optically induced electrokinetic trapping and sorting of colloids," *Proc. ASME/FEDSM-ICNMM*, Paper#2010-30465, Montreal, Canada, Aug. 1-5, 2010.
8. J Duff, **SJ Williams**, and B Panchapakesan, "Microfluidic pumping with optically induced actuation of a carbon nanotube membrane," *Proc. ASME/FEDSM-ICNMM*, Paper#2010-30097, Montreal, Canada, Aug. 1-5, 2010.
9. A Kumar, C Cierpka, **SJ Williams**, CJ Kahler, and ST Wereley, "3D3C velocimetry measurements of an electrothermal microvortex using wavefront deformation PTV and a single camera," *15th International Symposium on Applications of Laser Techniques to Fluid Mechanics*, Lisbon, Portugal, July 5-8, 2010.

10. **SJ Williams** and ST Wereley, "Experiments and simulation of a dielectrophoretically oscillating microparticle," *15th International Symposium on Applications of Laser Techniques to Fluid Mechanics*, Lisbon, Portugal, July 5-8, 2010.
11. JS Kwon, A Kumar, **SJ Williams**, and ST Wereley, "A study for electrokinetic mechanism of colloidal particle on an electrode surface using Voronoi and Delaunay tessellation," *15th International Symposium on Applications of Laser Techniques to Fluid Mechanics*, Lisbon, Portugal, July 5-8, 2010.
12. **SJ Williams**, A Kumar, and ST Wereley, "Micro and nano particle manipulation using optically modulated electrokinetic flows," *ASME 2009 Micro/Nanoscale Heat and Mass Transfer International Conference*, MNHMT2009-18493, Shanghai, China, Dec. 18-21, 2009.
13. A Kumar, **SJ Williams**, J-S Kwon, NG Green, NK Yip, and ST Wereley, "Optically induced rapid electrokinetic patterning: a study of the operational regimes and dominant forces," *Proc. ASME/IMECE*, IMECE2009-11518, Lake Buena Vista, FL, Nov. 13-19, 2009.
14. **SJ Williams**, A Kumar, and ST Wereley, "Optically induced electrohydrodynamics and electrokinetic colloidal aggregation," *Proc. ASME/FEDSM*, Paper#2009-78121, Vail, CO, Aug. 2-6, 2009.
15. **SJ Williams** and ST Wereley, "Hydrodynamic investigations of a dielectrophoretically trapped and agitated microparticle," *Proc. ASME/FEDSM*, Paper#2009-78068, Vail, CO, Aug. 2-6, 2009.
16. A Kumar, **SJ Williams**, and ST Wereley, "A novel optically driven electrokinetic technique for manipulating nanoparticles," *Proc. SPIE*, 7400, 74000V (2009).
17. A Kumar, JS Kwon, **SJ Williams**, and ST Wereley, "Optically modulated rapid electrokinetic patterning for micro and nano particles," *Proc. SPIE*, 7371, 737110 (2009).
18. E Judokusumo, A Kumar, **SJ Williams**, and ST Wereley, "Analysis of optically induced fluid flows in electric fields," *Proc. ASME/IMECE*, Paper #2008-66935, Boston, MA, Oct. 31 to Nov. 6, 2008.
19. A Kumar, **SJ Williams**, and ST Wereley, "Rapid electrokinetic patterning of colloids using optical landscapes," *Proc. 12th International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS2008)*, San Diego, CA, Oct. 12-16, 2008 (Poster).
20. **SJ Williams**, P Chamarty, and ST Wereley, "Laser-induced fluorescence thermometry for Joule heating in AC electrokinetic chips," *Proc. ASME/FEDSM*, Paper#2008-55175, Jacksonville, FL, Aug. 10-14, 2008.
21. **SJ Williams** and ST Wereley, "Field flow analysis of dielectrophoretically suspended particles," *Proc. ASME/IMECE*, Paper #2007-41252, Seattle, WA, Nov. 11-15, 2007.

Conference Abstracts, Conference Posters, and Invited Presentations

1. V Velasco, PA Soucy, R Keynton, and **SJ Williams**, "In vitro electrical impedance characterization of HUVECs undergoing hydrodynamic shear stress", *2016 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society*, San Francisco, CA, Nov. 13-18, 2016 (Oral).
2. V Velasco, PA Soucy, R Keynton, and **SJ Williams**, "Electrode topography effects on sheared HUVEC morphology within an electrical impedance system", *2016 AIChE*

- Annual Meeting, Annual Meeting of the American Electrophoresis Society*, San Francisco, CA, Nov. 13-18, 2016 (Poster).
- Honorable Mention, AES Poster Session
3. V Velasco, DJ Allen, and **SJ Williams**, “Isomotive dielectrophoresis (isoDEP): Characterization through particle velocimetry”, *2016 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society*, San Francisco, CA, Nov. 13-18, 2016 (Oral).
 4. V Velasco, M Gruenthal, E Zusstone, JMD Thomas, RE Person, R Keynton, and **SJ Williams**, “Introduction of two electrical impedance systems for the *in-vitro* characterization of HUVECs undergoing hydrodynamic shear stress”, *2016 AIChE Annual Meeting*, San Francisco, CA, Nov. 13-18, 2016 (Oral).
 5. B King, RW Cohn, B Panchapakesan, and **SJ Williams**, “Nucleation and growth of spontaneously aligned regions in carbon nanotube thin films: a morphological analysis”, *2016 AIChE Annual Meeting*, San Francisco, CA, Nov. 13-18, 2016 (Oral).
 6. B King, JD Schneider, M Larkin, J Tangney, and **SJ Williams**, “Colloidal dielectric forces within an electric curtain”, *2016 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society*, San Francisco, CA, Nov. 13-18, 2016 (Oral).
 7. Md Mahmudur Rahman, B King, NN Sreeramulu, J Ferguson, H Rathnayake, GA Willing, and **SJ Williams**, “An extended nanoparticle haloing study in microgravity”, *2016 AIChE Annual Meeting*, San Francisco, CA, Nov. 13-18, 2016 (Oral).
 8. A Mishra, K Clayton, **SJ Williams**, TL Kinzer-Ursem, ST Wereley, and A Kumar, “Optoelectronic trapping: effect of electrode material and thickness on light-induced electrothermal flow”, *2016 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society*, San Francisco, CA, Nov. 13-18, 2016 (Oral).
 9. RP Accolla, DJ Allen, and **SJ Williams**, “Application of microfluidic techniques for an isomotive dielectrophoresis (isoDEP) platform”, *ASME/IMECE, IMECE2016-68895*, Phoenix, AZ, Nov. 11-17, 2016 (Poster).
 - Awarded first place, NSF REU Poster Competition, Track 19-2
 10. GA Willing, **SJ Williams**, JJ Lee, B King, M Moradi, and DR Ryan, “Impact of microgravity on particle aggregation in complex fluids with a bimodal particle size distribution”, *ASGSR 2016*, Cleveland, OH, October 26-29, 2016 (Oral).
 11. Md M Rahman and **SJ Williams**, “Microfluidic motion of suspended colloids within a vertically rotated reference frame”, *ASGSR 2016*, Cleveland, OH, October 26-29, 2016 (Poster).
 12. M Moradi, JJ Lee, **SJ Williams**, and GA Willing, “Interparticle interaction forces and the stability of colloidal suspensions in the presence of charged nanoparticles”, *ASGSR 2016*, Cleveland, OH, October 26-29, 2016 (Poster).
 13. JJ Lee, M Moradi, Md M Rahman, B King, **SJ Williams**, and GA Willing, “The influence of gravity on stable crystalline colloidal self-assembly using the nanoparticle haloing method”, *ASGSR 2016*, Cleveland, OH, October 26-29, 2016 (Poster).
 14. B King, Md M Rahman, G Willing, H Rathnayake, JJ Lee, and **SJ Williams**, “Image analysis and data visualization for long term studies aboard the ISS with the Light Microscopy Module”, *ASGSR 2016*, Cleveland, OH, October 26-29, 2016 (Poster).
 15. GA Willing, **SJ Williams**, H Rathnayake, D Ryan, B King, M Moradi, and JJ Lee “Influence of microgravity on aggregation in complex fluids with a bimodal particle size distribution: analysis of experiments performed on the International Space Station”,

