

# Dr. Cindy K. Harnett

## Curriculum Vitae

### Contact Information

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### Appointments:

Associate Professor, Electrical and Computer Engineering, University of Louisville 2012-present  
Assistant Professor, Electrical and Computer Engineering, University of Louisville  
2006- 2011  
Senior Member of Technical Staff, Sandia National Laboratories (CA) 04/05-10/05  
Limited Term Employee, Sandia National Laboratories (CA) 09/01-04/05  
Postdoctoral Research Associate, Cornell University 08/00-08/01

### Education

Ph.D., August 2000, School of Applied and Engineering Physics, Cornell University  
Thesis Title: Studies of Self Assembled Nanostructures for Integration with Microfabricated Devices; Supervisor: Dr. Harold G. Craighead  
B.S. Physics, May 1993, Harvey Mudd College

### Honors/Awards

NSF CAREER Award, “Ultra-Low Power Embedded Sensors for High-Density Remote Monitoring of Water Quality” 2007-2012  
Nellie Yeoh Whetten Award, National Nanofabrication Facility Cornell University, 2001  
NSF Graduate Research Fellowship, 1993-1996

### Journal Articles

Doerger, S. R. and Harnett, C. K., “Force-Amplified Soft Electromagnetic Actuators,” *Actuators* vol. 3, no. 4, p 76 (2018) <https://doi.org/10.3390/act7040076>

Ceron, S., Cohen, I., Shepherd, R. F., Pikul, J. H., and Harnett, C. K., “Fiber Embroidery of Self-Sensing Soft Actuators,” *Biomimetics*, vol. 3, no. 3, pp. 24–37, (2018) <https://doi.org/10.3390/biomimetics3030024>

Harnett, C. K., Zhao, H., and Shepherd, R. F., “Stretchable Optical Fibers: Threads for Strain-Sensitive Textiles,” *Advanced Materials Technologies* (2017) <https://doi.org/10.1002/admt.201700087>

Lucas, T. M., Porter, D. A., Beharic, J., Berfield, T. A., and Harnett, C. K., "Bistability in a symmetric out-of-plane microstructure," *Microsystem Technologies* (2016). doi:10.1007/s00542-016-2992-2

Kulkarni, A. S., Harnett, C. K., and Welch, K. C., "EMF Signature for Appliance Classification," *IEEE Sensors Journal* **15**, 3573-3581 (2015). doi: [10.1109/JSEN.2014.2379113](https://doi.org/10.1109/JSEN.2014.2379113)

Stewart, R., J. Fox, and C. Harnett, "Estimating Suspended Sediment Concentration in Streams by Diffuse Light Attenuation." *Journal of Hydraulic Engineering* (2014): 04014033. doi:10.1061/(ASCE)HY.1943-7900.0000887.

Beharic, J., T. M. Lucas, and C. K. Harnett, "Analysis of a Compressed Bistable Buckled Beam on a Flexible Support." *Journal of Applied Mechanics* (2014). doi:10.1115/1.4027463.

Lucas, T. M., James, K. T., Beharic, J., Moiseeva, E. V., Keynton, R. S., O'Toole, M. G., and Harnett, C. K., "Wavelength specific excitation of gold nanoparticle thin films," *Applied Physics Letters* **104** 011909 (2014). doi:10.1063/1.4861603

Lucas, T. M., Moiseeva, E. V., Zhang, G., Gobin, A. M., and Harnett, C. K., "Thermal properties of infrared absorbent gold nanoparticle coatings for MEMS applications," *Sensors and Actuators A: Physical* **198**, 81-86 (2013) <http://dx.doi.org/10.1016/j.sna.2013.04.033>

Stewart, R. L., Fox, J. F., and Harnett, C. K., "Time-average Velocity and Turbulence Measurement Using Wireless Bend Sensors in Open Channel with Rough Bed," *J. Hydraulic Eng.* **139**, 696-706 (2013). DOI: 10.1061/(ASCE)HY.1943-7900.0000725

Zhang, M., Lian, Y., Harnett, C., and Brehob, E., "Investigation of Hydrodynamic Focusing in a Microfluidic Coulter Counter Device," *J. Biomech. Eng.* **134**, 081001, 2012 DOI: 10.1115/1.4007091

Goessling, B. A., Lucas, T. M, Moiseeva, E. V., Aebersold, J. W., and Harnett, C. K., "Bistable out-of-plane stress mismatched thermally actuated bilayer devices with large deflection," *J. Micromech. Microeng.* **21** 065030, 2011 DOI: 10.1088/0960-1317/21/6/065030

Harnett, C. K., "Open source hardware for instrumentation and measurement," *IEEE Instrumentation and Measurement Magazine* **14**, 34-38 2011 DOI: 10.1109/MIM.2011.5773535

Moiseeva, E. V., Fletcher, A. A., and Harnett, C. K., "Thin-film electrode based droplet detection for microfluidic systems," *Sensors and Actuators B - Chemical* **155**, 408-414, 2011 DOI:10.1016/j.snb.2010.11.028

Lucas, T. M., and Harnett, C. K., "Control of electrolysis-generated microbubbles for sensor surface passivation," *Applied Physics Letters* **98** 011915, 2011

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Senousy, Y. M. and Harnett, C. K., "Fast three dimensional ac electro-osmotic pumps with nonphotolithographic electrode patterning," *Biomicrofluidics* **4** 036501, 2010  
DOI: 10.1063/1.3463719

Harnett, C. K., Schueler, M. T., Blumenthal, N. R., Hopf, K. L., Fox, J. F., and Pulugurtha, S., "Calibration and field deployment of low-cost fluid flow-rate sensors using a wireless network," *IEEE Transactions on Instrumentation and Measurement* **99**, 1-9, 2010  
DOI: 10.1109/TIM.2010.2051625

Harnett, C. K., "Open wireless sensor network telemetry platform for mobile phones," *IEEE Sensors Journal* **10**, 1083-1084, 2010

Harnett, C. K., "Nanotechnology in Environmental Sensors," *IEEE Instrumentation and Measurement Magazine* **13**, 8-12, 2010.  
DOI: 10.1109/MIM.2010.5438331

Kona, S., Kim, J. H., Harnett, C. K., and Sunkara, M. K., "Carbon nanotube growth studies using an atmospheric, microplasma reactor," *IEEE Trans. Nanotech.* **8**, 286-290, 2009

Harnett, C. K., Templeton, J., Dunphy-Guzman, K. A., Senousy, Y. M., and Kanouff, M. P., "Model-based design of a microfluidic mixer driven by induced charge electroosmosis," *Lab on a Chip* **8**, 565-572, 2008

Harnett, C. K. "Determining the physical sequence of sensors on a serial bus with minimal wiring," *IEEE Sensors Journal* **8**, 382-383, 2008

Scott, R., Sethu, P., and Harnett, C. K., "Three-dimensional hydrodynamic focusing in a microfluidic Coulter counter," *Review of Scientific Instruments* **79**, 046104, 2008

Moiseeva, E., Senousy, Y. M., McNamara, S., and Harnett, C. K., "Single-mask microfabrication of three-dimensional objects from strained bimorphs," *J. Micromech. Microeng.* **17**, N63-68, 2007

Lee, E. S., Robinson, D., Rognlien, J. L., Harnett, C. K., Simmons, B. A., Ellis, C. R., and Davalos, R. V., "Microfluidic electroporation of robust 10- $\mu$ m vesicles for manipulation of picoliter volumes," *Bioelectrochemistry* **69**, 117-125, 2006

Senaratne, W., Harnett, C., Sengupta, B., Baird, H., Craighead, H., and Ober, C. K., "Molecular templates for bio-specific recognition by low-energy electron beam lithography," *Nanobiotechnology* **1**, 23-34, 2005

Harnett, C. K., Coates, G. W., and Craighead, H. G., "Direct electron-beam patterning of surface coatings and sacrificial layers for micro-total analysis systems," *J. Photopol. Sci. Technol.* **15**, 493-496, 2002

Harnett, C. K. and Craighead, H. G., "Liquid crystal micropolarizer array for polarization-difference imaging," *Applied Optics* **41**, 1291-1296, 2002

Harnett, C. K., Coates, G. W., and Craighead, H. G., "Heat-depolymerizable polycarbonates as electron beam patternable sacrificial layers for nanofluidics." *Journal of Vacuum Science and Technology B* **19**, 2842-2845, 2001

Harnett, C. K., Satyalakshmi, K. M., and Craighead, H. G. "Bioactive templates fabricated by low-energy electron beam lithography of self-assembled monolayers." *Langmuir* **17** (1) 178-182, 2001

Satyalakshmi, K. M., Olkhovets, A., Metzler, M. G., Harnett, C. K., Tanenbaum, D. M., and Craighead, H. G., "Charge induced pattern distortion in low energy electron beam lithography," *J. Vac. Sci. Tech. B* **18**, 3122-3125, 2000

Harnett, C. K., Satyalakshmi, K. M., and Craighead, H. G. "Low-energy electron-beam patterning of amine-functionalized self-assembled monolayers," *Applied Physics Letters* **76**, 2466-2468, 2000

Evoy, S., Harnett, C. K., Craighead, H. G., Keller, S., Mishra, U. K., DenBaars, S. P., "Low-temperature scanning tunneling microscope-induced luminescence of an InGaN/GaN multiquantum well," *Applied Physics Letters* **74**, 1457-1459, 1999

Evoy, S., Harnett, C. K., Craighead, H.G., Eustis, T. J., Davis, W. A., Murphy, M. J., Schaff, W. J., Eastman, L. F. "Low temperature scanning tunneling microscope-induced luminescence of GaN," *Journal of Vacuum Science and Technology B* **16**, 1943-1947, 1998

Kane, B. E., Pfeiffer, L. N., West, K. W., and Harnett, C. K. "Variable-density high-mobility 2-D electron and hole gases in a gated GaAs/Al<sub>x</sub>Ga<sub>1-x</sub>As heterostructure," *Applied Physics Letters* **63**, 2132-2134, 1993

## Other Reviewed Reports

Harnett, C. K. and Wagner, B. P., "Integrating Fibers in Robotics using Automation," module of online Soft Robotics Toolkit, <https://softroboticstoolkit.com/integrating-fibers>

Liu, T., Moiseeva, E. V., and Harnett, C. K., "Chips and Tips: Integrated reservoirs for PDMS microfluidic chips," Online: Lab on a Chip: Chips and Tips, 2008  
([http://www.rsc.org/Publishing/Journals/lc/Chips\\_and\\_Tips/integrated\\_reservoirs.asp](http://www.rsc.org/Publishing/Journals/lc/Chips_and_Tips/integrated_reservoirs.asp))

Kanouff, M. P., Harnett, C. K., Dunphy-Guzman, K., Templeton, J., Senousy, Y., and Skulan, A., Science-based engineering of a sample preparation device for biological agent detection, Sandia Report SAND2006-7722, 2007

## Conference and Workshop Proceedings

Harnett, C. K. and Wagner, B. P., "Expanding the Robotics Materials Set with Machine Embroidery," *Robotics: Science and Systems (RSS)*, In workshop: *Material Robotics -- Bridging Materials Science and Robotics*. (3 pp), Cambridge, Massachusetts, USA, July 2017

Harnett, C. K., 2017 "Tobiko: A Contact Array for Self-Configuring, Surface-Powered Sensors." In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, pp. 2024-2028, Denver, CO May 9, 2017. <http://dl.acm.org/citation.cfm?id=3025504> (acceptance rate: 25%)

Kimmer, C. J., Harnett, C. K. 2016. "Combining Strings and Fibers with Additive Manufacturing Designs." In *Proceedings of ASME 2016 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, V004T05A014. Charlotte, NC. <http://doi.org/10.1115/DETC2016-59569>.