- Probing Dynamic Processes in Soft Materials Using Advanced Light Sources: a MaRIE Workshop*, Santa Fe, NM, July 25-27, 2016 (Poster).
16. DJ Allen and **SJ Williams**, "Isomotive dielectrophoresis for particle subpopulation analysis", *Dielectrophoresis 2016*, Boston, MA, July 13-15, 2016 (Oral).
 17. B King, JD Schneider, M Larkin, J Tangney, and **SJ Williams**, "Frequency-dependent dielectric force studies within a travelling wave electric curtain", *Dielectrophoresis 2016*, Boston, MA, July 13-15, 2016 (Poster).
 18. DJ Allen and **SJ Williams**, "Measuring Dielectric Properties from Individual Particles using Isomotive Dielectrophoresis (isoDEP)", *Microfluidics Congress: USA*, Philadelphia, PA, July 11-12, 2016 (Poster).
 19. NN Sreeramulu, H Rathnayake, **SJ Williams** and Gerold Willing, "Colloidal Self-assembly of multi-fluorescent silsesquioxane particles", *American Chemical Society, Spring 2016 National Meeting*, San Diego, CA, March 2016 (Oral).
 20. **SJ Williams**, GA Willing, and H Rathnayake, "Influence of gravity on nanoparticle haloing colloidal self-assembly," *American Society for Gravitational and Space Research*, Washington, DC, November 11-14, 2015 (Oral).
 21. **SJ Williams**, JD Schneider, and B King, "AC electrokinetic dust manipulation," *American Society for Gravitational and Space Research*, Washington, DC, November 11-14, 2015 (Poster).
 22. NN Sreeramulu, GA Willing, **SJ Williams**, and H Rathnayake, "Synthesis of multi-fluorescent silicon based colloids for colloidal self-assembly under microgravity," *American Society for Gravitational and Space Research*, Washington, DC, November 11-14, 2015 (Poster).
 23. V Velasco, RS Keynton, **SJ Williams**, "Microfluidic impedance chip for real-time *in vitro* analysis of endothelium under shear stress," *Gordon Research Conference: Microfluidics, Physics & Chemistry of*, West Dover, VT, May 31-June 5, 2015 (Poster).
 24. **SJ Williams**, V Hutchinson, J Jones, and J Duff, "Enhanced air filtration using dielectrophoresis," *2015 Kentucky EPSCoR Annual Conference*, Lexington, KY, May 22, 2015 (Poster).
 25. A Hack, D O'Brien, and **SJ Williams**, "Experimentation with colloidal particles for the ISS," *2015 Kentucky EPSCoR Annual Conference*, Lexington, KY, May 22, 2015 (Poster).
 26. H Rathnayake, T Abbewickrama, NN Sreeramulu, J Ferguson, **SJ Williams**, and G Willing "Synthesis of multi-fluorescent silicon based colloids for colloidal self-assembly under microgravity," *2015 Kentucky EPSCoR Annual Conference*, Lexington, KY, May 22, 2015 (Poster).
 27. A Mishra, **SJ Williams**, and ST Wereley, "Rapid electrokinetic patterning of metal nanoparticles and nanowires," *67th Annual Meeting of the APS Division of Fluid Dynamics*, San Francisco, CA, Nov. 23-25, 2014 (Oral).
 28. V Velasco and **SJ Williams**, "Microfluidic platform for impedance characterization of endothelial cells under fluid shear stress," *2014 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society*, Atlanta, GA, Nov. 16-21, 2014 (Oral).
 29. V Velasco, M Gruenthal, **SJ Williams**, JMD Thomas, RE Berson, and R Keynton, "An orbital shear platform for in-vitro real-time endothelium characterization," *2014 AIChE*