Harnett, C. K., "Flexible circuits with integrated switches for robotic shape sensing," paper 9859-18 presented at Sensors for Next Generation Robotics session of SPIE Defense and Commercial Sensing, Baltimore, MD April 21, 2016. <http://doi.org/http://dx.doi.org/10.1117/12.2235356>.

Harnett, C. K., Philipp, S. B., and Tretter, T. R., "Hackerspaces and Engineering Education," in *Proceedings of 44th International Frontiers in Education Conference*, Madrid, Spain, October 22-25, 2014. [http://ieeexplore.ieee.org/xpls/abs\\_all.jsp?arnumber=7044395](http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=7044395).

Lucas, T. M., James, K. T., Beharic, J., Moiseeva, E. V., Keynton, R. S., O'Toole, M. G., and Harnett, C. K., "Enhancing light-induced thermal actuation with gold nanoplates," *Proceedings of TechConnect Nano Conference*, Washington, D. C., June 15-18, 2014. Abstract: <http://www.techconnectworld.com/World2014/a.php?i=1087>  
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Beharic, J., Lucas, T.M., Senousy, Y. M., and Harnett, C. K., "Flexible microsensor for shape detection," *Proceedings of TechConnect Nano Conference*, Washington, D. C., June 15-18, 2014. Abstract: <http://www.techconnectworld.com/World2014/a.php?i=1095>  
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Bradshaw, R. D., Beharic, J., and Harnett, C., "Experimental Study and Numerical Analysis of Bistable Buckled Inclined Beams," *Proceedings of 2014 Society for Experimental Mechanics Annual Conference and Exposition on Experimental and Applied Mechanics*, Greenville, SC, June 2-5, 2014. <http://www.sem.org/APP-CONF-AC-List2-Abstract.asp?PaperNo=481>

Harnett, C. K. and Kimmer, C. J., "Digital origami from geometrically frustrated tiles," proceedings of the ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, 2013  
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Smith, S. W., Wiederkehr, R. S., Stewart, A. P., Carver, A. L., Crain, M. M., Jackson, D. J., Milligan, A., Dall'Olmo, G., Behrenfeld, M. J., Gaff, J. R., Harnett, C. K., and Mendes, S. B., "A microfluidic flow cytometer to detect, size, and classify sub-micron phytoplankton cells in the open ocean," Proceedings of 2013 Kentucky nanoSymposium, Louisville, KY, Aug 16-17, 2013.

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Kona, S. and Harnett, C. K., "Graphene in plastic packages: A low cost construction method for resistive chemical sensors," Materials Research Society Proceedings 1407, 2012, DOI 10.1557/opl.2012.661

Harnett, C. K., Lucas, T. M., Moiseeva, E. V., Casper, B., and Wilson, L., "Microscopic containers for sample archiving in environmental and biomedical sensors," Proceedings of IEEE International Instrumentation and Measurement Technology Conference, Austin, Texas, May 3-5, 2010, pages 328-331, DOI 10.1109/IMTC.2010.5488211

Moiseeva, E. V. and Harnett, C. K., "Shear-Based Droplet Production for Biomaterial Printing," Proceedings of Digital Fabrication 2009, Louisville, KY September 21-25, 2009, pages 806-809.

Harnett, C. K., Blumenthal, N., Fox, J. F., Pulugurtha, S., and Hopf, K. L., "Wireless sensor network for calibration and deployment of low-cost fluid flow-rate sensors," Proceedings of IEEE International Instrumentation and Measurement Technology Conference, Singapore, May 5-7, 2009, pages 411-416, DOI 10.1109/IMTC.2009.5168484

Harnett, C. K., Courtney, S. M., and Kimmer, C. J., "SALAMANDER: A distributed sensor system for aquatic environmental measurements," Proceedings of IEEE International Instrumentation and Measurement Technology Conference (DOI: 10.1109/IMTC.2008.4547334), pages 1787-1792, 2008

Harnett, C. K., Skulan, A. J., Hill, T. F., L.M. Barrett, G.J. Fiechtner, and E.B. Cummings, "Microparticle mixing and separation by nonlinear electrokinetic effects in microfluidic channels," Proceedings of Ninth International Conference on Micro Total Analysis Systems vol. 1 82-85, 2005

Morales, A. M., Brazzle, J. D., Crocker, R. W., Domeier, L. A., Domeier, Goods, E. B., Hachman, J. T., Harnett, C. K., Hunter, M. C., Seethambal, S. M., Mosier, B. P., and Simmons, B. A., Fabrication and Characterization of Polymer Microfluidic Devices for BioAgent Detection, Proc. SPIE 5716-11, 2005

Mosier, B. P., Crocker, R. W., Harnett, C. K., and Patel, K. D., Precise and automated microfluidic sample preparation. Proceedings of Eighth International Conference on Micro Total Analysis Systems, 2004

Harnett, C. K., Mosier, B. P., Caton, P. F., Wiedenman, B., and Crocker, R. W., Conductivity pulse time-of-flight flow sensor for sub-microliter/minute flow rates. Proceedings of Seventh International Conference on Micro Total Analysis Systems vol. 1 139-142, 2003

Harnett, C., Lopez, A., Kayyar, S., Chen, Y. -F., and Craighead, H. Self-assembled monolayers as high-resolution etch masks and templates for organic molecular assembly. Materials Research Society Symposium F Symposium Proceedings, Paper D6.6, 2001

## Presentations

Ternival, C., Islam, M. S., Beharic, J., and Harnett, C. K., “Transferring Microelectromechanical Devices to Breathable Fabric Carriers with Strain-Engineered Grippers,” Presentation at the Fall Materials Research Society Meeting, Boston, MA, November 25-30, 2018

Newquist, C., Dong, G., Harnett, C., and Cai, S., “Integrating Optically Actuated Liquid Crystal Elastomer Fibers into Textiles,” Presentation at the Fall Materials Research Society Meeting, Boston, MA, November 25-30, 2018.