- Annual Meeting, Annual Meeting of the American Electrophoresis Society, Atlanta, GA, Nov. 16-21, 2014 (Poster).*
30. A Mishra, **SJ Williams**, and ST Wereley, "Optoelectric trapping and manipulation of metal nanoparticles," *2014 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society, Atlanta, GA, Nov. 16-21, 2014 (Oral).*
 31. K Clayton, A Mishra, **SJ Williams**, and ST Wereley, "Optoelectric assembly and manipulation of beads in a vertical tower configuration," *2014 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society, Atlanta, GA, Nov. 16-21, 2014 (Oral).*
 32. A Mishra, K Clayton, **SJ Williams**, and ST Wereley, "Rapid electrokinetic patterning: manipulating particles with laser and electric field," *2014 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society, Atlanta, GA, Nov. 16-21, 2014 (Poster).*
 - Awarded first place, *AES Electrophoresis Society* poster session
 33. **SJ Williams** and DG Allgeier, "Insulator-based micropipette dielectrophoretic trapping of particles," *2014 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society, Atlanta, GA, Nov. 16-21, 2014 (Oral).*
 34. GA Willing, Q He, H Rathnayake, and **SJ Williams**, "Stability of colloid suspensions with bimodal particle size distribution under thermophoretic flows," *30th Annual Meeting of the American Society for Gravitational and Space Research, Pasadena, CA, Oct. 22-26, 2014 (Poster).*
 35. **SJ Williams**, A Mishra, V Velasco, and ST Wereley, "Electrothermal flow patterns generated by resistive heaters," *ASME FEDS/ICNMM, FEDSM2014-21623, Chicago, IL, Aug. 3-7, 2014 (Oral).*
 36. **SJ Williams**, "Rapid electrokinetic patterning (REP): Current state of the art," *Dielectrophoresis 2014, London, U.K., July 14-16, 2014 (Oral).*
 37. A Wolsiefer and **SJ Williams**, "Simultaneous opto-electrokinetic particle concentration and electrowetting," *9th International Meeting on Electrowetting and Related Micro/Electrofluidic Science and Technology, Cincinnati, OH, June 23-25, 2014 (Poster).*
 38. SR Wills, K Heacox, RW Cohn, and **SJ Williams**, "Electrohydrodynamics of a point-and-plate nanoneedle," *ASME/IMECE, IMECE2013-64773, San Diego, CA, Nov. 15-21, 2013 (Oral).*
 39. MJ Gruenthal, V Velasco, RE Berson, RS Keynton, and **SJ Williams**, "Impedance analysis of endothelial cells cultured on an orbital platform," *ASME/IMECE, IMECE2013-64789, San Diego, CA, Nov. 15 – 21, 2013 (Oral).*
 40. N Romero, L Parkes, D Jackson, J Naber, and **SJ Williams**, "Inexpensive electrokinetic microfluidic systems using printed circuit board substrates," *2013 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society, San Francisco, CA, Nov. 3 – 8, 2013 (Oral).*
 41. **SJ Williams**, "Effects of microtopography on two-dimensional electrokinetic patterning of colloids on an electrode surface," *2013 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society, San Francisco, CA, Nov. 3 – 8, 2013 (Oral).*
 42. **SJ Williams** and NG Green, "Design of electrothermal pumps using resistive heaters," *2013 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society, San Francisco, CA, Nov. 3 – 8, 2013 (Oral).*

43. **SJ Williams** “Rapid electrokinetic patterning and sorting of colloids” (video, selected from top abstracts submitted) *2013 Kentucky EPSCoR Annual Conference*, Louisville, KY, Oct. 17, 2013 (Video/Oral).
44. KE Heacox, BH Fasciotto, RW Cohn, and **SJ Williams**, “Electrohydrodynamic flows generated using a nanoneedle,” *9th Kentucky Innovation & Entrepreneurship Conference*, Lexington, KY, August 29, 2013 (Poster).
45. **SJ Williams**, V Velasco, A Mishra, J-S Kwon, and ST Wereley, “Rapid electrokinetic patterning (REP): manipulating colloids from nanoparticles to bacteria,” *2013 Kentucky Nano Symposium*, Louisville, KY, Aug. 16-17, 2013 (Oral).
46. KE Heacox, BH Fasciotto, RW Cohn, and **SJ Williams**, “Electrohydrodynamic flows generated using a nanoneedle,” *2013 Kentucky Nano Symposium*, Louisville, KY, Aug. 16-17, 2013 (Poster).
47. A Mishra, K Clayton, R Thakur, **SJ Williams**, A Kumar, S Wereley, “Rapid Optoelectrokinetic manipulation of nanoparticles,” *Advances in Microfluidics & Nanofluidics*, South Bend, IN, May 24-26, 2013 (Oral).
48. J-S Kwon, V Velasco, **SJ Williams**, ST Wereley, “Rapid electrokinetic patterning technique for manipulation of colloids and microorganisms, and its technical advancement,” *Advances in Microfluidics & Nanofluidics*, Notre Dame, IN, May 24-26, 2013 (Oral).
49. NR Wood, AI Wolsiefer, KE Heacox, RW Cohn, and **SJ Williams**, “Dielectrophoretic capture of nanoparticles with a self-assembled nanoprobe,” *Advances in Microfluidics & Nanofluidics*, Notre Dame, IN, May 24-26, 2013 (Oral).
50. V Velasco, **SJ Williams**, and RS Keynton, “A microfluidic chip for impedance analysis and characterization of human umbilical vein endothelial cells under fluid shear stress,” *7th International Conference on Microtechnologies in Medicine and Biology (MMB2013)*, Marina Del Rey, CA, April 10-12, 2013 (Poster).
51. V Velasco and **SJ Williams**, “Electrokinetic concentration and patterning of colloids with thin film resistors,” *Proc. ASME/IMECE*, Presentation #2012-87541, Houston, TX, Nov. 9-15, 2012 (Oral).
52. J Duff and **SJ Williams** “Dielectrophoretic precipitation of airborne particles,” *Proc. ASME/IMECE*, Presentation #2012-89927, Houston, TX, Nov. 9-15, 2012 (Oral).
53. MJ Gruenthal, V Velasco, RE Berson, RS Keynton, and **SJ Williams**, “Impedance analysis of endothelial cells in development of an orbital shear platform,” *2012 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society*, Pittsburgh, PA, Oct. 28 – Nov. 2, 2012 (Poster).
54. KE Heacox, NR Wood, AI Wolsiefer, RW Cohn, and **SJ Williams**, “Manipulation of nanoparticles using electro-kinetics generated by nano-needles,” *2012 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society*, Pittsburgh, PA, Oct. 28 – Nov. 2, 2012 (Poster).
55. AH Work, Jr., V Velasco, and **SJ Williams**, “Rapid electrokinetic patterning (REP) of hydrosol colloids at a planar electrode,” *2012 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society*, Pittsburgh, PA, Oct. 28 – Nov. 2, 2012 (Oral).

56. AH Work, Jr., V Velasco, and **SJ Williams**, "Patterning simple geometries with colloids using a scanning laser," *2012 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society*, Pittsburgh, PA, Oct. 28 – Nov. 2, 2012 (Poster).
57. NR Wood, AI Wolsiefer, RW Cohn, and **SJ Williams**, "Trapping of nanoparticles with dielectrophoretic nano-probes," *2012 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society*, Pittsburgh, PA, Oct. 28 – Nov. 2, 2012 (Oral).
58. V Velasco, MJ Gruenthal, RS Keynton, and **SJ Williams**, "A microfluidic platform for impedance analysis and characterization of human umbilical vein endothelial cells," *2012 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society*, Pittsburgh, PA, Oct. 28 – Nov. 2, 2012 (Oral).
59. V Velasco, RS Keynton, and **SJ Williams**, "Colloid concentration and sorting with double layer electrokinetics," *Colloids and Nanomedicine*, Amsterdam, The Netherlands, July 15-17, 2012 (Poster).
60. NR Wood, AI Wolsiefer, KE Heacox, RW Cohn, and **SJ Williams**, "Trapping of nanoparticles with dielectrophoretic nanoneedles," *8th Kentucky Innovation & Entrepreneurship Conference*, Louisville, KY, June 1, 2012 (Poster).
61. **SJ Williams** and RW Cohn, "The ElectroOptics Research Institute and Nanotechnology Center's Huson Nanotechnology Core Facility," *1st Annual Kentucky Nanotechnology Symposium*, Bowling Green, KY, March 30-31, 2012 (Oral).
62. V Velasco, AH Work, Jr., and **SJ Williams**, "Rapid electrokinetic self-assembly and patterning of colloids," *1st Annual Kentucky Nanotechnology Symposium*, Bowling Green, KY, March 30-31, 2012 (Oral & Poster).
63. NR Wood, AI Wolsiefer, KE Heacox, RW Cohn, and **SJ Williams**, "Trapping of nanoparticles with dielectrophoretic nanoneedles," *1st Annual Kentucky Nanotechnology Symposium*, Bowling Green, KY, March 30-31, 2012 (Oral & Poster).
64. **SJ Williams**, "Colloidal aggregation and concentration through double layer polarization," *2011 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society*, Minneapolis, MN, Oct. 16-21, 2011 (Oral).
65. V Velasco, K King, **SJ Williams**, and RS Keynton, "Development of an automated microfluidic platform for impedance analysis of the endothelium," *2011 BMES Annual Meeting*, Hartford, CT, Oct. 12-15, 2011 (Poster).
66. **SJ Williams**, A Kumar, J-S Kwon, R Thakur, and ST Wereley, "Rapid and dynamic multiscale manipulation based on an optoelectric device," *Proceedings of the 2010 IEEE-EDS University Government Industry Micro/Nano Symposium*, West Lafayette, IN, July 1, 2010 (Oral).
67. ST Wereley, **SJ Williams**, A Kumar, H-S Chuang, J-S Kwon, and C Smith, "Opto-electric manipulation of droplets and colloids for material assembly," *2010 Materials Research Society Spring Meeting*, Invited Presentation, San Francisco, CA, April 5-9, 2010 (Oral).
68. **SJ Williams**, A Kumar, and ST Wereley, "Continuous colloidal concentration and patterning with optically induced AC electrokinetics," *2009 AIChE Annual Meeting, Annual Meeting of the American Electrophoresis Society*, Nashville, TN, Nov. 8-13, 2009 (Oral).

69. **SJ Williams**, D Hilgart, and RS Keynton, "Fabrication of a microfluidic platform for impedance analysis of endothelial monolayers," *2009 BMES Annual Meeting*, Pittsburgh, PA, Oct. 7-10, 2009 (Poster).
70. A Kumar, **SJ Williams**, and ST Wereley, "A novel optically driven electrokinetic technique for manipulating nanoparticles," *Proc. SPIE*, 7400, 74000V (2009).
71. ST Wereley, E Judokusumo, A Kumar, and **SJ Williams**, "Velocity fields in opto-electrically induced fluid flows," *The Seventh International Conference on Nanochannels, Microchannels, and Minichannels (ICNMM)*, Keynote Presentation, ICNMM09-82153, Pohang, South Korea, June 22-24, 2009 (Oral).
72. A Kumar, **SJ Williams**, and ST Wereley, "Rapid electrokinetic patterning of colloids using optical landscapes," *MF3 Industrial Advisory Board Meeting*, Napa, CA, Jan 13, 2009 (Oral).
73. ST Wereley, **SJ Williams**, and A Kumar, "Optoelectronic micro/nano particle manipulation for biological applications," *2nd International Symposium on LifeChips*, Invited Presentation, Irvine, CA, Jan. 9-10, 2009 (Oral).
74. **SJ Williams**, SD Peterson, A Kumar, and ST Wereley, "Three dimensional transport of an optically induced electrothermal microvortex," *APS/DFD Annual Meeting*, Pres. # LN.00003, San Antonio, TX, Nov. 23-25, 2008 (Oral).
75. **SJ Williams**, A Kumar, and ST Wereley, "Rapid colloidal assembly with optically induced electrokinetic forces," *Proceedings of the 2008 IEEE-EDS University Government Industry Micro/Nano Symposium*, Louisville, KY, July 13-16, 2008 (Oral).

Non-refereed Publications

1. **SJ Williams**, A Kumar, and ST Wereley, "Optically induced electrokinetic patterning and manipulation of particles," *Physics of Fluids*, 26th Annual Gallery of Fluid Motion, Vol. 21, 091104, (2009).

Invited Speaker and Participant

1. **SJ Williams**, B King, Md M Rahman, M Moradi, JJ Lee, D Bergman, A Penn, D Ryan, GA Willing, and H Rathnayake "Investigating long-term colloid stability in microgravity", *Space Grant Directors Southeast Regional Meeting*, September 28-30, Lexington, KY.
2. **SJ Williams**, "Electrohydrodynamic assembly and sorting of colloids," Western Kentucky University, Bowling Green, Kentucky, February 19, 2016.
3. **SJ Williams**, "AC electrokinetics & dielectrophoresis in microsystems," PGXL Laboratories, Louisville, Kentucky, January 24, 2014.
4. **SJ Williams**, "Electrohydrodynamic trapping, patterning, and sorting of colloids," University of Kentucky, Oct. 1, 2013.
5. **SJ Williams**, "Real-time in vitro analysis of the endothelium using impedance techniques," *Engineering Platforms for Exploring Cellular and Molecular Processes* seminar series, University of Louisville, Dec. 5, 2012
6. **SJ Williams**, "Applications of microfluidic velocimetry techniques," University of Louisville Cardiovascular Innovation Institute, Oct. 27, 2011.