Doerger, S. R. and Harnett, C. K. “Soft Electromagnetic Actuators,” Presentation at the Fall Materials Research Society Meeting, Boston, MA, November 25-30, 2018.

Campbell, M., Singh, P., Kate, K., and Harnett, C. K., “Controlling Thermoplastic Elastomer Optical Properties by Mechanical Processing,” Presentation at the Fall Materials Research Society Meeting, Boston, MA, November 25-30, 2018

Beharic, J., and Harnett, C. K., “Experimental study of AC-driven flow through nanopores with single-side conductive coatings,” Presentation at the 71st Annual Meeting of the American Physical Society’s Division of Fluid Dynamics (DFD), Atlanta, GA, November 18-20, 2018

Islam, M. S. and Harnett, C. K., “Experimental Study in Optimizing Enzyme-Based Polymeric Membrane Bioreactors.” Presentation at the 71st Annual Meeting of the American Physical Society’s Division of Fluid Dynamics (DFD), Atlanta, GA, November 18-20, 2018

M. S. Islam and C. K. Harnett, “Electrochemical Study of *Trametes Versicolor* Laccase Activity On Screen-Printed Electrodes,” The 9th International Conference on Microtechnologies in Medicine and Biology (MMB), Monterey, CA, Mar 26-28, 2018

Harnett, C. K. and Wagner, B. P., “Expanding the Robotics Materials Set with Machine Embroidery,” Talk and poster at *Robotics: Science and Systems (RSS)*, In workshop: *Material Robotics -- Bridging Materials Science and Robotics*, Cambridge, Massachusetts, USA, July 15, 2017. <https://issuu.com/harnettlab/docs/harnpostermaro>

Harnett, C. K., 2017 "Tobiko: A Contact Array for Self-Configuring, Surface-Powered Sensors." Presentation at *ACM CHI Conference on Human Factors in Computing Systems*, Denver, CO May 9, 2017.

Beharic, J., Senousy, Y. M., and Harnett, C. K., "Alternating Current Electro-Osmotic Pumping at Asymmetrically Metallized Porous Membranes," presentation by J. Beharic at AES Electrophoresis Society Meeting section of AIChE Annual Conference, San Francisco, CA, November 15, 2016.

Beharic, J., Harnett, C. K., "Simulation and validation of induced-charge electrokinetic flow at porous membranes with conductive coatings," Presentation by J. Beharic at NANO 2016, Quebec, Canada August 2016.

O'Toole, M., Harnett, C., James, K. T., Beharic, J., Lucas, T. M., and Keynton, R. S., "Near-infrared Harvesting Surfaces Using Gold Nanoplate Thin Films," Presentation by Martin G. O'Toole at the 4<sup>th</sup> International Symposium on Energy Challenges and Mechanics, 11-13 August 2015, Aberdeen, Scotland, UK

Beharic, J. and Harnett, C. K., "Experimental and analytical investigation of metalized porous membranes for induced-charge electrokinetic flows", Poster presentation by J. Beharic at the Gordon Research Conference on the Physics and Chemistry of Microfluidics, Mount Snow, West Dover, VT May 31-June 5, 2015.

Tretter, T. R., Philipp, S.B., and Harnett, C. K., "Novel makerspace internship: How culture supports engineering student creativity and initiative," Presentation by S. B. Philipp at National Association for Research in Science Teaching Annual Meeting, Chicago, IL April 11-14, 2015.

Harnett, C. K., "Asymmetric conductive coatings on porous membranes for induced-charge electrokinetic flows," poster presentation at Membranes: Materials and Processes: Making Engineering Membranes Alive (Gordon Research Conference), New London, NH, July 6-11, 2014.

Harnett, C. K., "Electrodes for microfluidic control and sensing," invited talk in plenary session at AES Electrophoresis Society Meeting section of AIChE Annual Conference, San Francisco, CA, November 4, 2013.

Lucas, T. M., Moiseeva, E. V., and Harnett, C. K., "Progress toward a light-driven bistable microactuator," poster presentation by T. Lucas at Kentucky Innovation and Entrepreneurship Conference, Lexington, KY August 29, 2013. *Received "Best Poster" award.*

Beharic, J., Senousy, Y. M., Lucas, T. M., and Harnett, C. K., "Flexible sensors for shape detection," poster presentation by J. Beharic at Kentucky Innovation and Entrepreneurship Conference, Lexington, KY August 29, 2013.



Lian, Y. S., Zhang, M. H., Brehob, E. G., Harnett, C. K. "Development of a Micro-Fluidic Coulter Counter," Poster presentation by E. Brehob at Kentucky Innovation and Entrepreneurship Conference, Lexington, KY, August 29, 2013.

Beharic, J. Senousy, Y. M., Lucas, T. M. and Harnett, C. K., "Flexible sensors for shape detection," Poster presentation by J. Beharic at 2013 Kentucky nanoSymposium, Louisville, KY Aug 16-17, 2013.

Smith, S. W., Wiederkehr, R. S., Stewart, A. P., Carver, A. L., Crain, M. M., Jackson, D. J., Milligan, A., Dall'Olmo, G., Behrenfeld, M. J., Gaff, J. R., Harnett, C. K., and Mendes, S. B., "A microfluidic flow cytometer to detect, size, and classify sub-micron phytoplankton cells in the open ocean," Oral presentation by S. Smith, 2013 Kentucky nanoSymposium, Louisville, KY, Aug 16-17, 2013.

Harnett, C. K. and Kimmer, C. J. "Digital origami from geometrically frustrated tiles," oral presentation at ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference IDETC/CIE, Portland, OR, August 4-7, 2013.

Harnett, C. K., "Manufacturing thin films with controlled stress for micro- and nanomechanical devices." Poster and "flash" presentation, NSF Workshop on Nano and Micro Manufacturing. Dearborn, MI, May 23, 2013.

Harnett, C. K., "Flexible switching sensors for passive shape monitoring," oral presentation at International Society of Automation Passive Wireless Sensor Workshop, (ISA 2013), Washington, DC, May 21, 2013.

Lucas, T. M., Moiseeva, E., and Harnett, C. K., "Thermal properties of infrared absorbent gold nanoparticle coatings," poster presentation by T. Lucas, The 7th International Conference on Microtechnologies in Medicine and Biology (MMB 2013), Marina Del Rey, CA, April 10-12, 2013.

Stewart, R., Fox, J., Harnett, C. K., "Sensor network for suspended sediment monitoring," Kentucky Water Resources Annual Symposium, Lexington, KY, March 2013.

Harnett, C. K., Kimmer, C. J., and Russo, A., "Hackerspaces and Engineering Education," panel presentation at World Maker Faire, New York, NY September 30, 2012.

Harnett, C. K., "Trilife: A kit for large group workshops," Demonstration at Open Hardware Summit, New York, NY September 27, 2012.

Lucas, T., Moiseeva, E., and Harnett, C., "Design and Simulation of Optically Actuated Bistable MEMS," Poster presentation by T. Lucas at Kentucky Innovation and Entrepreneurship Conference, Louisville, KY June 1, 2012.

Zhang, J, Lian, Y., and Harnett, C., “Numerical Simulation for Detecting Particles in Micro Coulter Counter,” Poster presentation by J. Zhang at Kentucky Innovation and Entrepreneurship Conference, Louisville, KY June 1, 2012.

Harnett, C. K., "Folding and Flowing: applications of micro- and nano structures in biotechnology," invited presentation at Kentucky Innovation and Entrepreneurship Conference, Louisville, KY May 31, 2012.

Senousy, Y. M., Harnett, C. K., “Soft lithography at the University of Louisville Cleanroom,” Poster presentation by Y. M. Senousy at the 17<sup>th</sup> Annual Kentucky EPSCoR Conference, Lexington, KY, May 17, 2012.

Lucas, T. M., Moiseeva, E. V., Zhang, G., Gobin, A. M., and Harnett, C. K., “Design and Simulation of Optically Actuated Bistable MEMS,” Poster presentation by T. M. Lucas at the 17<sup>th</sup> Annual Kentucky EPSCoR Conference, Lexington, KY, May 17, 2012.

Kona, S., Harnett, C. K., “ Graphene on Plastic: A Low Cost Substrate for Vapor Sensors,” Poster presentation by S. Kona at the 17<sup>th</sup> Annual Kentucky EPSCoR Conference, Lexington, KY, May 17, 2012.

Moiseeva, E. V., Lucas, T. M., Zhang, G., Gobin, A. M. and Harnett, C. K.,”Development of a MEMS Bistable Actuator Integrated with Nanoparticles,” Poster presentation by E. V. Moiseeva at the 17<sup>th</sup> Annual Kentucky EPSCoR Conference, Lexington, KY, May 17, 2012.

Philipp, S, Tretter, T. and Harnett, C. K., “Can Makerspaces Increase Undergraduate Students’ Research Creativity and Innovation,” presentation at the NSF Research in Engineering Education Awardees’ Meeting, Arlington, VA, March 27, 2012.

Kona, S., and Harnett, C., “A low cost construction method for graphene based resistive chemical sensors,” oral presentation by S. Kona at the American Physical Society Meeting, Boston, MA, February 27-March 2. 2012.

Senousy, Y., and Harnett, C., “Fabrication of out-of-plane electrodes for ACEO pumps,” poster presentation by Y. Senousy at the American Physical Society Meeting, Boston, MA, February 27-March 2. 2012.

Lucas, T., Moiseeva, E., and Harnett, C., “Design and simulation of optically actuated bistable MEMS,” poster presentation by T. Lucas at the American Physical Society Meeting, Boston, MA, February 27-March 2. 2012..

Moiseeva, E., Lucas, T., Zhang, G., Gobin, A., and Harnett, C., “Light-powered nanoparticle-MEMS hybrid,” oral presentation by E. Moiseeva at the American Physical Society Meeting, Boston, MA, February 27-March 2. 2012.

Kona, S., and Harnett, C. K., "Graphene in Plastic Packages: A Low Cost Construction Method for Resistive Chemical Sensors," poster presentation AA20.29 by S. Kona at Fall 2011 Materials Research Society Meeting, Boston, MA November 28-December 2, 2011.

Kulkarni, A., Welch, K. C., and Harnett, C. K., "Modeling human behavior for energy-usage prediction," poster presentation by A. Kulkarni at 14th International Conference on Human-Computer Interaction, Orlando, FL July 9-14, 2011

Lucas, T. M. and Harnett, C. K., "Low-cost conductivity sensor with data logging," poster presentation at 16<sup>th</sup> Annual Kentucky EPSCoR conference, Louisville, KY, May 26, 2011.

Moiseeva, E. V., Lucas, T. M., and Harnett, C. K., "Light-powered nanoparticle-MEMS hybrid," poster presentation at 16<sup>th</sup> Annual Kentucky EPSCoR conference, Louisville, KY, May 26, 2011.

Senousy, Y. M. and Harnett, C. K., "Out-of-plane electrodes for microfluidic pumps," poster presentation at 16<sup>th</sup> Annual Kentucky EPSCoR conference, Louisville, KY, May 26, 2011.

Zhang, M., Lian, Y., and Harnett, C., "Numerical simulation for the hydrodynamic focusing effect in the microfluidic Coulter counter," poster presentation at 16<sup>th</sup> Annual Kentucky EPSCoR conference, Louisville, KY, May 26, 2011.