7. **SJ Williams**, “Optically controlled electrokinetic manipulation of micro- and nanoparticles,” Virginia Tech., May 2, 2011.
8. **SJ Williams**, A Kumar, and ST Wereley, “Rapid electrokinetic patterning,” Arryx Inc., Chicago, IL, Nov. 19, 2008.
9. **SJ Williams**, A Kumar, and ST Wereley, “Rapid electrokinetic patterning,” Arryx Inc., Chicago, IL, Feb. 18, 2008.

Patents & Intellectual Property

Patents

U. S. Provisional Patent Application Serial No. 62/359,850

1. Isomotive dielectrophoresis for dielectric analysis of particle subpopulations. US Provisional Patent Application Serial No. 62/359,850. (ULRF Ref.: 14074) Filed July 8, 2016.

Grants – Funded

1. **SJ Williams** and S Hendricks, “Isomotive dielectrophoresis for enhanced analyses of cell subpopulations”, NSF IDBR (#1550509), 04/01/2016-03/31/2019, \$372,500. [*SJ Williams share: \$304,834*]
2. **SJ Williams**, “Self-assembly of colloids for enhanced solar cells”, UF-16-006, NASA Kentucky Space Grant Consortium, Undergraduate Fellowship (Student: David Bergman), 01/01/2016-12/31/2016, \$6,000.
3. **SJ Williams**, “Dielectrophoresis in air for autonomous dust manipulation and analysis”, UF-16-005, NASA Kentucky Space Grant Consortium, Undergraduate Fellowship (Student: Daniel Allen), 01/01/2016-12/31/2016, \$6,000.
4. **SJ Williams** (Science-PI), S Smith (Managing-PI), GA Willing, H Rathnayake, and J Lump, “Influence of Gravity on Electrokinetic and Electrochemical Colloidal Self-Assembly for Future Materials”, NASA EPSCoR, NNX14AN28A (14-EPSCoR-0011), 10/01/2014-09/30/2018, \$1,050,000 (\$750,000 NASA EPSCoR, \$300,000 Kentucky EPSCoR) [*SJ Williams share: \$425,000*].
5. **SJ Williams**, “Microfluidic platform for impedance characterization of endothelial cells under fluid shear stress” University of Louisville, Project Completion Grant, 06/01/2014-05/31/2015, \$4,000.
6. **SJ Williams**, “Development of an electrokinetic self-cleaning air filter (ESCAF) to support NASA missions” NASA Kentucky EPSCoR, RFP-14-003, 07/01/2014-12/31/2015, \$20,000.
7. **SJ Williams** (PI) and RE Berson (Co-PI), “Impedance analysis of endothelial cells undergoing orbital shear”, University of Louisville, Multidisciplinary Research Grant, 01/2012-12/2012, \$10,000 [*SJ Williams share: \$6,000*].
8. **SJ Williams** (PI) and RW Cohn (Co-PI), “Dielectrophoretic nanoneedles for trapping and characterization of sub-cellular entities”, Kentucky Science and Engineering Foundation (KSEF), RDE-2298-014. 07/2011 – 12/2013, \$80,000 [*SJ Williams share: \$48,000*].

9. **SJ Williams**, “Electrokinetic filtration of neutrally charged airborne microparticles,” University of Louisville, Research Initiation Grant, 01/2011 – 12/2011, \$4,790.
10. **SJ Williams**, “Development of an optoelectrowetting platform at the University of Louisville,” University of Louisville, Undergraduate Research Grant, 01/2011 – 12/2011, \$3,000.
11. **SJ Williams**, “Microfluidic pumping with optically induced carbon nanotube actuation,” University of Louisville, Undergraduate Research Grant, 01/2011 – 12/2011, \$3,000.
12. **SJ Williams**, “Suspended Single-Cell Shear-Induced Reactions Measured Using Micro-PIV,” National Science Foundation Graduate Research Fellowship. 05/2006 – 05/2009, \$121,500.

Non-Research Grants (Travel Grants, Equipment Acquisition, etc.)

13. **SJ Williams**, NASA Kentucky Travel Grant (RFP-12-003), 07/2014, \$1,000.
14. C Hansen, **SJ Williams**, and R Yang, “Student Poster Symposium at the ASME International Mechanical Engineering Congress and Exposition (ASME-IMECE); San Diego California; November 15-21, 2013,” National Science Foundation, CMMI-1343049, 08/10/2013-08/31/2014, \$49,946.
15. **SJ Williams**, Obtained hydraulic equipment from BW Rogers, Inc. (Louisville, KY) to supplement instruction in ME 544. Six items valued at \$3,950. 07/2013.
16. **SJ Williams**, NASA Kentucky Travel Grant (RFP-12-003), 06/2013, \$1,000.
17. TJ Huang, V Prakash, D Attinger, **SJ Williams**, “Student Poster Symposium at ASME Society-Wide Micro and Nano Technology Forum, Houston, Texas, November 9-15, 2012,” National Science Foundation, CBET-1248221, 09/07/2012-08/31/2013, \$26,000.

TEACHING AND SCHOLARSHIP OF TEACHING

Courses Taught

Undergraduate Level Courses

Mechanics II: Dynamics (ME 206)
Engineering Measurements (ME 314)
Mechanical Engineering Lab (ME 315)
Machine Design I (ME 422)
Capstone Design (ME 497)

Graduate Level Courses

Introduction to Fluid Power Systems (ME 544)
Experimental Fluid Mechanics (ME 675, also taught at GE Appliance Park)

Course Coordinator

Mechanics II: Dynamics (ME 206)
Fluid Power Systems (ME 544)
Experimental Fluid Mechanics (ME 675)

Description of Relevant Courses

Mechanics II: Dynamics (ME 206): Study of the motions and forces of engineering systems. Topics include: kinematics and kinetics of particles, equations of motion, energy and momentum methods, and introduction to rigid body dynamics.

Introduction to Fluid Power Systems (ME 544): Design methodology of hydraulic circuits and fluid power components. Study of rotary/linear actuators, hydrostatic transmissions, temperature control, contamination control, pneumatics, valves, and control components. Applied design projects and laboratory modules are required.

Experimental Fluid Mechanics (ME 675): This course provides a graduate-level introduction to the basic theory and practical application of several important experimental techniques used in fluid dynamics. Topics include techniques for the measurement of material properties, pressure, density, force, fluid velocity, temperature and heat flux. The course will also review applications of measurement techniques for hydraulics, microfluidics, and other special-case topics.

Class Guest Lectures

1. “Dielectrophoresis & AC Electrokinetics,” BE 680, *Bio-Micro-Electro-Mechanical Systems*, University of Louisville, Professor Robert Keynton (03/2010, 02/2014, 02/2015).
2. “Electrowetting,” BE 680, *Bio-Micro-Electro-Mechanical Systems*, University of Louisville, Professor Robert Keynton (02/2014).
3. “Rapid Electrokinetic Patterning,” ECE 575, *Nanostructure Self-Assembly*, University of Louisville, Professor Robert Cohn (09/2010, 09/2012).
4. “Microfluidics: An Introduction,” ME 575, *Mechanics of Micro-Machines*, University of Louisville, Professor Thomas Berfield (10/2010, 10/2011).

5. "AC Electrohydrodynamics," ECE 500, *Microfluidics*, University of Louisville, Professor Cindy Harnett (04/2010).
6. "Chips and Tricks: Microfluidic Fabrication Techniques," ME 517, *Micro/Nanoscale Physical Processes*, Purdue University, Professor Steven T. Wereley (02/2009).
7. "Dielectrophoresis: An Introduction," ME 697W, *Small-scale Fluid Mechanics*, Purdue University, Professor Steven T. Wereley (10/2008).

Teaching Evaluations

Course Title	Course	Term	Year	Students	Evaluation	Dept. Norm
ME 206: Mechanics II: Dynamics						
Mechanics II: Dynamics	ME206	Fall	2015	90	-	-
Mechanics II: Dynamics	ME206	Spring	2015	46	3.57	3.69
Mechanics II: Dynamics	ME206	Summer	2014	43	4.03	3.88
Mechanics II: Dynamics	ME206	Fall	2013	49	4.35	3.77
Mechanics II: Dynamics	ME206	Fall	2012	44	4.14	3.87
Mechanics II: Dynamics	ME206	Fall	2011	80	2.75	3.74
Mechanics II: Dynamics	ME206	Spring	2010	44	4.17	-
Mechanics II: Dynamics	ME206	Fall	2009	45	3.98	-
ME 544: Introduction Fluid Power Systems						
Intr. Fluid Power Sys.	ME544	Spring	2015	33	4.36	3.69
Intr. Fluid Power Sys.	ME544	Spring	2014	12	4.55	3.75
Intr. Fluid Power Sys.	ME544	Spring	2013	17	4.80	3.79
Intr. Fluid Power Sys.	ME544*	Spring	2012	30	4.42	3.69
ME675: Experimental Fluid Mechanics						
Experimental Fluid Mech.	ME675	Fall	2014	17	4.25	3.78
Experimental Fluid Mech.	ME675	Spring	2014	13	3.42	3.75
Other ME Courses						
Machine Design I	ME422	Spring	2011	27	3.79	-
Eng. Measurements	ME314	Fall	2010	26	3.61	-
Mech. Eng. Lab I	ME315	Fall	2010	10	2.89	-
Machine Design I	ME422	Summer	2010	19	4.54	-
Capston Design Project	ME497	Spring	2010	25	4.55	-

*was listed as ME575

Mean: 4.01 3.76

Students Advised

Graduate Students (PhD)

1. Vanessa Velasco, Ph.D., “A microfabricated platform for impedance analysis and characterization of adherent cells,” Fall 2010 – Fall 2015.
 - Awarded Southern Regional Education Board State Doctoral Fellowship (Fall 2010)
 - Selected to attend the NanoBiophotonics Summer School, Urbana, Illinois (Summer 2011)
 - Six-month internship with Dr. Utkan Demirci at Harvard/MIT (Fall 2013)
 - Awarded \$500 travel grant to attend 2014 AIChE Annual Meeting (Fall 2014)
 - Received Carl Storm Underrepresented Minority Fellowship for support in the participation of the 2014 Physics & Chemistry of Microfluidics GRC.
2. Benjamin King, Ph.D., Spring 2015 – present.
 - Received ASGSR 2016 travel award (Fall 2016)
3. Md Mahmudur “Rony” Rahman, Ph.D., Fall 2015 – present.

Graduate Students (M.Eng.: thesis option)

4. Matthew Okruch, M.Sci. (GE Student), August 2015 – present.
5. Lazaro Galban, M.Sci. (GE Student) “Experimental hydraulic switch for dishwashers with a bottle blaster system,” August 2013 – August 2014.
6. Mark J. Gruenthal, M.Eng., “Impedance analysis of endothelial cells undergoing orbital shear,” Spring 2012 – Spring 2013.
7. Joseph “Nick” Duff, M.Eng., “Fabrication and analysis of an electrokinetic air filter,” Fall 2010 – Summer 2013.
8. Nicholas R. Wood, M.Eng., “Dielectrophoretic nanoneedles for trapping and characterization of sub-cellular entities,” Fall 2011 – Spring 2012.
9. Andrew H. Work, Jr., M.Eng., “Electrokinetic concentration and patterning of colloids with a scanning laser,” Fall 2011 – Summer 2012.
 - Selected for University of Louisville Doctoral Fellowship (Spring 2012)

Graduate Students (M.Eng.: non-thesis option)

10. Jacob Weigel, M.Eng., “Electrokinetic repulsion of particles: directionality study,” Spring 2016.
11. Thomas Cushing, M.Eng., “Effect of electrode separation on dust repulsion by standing wave dielectrophoresis,” Spring 2015-Spring 2016.
12. John Tangney, M.Eng., “Electrokinetic particle sorting and repulsion,” Fall 2015
13. Matthew Larkin, M.Eng., “An investigation of the dielectrophoretic force of uniform spherical particles in a standing wave field,” Fall 2015
14. Matthew J. Baker, M.Eng., “Experimental measurement of orbital fluid mechanics,” Fall 2015
15. Andrew Sudkamp, M.Eng., “Electrorotation (ROT) of porous microparticles,” Spring 2015.