Stewart, R., Ford, W., Fox, J., and Harnett, C., "Development of new sensors for monitoring velocity and sediment discharge in a watershed," oral presentation at World Environmental and Water Resources Congress, Palm Springs, CA May 22-26, 2011

Online:

<http://submissions.miracd.com/ASCE/EWRI2011/ViewPDF.asp?sbmID=513&psmID=1&validate=false>

Kulkarni, A., Welch, K. C., and Harnett, C. K., "A review of electricity monitoring and feedback systems," oral presentation by A. Kulkarni at IEEE SoutheastCon, Nashville, TN March 17-20, 2011

Aebersold, J., Goessling, B., Moiseeva, E., and Harnett, C. K., "Bistable thermal actuators," poster presentation at 15th Annual Kentucky EPSCoR conference, Lexington, KY May 24, 2010.

Fletcher, A. A., Moiseeva, E. V., and Harnett, C. K., "Pattern recognition for single-cell diagnostics," poster presentation at 15th Annual Kentucky EPSCoR conference, Lexington, KY, May 24, 2010.

Stewart, R., Fox, J., Ford, W., Thompson, A., Harnett, C. K., "Instrumentation to measure velocity and sediment discharge using turbidity and bend sensors to obtain real time data at the watershed scale," poster presentation at 15th Annual Kentucky EPSCoR conference, Lexington, KY, May 24, 2010

Moiseeva, E. V., Fletcher, A. A., and Harnett, C. K., "Electrode-based detection technique for microfluidic devices," poster presentation at 15th Annual Kentucky EPSCoR conference, Lexington, KY, May 24, 2010.

Senousy, Y. M., and Harnett, C. K., "Fast 3-D AC electroosmotic pumps with non-photolithographic electrode patterning," poster presentation at 15th Annual Kentucky EPSCoR conference, Lexington, KY, May 24, 2010.

Harnett, C. K., Casper, B., Moiseeva, E. V., and Wilson, L., "Microscopic containers for sample archiving in environmental and biomedical sensors," Presentation at IEEE International Instrumentation and Measurement Technology Conference, Austin, TX May 3-5, 2010.

Stewart, R., Fox, J. F., Harnett, C. K., Ford, W., and Thompson, A., "Instrumentation to measure velocity and sediment discharge using turbidity and bend sensors to obtain real time data at the watershed scale," Poster presentation by R. Stewart at Kentucky Water Resources Annual Symposium, Lexington, KY, March 22, 2010.

Harnett, C. K., Lucas, T. M., and Aegersold, J. W., "Interaction of thin-film microcoils with the air/water interface and applications in microfluidics," Presentation at American Physical Society meeting, March 15-21, 2010.

Moiseeva, E. V., Fletcher, A. A., and Harnett, C. K., "Electrode-based detection technique for microfluidic devices," Presentation at American Physical Society meeting, March 15-21, 2010.

Aegersold, J. W., Goessling, B., Moiseeva, E. V., and Harnett, C. K., "Bi-stable thermal actuators," Presentation at American Physical Society meeting, March 15-21, 2010.

Senousy, Y. M. and Harnett, C. K., "Cost-effective fabrication method for microscaled interdigitated 3-D ACEO pumps," Presentation at American Physical Society meeting, March 15-21, 2010.

Kona, S. and Harnett, C. K., "In-situ grown carbon nanotubes in a microreactor environment," Presentation at American Physical Society meeting, March 15-21, 2010.

Senousy, Y. M. and Harnett, C. K., "Fabrication of all-metal strained bimorphs by controlling the stress in titanium-tungsten sputtered thin films," Poster at American Physical Society meeting, March 2010.

Harnett, C. K., "Integrating nanotechnology into sensors, lab-on-chip systems, and other electronic devices," Invited presentation at IEEE Nanotechnology Conference, Ypsilanti, Michigan, November 18, 2009. [http://ewh.ieee.org/r4/se\\_michigan/ems/20091118Harnett.pdf](http://ewh.ieee.org/r4/se_michigan/ems/20091118Harnett.pdf)

Moiseeva, E. V. and Harnett, C. K., "Shear-Based Droplet Production for Biomaterial Printing," Interactive presentation by E. V. Moiseeva, Digital Fabrication 2009, Louisville, KY September 21-25, 2009.

Harnett, C. K., Blumenthal, N., Hopf, K. L., Fox, J. F., and Pulugurtha, S., "Wireless sensor network for calibration and deployment of low-cost fluid flow-rate sensors," IEEE International Instrumentation and Measurement Technology Conference, Singapore, May 5-7, 2009.

Harnett, C. K., "Wireless sensor networks in environmental measurements," tutorial given at IEEE International Instrumentation and Measurement Technology Conference, Singapore, May 4, 2009.

Pulugurtha, S., Fox, J., and Harnett, C., "The Use of the Acoustic Doppler Velocimeter (ADV) and New Velocity Sensors for Studying Turbulent Processes in the Field and Laboratory," poster presentation by S. Pulugurtha at Kentucky Water Resources Annual Symposium, Lexington, KY, March 2, 2009.

Harnett, C. K. "Interfacing microfabricated and nanomaterial-based sensors with a modular environmental monitoring system," University Government Industry Micro/Nano Symposium (UGIM), Louisville, KY July 13-16, 2008.

Senousy, Y. M., Moiseeva, E. V., and Harnett, C. K., "Strain-induced three-dimensional microfabrication for advanced antenna architectures," University Government Industry Micro/Nano Symposium (UGIM), Louisville, KY July 13-16, 2008.

Moiseeva, E. V., and Harnett, C. K., "High-temperature microreactors for in-situ nanomaterial deposition," University Government Industry Micro/Nano Symposium (UGIM), Louisville, KY July 13-16, 2008.

Harnett, C. K., Templeton, J., Dunphy-Guzman, K. A., Senousy, Y. M., and Kanouff, M. P., "Design, fabrication, and testing of an induced charge electroosmotic mixer," Invited presentation at Eighth International Electrokinetics Conference (ELKIN), Santa Fe, NM May 18-23, 2008.

Harnett, C. K., Courtney, S. M., and Kimmer, C. J., "SALAMANDER: A distributed sensor system for aquatic environmental measurements," IEEE International Instrumentation and Measurement Technology Conference (I2MTC), Victoria, BC May 12-17, 2008.

Kona, S., Harnett, C., and Sunkara, M. K., "Catalyst-aided nanomaterial growth in microreactor chamber under extreme conditions," American Institute of Chemical Engineers Annual Meeting, Salt Lake City, UT November 5-12, 2007.

Harnett, C. K., Moiseeva, E. V., and Senousy, Y. M., "Embeddable metal coil microparticles for 3-D metamaterial applications," American Physical Society meeting, Denver, CO, March 5-9, 2007

Moiseeva, E. V., Senousy, Y. M., and Harnett, C. K., "Strain-based self assembly of nanostructures for non-destructive large-scale integration," American Physical Society meeting, Denver, CO March 5-9, 2007

Harnett, C. K., Skulan, A. J., Hill, T. F., L.M. Barrett, G.J. Fiechtner, and E.B. Cummings, Microparticle mixing and separation by nonlinear electrokinetic effects in microfluidic channels. Poster presentation at Micro Total Analysis Systems, Boston, MA Oct. 9-13 2005

E.S. Lee, D. Robinson, J.L. Rognlien, C.K. Harnett, B.A. Simmons, C.R. Bowe Ellis, P.M. Dentinger, C.M. Munoz, and R.V. Davalos, Preparation and electrically monitored manipulation of giant lipid vesicles for improved mass transport on-chip, Poster presented by E. Lee at Micro Total Analysis Systems, Boston, MA Oct. 9-13 2005

Harnett, C. K., Hill, T. F., Skulan, A. J., Barrett, L. M., Fiechtner, G. J., Cummings, E. B., and Simmons, B. A., Patterning electrohydrodynamic flows with conductive obstacles in microfluidic channels," American Physical Society meeting, Los Angeles, CA, Mar. 21-25 2005

Mosier, B. P., Crocker, R. W., Harnett, C. K., and Patel, K. D., Precise and automated microfluidic sample preparation. Poster presented by K. D. Patel at Micro Total Analysis Systems, Malmö, Sweden, Sept. 26-30 2004

Harnett, C. K., Mosier, B. P., Caton, P. F., Wiedenman, B., and Crocker, R. W., Conductivity pulse time-of-flight flow sensor for sub-microliter/minute flow rates. Poster presentation at Micro Total Analysis Systems, Squaw Valley, CA, Oct.5-9 2003

Harnett, C. K., Applications of self-assembled monolayers in microfabrication. Oral presentation invited to Pomona College Physics Colloquium, Claremont, CA Feb. 25, 2003

Harnett, C. K., Satyalakshmi, K. M., Coates, G. W., and Craighead, H. G., Direct electron beam patterning of sacrificial layers and chemical templates for micro-total analysis systems. Invited presentation at 19th International Photopolymer Conference, Chiba, Japan June 26-28, 2002

Harnett, C. K., Coates, G. W., and Craighead, H. G. Heat-depolymerizable polycarbonates as electron beam patternable sacrificial layers for nanofluidics. Poster presentation at Electron, Ion, and Photon Beams and Nanofabrication conference, Washington, DC May 28-June 1, 2001

Harnett, C., Lopez, A., Kayyar, S., and Craighead, H. Self-assembled monolayers as high-resolution etch masks and templates for organic molecular assembly. Presented at Materials Research Society 2000 Symposium by H. Craighead.

Harnett, C., Satyalakshmi, K., and Craighead, H. Fabrication of biologically active nanostructures by electron beam lithography of self-assembled monolayers. Oral presentation at 44th International Conference on Electron, Ion, and Photon Beam Technology & Nanofabrication, Palm Springs, CA May 30-June 2, 2000

Satyalakshmi, K., Olkhovets, A., Metzler, M., Harnett, C., Tanenbaum, D., and Craighead, H. Charge induced pattern distortion in low energy electron beam lithography. Poster presentation at 44th International Conference on Electron, Ion, and Photon Beam Technology & Nanofabrication, Palm Springs, CA May 30-June 2, 2000

Harnett, C. K., Satyalakshmi, K. M., Metzler, M. G., Medeiros, D. R., and Craighead, H. G. Electron beam patterning of amine-functionalized self-assembled monolayers. Oral presentation at the American Vacuum Society 46th International Symposium, Seattle, WA October 25-29, 1999

Harnett, C.K., Evoy, S., Craighead, H.G., Pond, K., Kim, J., and Gossard, A. Cross-sectional scanning tunneling microscopy of InGaAs quantum dots. Poster presentation at Conference on Lasers and Electro-Optics, San Francisco, CA, May 3-8, 1998

## Patents and Published Patent Applications

Harnett, C. K., “System and method for collecting data using wired sensors connected to wireless nodes,” U. S. Patent 8,648,734

Sethu, P. and Harnett, C. K., “3D fluid confined sample stream Coulter flow cytometry,” U. S. Patent Application 20090051372

Harnett, C. K., Crocker, R. W., Mosier, B. P., Caton, P. F., and Stamps, J. F., “Composition pulse time-of-flight mass flow sensor,” U. S. Patent 7,225,683

Harnett, C. K., Hill, T. F., and Kanouff, M. P., “Coated metal structures and methods of making and using thereof,” U. S. Patent Application 20070080062

Mosier, B. P., Crocker, R. W., Patel, K. D., Harnett, C. K., “Sample preparation system for microfluidic applications,” U. S. Patent 7,213,473