16. Victoria Hutchinson, M.Eng., “Particle filtration utilizing alternating current dielectrophoresis,” Fall 2014.
17. Alexander Hack, M.Eng., “Simulating microgravity on earth for colloidal samples,” Fall 2014.
18. Devin O’Brien, M.Eng., “Mixing of colloidal particles in a capillary using PZT piezoelectric ultrasonic vibrations,” Fall 2014.
19. Daniel Allgeier, “Particle manipulation using glass micropipettes utilizing dielectrophoresis,” Spring 2014.
20. Seth Hannan, M.Eng., “Electrohydrodynamic analysis of nanoneedles and nanoparticle trapping” Spring 2013.
21. Joshua Weil, M.Eng., Spring 2013.
22. Nathan Romero, M.Eng., “Efficacy of CNC milled, PCB based, electrokinetic microfluidic devices,” Fall 2012.
23. Jeremy Jones, M.Eng., “Feasibility and testing of an AC electrokinetic filter,” Fall 2012.
24. Liam Parkes, M.Eng. Fall 2012 – Spring 2013.
25. James Lee Tucker, M.Eng., “Shaping of colloid aggregations using an infrared scanning laser,” Fall 2011 – Spring 2012.
26. Bennie R. LaPrade, M.Eng., “Analysis of the opto-mechanical response of a carbon-nanotube composite diaphragm,” Fall 2011 – Spring 2012.
27. Amanda Wolsiefer, M.Eng., “Particle manipulation using rapid electrokinetic patterning and electrowetting,” Fall 2012 – Spring 2013.
 - Undergraduate Research Assistant, Spring 2012 – Summer 2012.
28. Corey Abrams, M.Eng., “Electrokinetic colloid self-assembly,” Spring 2012.
29. Dustin Webb, M.Eng., “Two color particle shadow velocimetry,” Spring 2012.
30. Tyler Cookson, M.Eng., “Development of an optical trapping system using commercially-available components,” Spring 2011.
31. Mandy Scott, M.Eng., “Development of an optical trapping system using commercially-available components,” Spring 2011.
32. Tim Viola, M.Eng., “Hydrodynamic motion study of a micro-particle using programmed dielectrophoretic agitation,” Spring 2011.

Undergraduate Students

33. Robert Accolla (NSF REU student from Virginia Tech), research on insulative-based isomotive dielectrophoresis, Summer 2016.
 - 2016 ASME Track 19 NSF Student Poster Competition travel award (Fall 2016)
34. Daniel Allen, worked on air-based dielectrophoresis and isomotive dielectrophoresis
 - Selected as Speed School Banner Bearer (Outstanding Student), December 2016
35. David Bergman, “Self-assembly of colloids for enhanced solar cells” (2016)
36. Esther Zusstone, “Label-free electrokinetic immunoassay analysis of magnetic particles” BIOL 405, Spring 2014

37. Andrew Survant, Undergraduate Research Assistant, electrokinetic hydrodynamic methods, 2013.
38. Samuel Wills, Co-op student, Conducted numerical simulations using COMSOL 4.3 studying electrokinetics and electrohydrodynamics of nanoneedles, Fall 2013.
39. Shawn Day, B.S., Undergraduate Research Assistant, “Development of an optoelectrowetting platform at the University of Louisville,” Spring 2011.

High School Students

40. Chandni Bhikha, “Microfluidic mixing in microgravity environments,” Manual High School, 2013 – 2014.
41. Kainat Ahmed, “Enhancing micro-channel structure of contactless dielectrophoresis device for more efficient separation of particles,” Manual High School, 2013.

Dissertation/Thesis Committee Member

42. Avanish Mishra, Mechanical Engineering, Ph.D. Candidate, (Purdue University).
43. Jubin Chen, Mechanical Engineering, Ph.D. Candidate.
44. Tom Lucas, “Development of a light-powered microstructure: enhancing thermal actuation with near-infrared absorbent gold nanoparticles,” Ph.D., Electrical Engineering, August 2014.
45. Daniel Porter, “Bi-stable buckled energy harvesters actuated via torque arms,” Ph.D., Mechanical Engineering, May 2015.
46. Alisha Bragg, Mechanical Engineering, M.Eng., August 2014.
47. Xiaoming Fan, “Photomechanical actuation of liquid crystal nanotube elastomers,” MS, Mechanical Engineering, August 2014.
48. Muheng “Justin” Zhang, “Numerical investigation of hydrodynamic focusing and Coulter principle in a microfluidic device,” Ph.D., Mechanical Engineering, May 2014.
49. Mai-Dung Nguyen, “Cardiac cell culture model (CCCM) as a left ventricle mimic for in-vitro cardiac tissue engineering,” Ph.D., Mechanical Engineering, June 2014.
50. Adam Scarsella, “Apical left ventricular cannula sutureless implantation development,” MEng., Bioengineering, December 2013.
51. Michael C. Clark, “Evaluation of drug release from abraxane and doxil in tumor tissue,” MEng, Bioengineering, August 2013.
52. Tim Broering, “The characterization of wing-wing vortex interactions of a tandem flapping wing configuration and its relationship to the phase angle and wing spacing,” Ph.D., Mechanical Engineering, July 2013.
53. Mitchell J. Buller, “Development of a physiologic ex vivo vessel perfusion system,” M.Eng., Bioengineering, July 2013.
54. Jeremy E. Phillips, “Surface bound PEG-RGDS on PEG-DA hydrogels and its effects on RPE cell morphology and differentiation,” M.Eng., Bioengineering, July 2013.
55. James Loomis, “Nanocarbon/elastomer composites: characterization and applications in photo-mechanical actuation,” Ph.D., Mechanical Engineering, May 2013.

56. Thomas A. Priest, "Examination of diffusion of gold nanoshells into cancer tissues," M.Eng., Bioengineering, May 2013.
57. Peng Xu, "Near infrared photon-assisted polymerization of advanced polymer composites," Ph.D., Mechanical Engineering, May 2013.
58. Kurtis T. James, "Production of high yield gold/gold-sulfide nanoparticles via cellulose membrane," MEng, Bioengineering, May 2013.
59. Vahidreza Parichehreh, "Microfluidics approaches for label free cell separations," Ph.D., Mechanical Engineering, August 2012.
60. Dhruvinkumar Patel, "A novel high yield process for fold sulfide nanoparticle synthesis via shifting equilibrium of self-assembly reaction," M.Eng., Bioengineering, May 2012.
61. Brek Meuris, "Thermal analysis of lead zirconate titanate thin films using digital image correlation," MEng, Mechanical Engineering, December 2011.
62. Ruthie S. Fligor, "Quantification of vascular perfusion in the spinal cord after injury," M.Eng., Bioengineering, December 2011.
63. Julia Kar, "A forward dynamics simulation study of increasing load on the anterior cruciate ligament of the knee, for young women performing recreational drop jump activities," Ph.D., Mechanical Engineering, May 2011.

Independent Study

64. Nicholas Schuppert, ME 688, "Surface flow contour reconstruction in oscillating petri dish using free-surface synthetic Schlieren method," Fall 2015
65. Jacob Sunding, "Electrothermal fluid flow," Spring 2011

SERVICE**Professional Activities**University of Louisville

Search Committee: ME Endowed Chair	2013 – 2015
Speed School Diversity Committee	2013 – present
ME Department Faculty Honors Advisor	2011 – present
Program Assessment Committee (Mech. Eng. Dept.)	2010 – 2013
Webpage Committee, Chair (Mech. Eng. Dept.)	2010

American Electrophoresis Society (AES)

Councilor (i.e. Board Member)	2014 – present
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Reviewer of Manuscripts

Lab on a Chip (12 papers)	2009 – present
Journal of Physics D: Applied Physics (1 paper)	2009 – present
Journal of Micromechanics and Microengineering (8 papers)	2009 – present
Journal of Fluids Engineering (2 papers)	2010 – present
Journal of Physics: Condensed Matter (1 paper)	2010 – present
Colloids and Surfaces A: Physicochemical and Engineering Aspects (1 paper)	2010 – present
Biomedical Microdevices (1 paper)	2010 – present
Biomicrofluidics (2 papers)	2011 – present
Electrophoresis (3 papers)	2011 – present
Microfluidics and Nanofluidics (1 paper)	2012 – present
Measurement Science and Technology (1 paper)	2012 – present
AIP Advances (1 paper)	2013 – present
Advances in Mechanical Engineering (1 paper)	2015 – present
ASME IMECE 2012 Conference	
ASME IMECE 2011 Conference	
ASME ICNMM 2011 Conference	
ASME IMECE 2010 Conference	
ASME FEDS-ICNMM 2010 Conference	

Conference Organizer, Session Chair/Co-Chair, etc.

Session Organizer and Co-Chair	2016 AIChE Annual Meeting, Topical 3: 2016 Annual Meeting of the American Electrophoresis Society (AES), <i>Soft Matter Electrokinetics: Particles, Drops and Bubbles</i>	2016
Conference Organizing Committee	Dielectrophoresis 2016 (Boston, MA)	2016
Session Chair	American Society for Gravitational and Space Research (ASGSR), <i>Complex Fluids #1</i>	2015
Session Organizer and Co-Chair	2015 AIChE Annual Meeting, Topical 3: 2015 Annual Meeting of the American Electrophoresis Society (AES),	2015

Soft Matter Electrokinetics: Particles, Drops and Bubbles

Session Co-Chair	ASME 2014 4 th Joint US-European Fluid Engineering Division Summer Meeting and 12 th International Conference on Nanochannels, Microchannels, and Minichannels, <i>Electrokinetic Flow</i>	2014
Conference Organizing Committee	Dielectrophoresis 2014 (London, U.K.)	2014
Session Chair & Organizer	ASME IMECE 2014 Conference, <i>ASME Society-Wide Micro & Nano Technology Forum, Student Poster Competition</i>	2014
Session Chair & Organizer	2014 AIChE Annual Meeting, Topical 3: 2014 Annual Meeting of the American Electrophoresis Society (AES), <i>Soft Matter Electrokinetics: Particles, Drops and Bubbles</i>	2014
Session Chair & Organizer	ASME IMECE 2013 Conference, <i>ASME Society-Wide Micro & Nano Technology Forum, Student Poster Competition</i>	2013
Session Chair & Organizer	2013 AIChE Annual Meeting, Topical 3: 2013 Annual Meeting of the American Electrophoresis Society (AES), <i>Electrokinetic Behavior of Micro- and Nano-Particles: Directed Assembly Under Electric Fields.</i>	2013
Session Chair	2013 Kentucky Nano Symposium, <i>Life Sciences I</i>	2013
Vice-Session Chair	ASME IMECE 2012 Conference, <i>ASME Society-Wide Micro & Nano Technology Forum, Student Poster Competition</i>	2012
Session Co-Chair & Organizer	2012 AIChE Annual Meeting, Topical 3: 2012 Annual Meeting of the American Electrophoresis Society (AES), <i>Electrokinetic Behavior of Micro- and Nano-Particles: Directed Assembly Under Electric Fields.</i>	2012
Session Co-Chair	2011 AIChE Annual Meeting, Topical 3: 2011 Annual Meeting of the American Electrophoresis Society (AES), <i>Electroporation, Electrophysiology and Cell Electrokinetics.</i>	2011
Session Co-Chair	ASME Fluids Engineering Division Summer Meeting, <i>Microfluidics Summer Forum 2009, 29-1 Microfluidics: Bubbles and Surface Tension</i>	2009

Other

RDR Science Review Panel: NASA ACE-T (Glenn Research Center), March 13, 2014

Education and Service

- Developing *www.dielectrophoresis.org*, a website dedicated to the public education of microscale electrokinetics (under construction)
- Louisville Regional Science and Engineering Fair: Open to all middle school and high school students in Jefferson County and 13 surrounding counties. Winners will compete at the state and national levels for scholarships, tuition grants, trips, and scientific equipment.
 - Member of the Board (2012 – present), Judging Committee (2013 – present), Vice President (2013 – 2014), Judge (2010 – 2012),
- Participated at the faculty panel discussion at the Society of Women Engineers' summer sleepover for the incoming freshmen class (2011, 2012, 2013).
- Organized engineering-related activities for the 'College for a Day' event for middle and high school boys and girls (2012, 2013).
- Purdue Space Day, Group Leader – Participated with and observed a group of 5th and 6th graders for a variety of space/engineering-related activities, Nov. 2008.
- Middle School MINDS (Mastering Ideas Necessary for Developing Students) – Planned and taught a fluid-mechanics based activity for a group of 7th and 8th graders, Fall 2005.
- Catholic School Athletic Association (CSAA), 5th and 6th grade football coach, Fall 2000 through Fall 2005.