Crocker, R. W., Harnett, C. K., Rognlien, J. L., “Electrodes for microfluidic applications,” U. S. Patent 7,094,326

Harnett, C. K., Craighead, H. G., and Coates, G. W., “Method of using heat-depolymerizable polycarbonate sacrificial layer to create nanofluidic devices,” U. S. Patent 6,743,570

Mosier, B., Crocker, R., Harnett, C., “Composition pulse time-of-flight mass flow sensor,” U. S. Patent 6,675,660

## Research Grants

Kentucky Science and Engineering Foundation (PI) “Combining Soft Materials with Mechanical Parts for Robotic and Human Health Applications” KSEF Research and Development Excellence Grant, \$30 K, 2016-2018

NSF EPSCoR (PI on \$145K subcontract at University of Louisville, main grant hosted at University of Kentucky, PI R. Andrews) Powering the Kentucky Bioeconomy for a Sustainable Future, 2014-2019

Kentucky Science and Engineering Foundation (PI with Co-PI Dr. Andre M. Gobin, Bioengineering): “Light-Powered Hybrid Microactuators for Biotechnology,” 2011-2013, \$90,000

NSF (PI, with co-PI Dr. Thomas Tretter, College of Education and Human Development): “Research Initiation Grant: Can Makerspaces Develop Undergraduates' Research Creativity and Innovation?,” 2012-2013, \$150,000

NASA (PI University of Louisville subcontract, co-PI Dr. S. Mendes, main grant hosted at Oregon State University, main grant PI Dr. Michael Behrenfeld and co-PIs Drs. A. J. Milligan, T. K. Westberry. ) Main grant "The Phytoplankton Carbon Project, 2010-2013, \$1,751,758. University of Louisville subcontract: "Liquid Aperture Coulter Counter," 2010-2013, \$169,715.

NSF EPSCoR (PI) Research Scholars: Printing Nanoparticle-Loaded Hydrogels for Microactuators using an Inkjet Printer, 2010-2011, \$5,000

NSF EPSCoR (PI on subcontract at University of Louisville, main grant hosted at University of Kentucky and University of Montana, main grant PI-Kentucky EPSCoR Dr. B. Kucera (UK), main grant PI-Montana EPSCoR: Dr. R. Hauer (UM), co-PIs Drs. J. Fox (UK), L. Ormsbee (UK), N. Jacobs (UK), J. Griffioen (UK), J. Melkers (Georgia Tech), D. White (science PI at Murray State Univ), S. Hendricks (MuSU), G. Kipphut (MuSU), A. Jones (Eastern Kentucky Univ), J. Stanford (science PI at Flathead Lake Biological Station, MT), M. Lorang (FLBS), B. Ellis (FLBS), B. Crabtree (FLBS), J. Kimball (FLBS), S. Running (UM), R. Ford (UM), M. Young (Montana State University), A. Hansen (MSU), G. Poole (MSU), B. McGlynn (MSU), W. Cross (MSU), D. Goodman (MSU), G. Jacobs (MSU), G. Rupp (MSU), T. Myers (National Center for Supercomputing Applications) ) “Collaborative Research: Cyberinfrastructure for a Virtual Observatory and Ecological Informatics System (VOEIS),” 2009-2012, \$2,998,589. University of Louisville subcontract amount \$114,100.

Kentucky Science and Engineering Foundation (PI with Co-PIs Drs. Y. Lian and E. Brehob): “Computer Aided Optimal Design of a Microfluidic Coulter Counter,” 2009-2012, \$100,000

NSF EPSCoR (PI) Research Scholars: Pattern Recognition for Single-Cell Diagnostics, 2009-2010, \$5,000

NSF EPSCoR (Co-PI with Drs. A. S. Gobin (PI), P. Sethu, M. -J. Lee, S. Mendes, R. S. Keynton, S. McNamara, R. W. Cohn, K. Walsh, B. Alphenaar, A. M. Gobin, D. Puleo (University of Kentucky), H. Shin (UK), and A. Patwardhan (UK)): Engineering Platforms for Exploring Cellular and Molecular Signaling Processes,” 2008-2013, \$5,460,000

Kentucky NASA EPSCoR (PI with Co-PI Dr. R. W. Cohn): Thin-film bimorphic components for shock-mounting and actuation of lunar micro-rovers,” 2007-2009, \$41,000

Kentucky Space Grant Consortium (PI): Student Fellowship, “Out-of-Plane Microcoils for Terahertz Resonators and Antenna Array Elements,” 2007-2009, \$18,000



NSF CAREER Award (PI), "Ultra-Low Power Embedded Sensors for High-Density Remote Monitoring of Water Quality," 2007-2012, \$400,000 plus the following supplements:

Research Experience for Undergraduates (REU): Sarah Courtney, 2007, \$5,686

Research Experience for Undergraduates (REU): Kristy Hopf, 2008, \$5,900

Research Opportunity Award (ROA): Dr. Lori Wilson at Eastern Kentucky University, 2008-2009, \$25,101

Research Experience for Undergraduates (REU): Brent Casper, 2009, \$5,953

NSF Major Research Instrumentation (Co-PI with Drs. S. McNamara (PI), S. Mendes, R. Keynton, and K. Walsh): Acquisition of a Low Pressure Chemical Vapor Deposition System for Applications in Micro/Nano Technology, 2007-2008, \$465,000

University of Louisville Research Initiation Grant (PI), "Micro Chemical Vapor Deposition for Nanoparticle Integration within Fluidic Channels," 2006, \$5000

Kentucky EPSCoR Scholars Program (PI), "Micro Chemical Vapor Deposition for Nanoparticle Integration within Fluidic Channels," 2006-2007, \$5000

Sandia National Laboratories: PI on University of Louisville subcontract to Laboratory Directed Research and Development Program, "Microfabricated Structures for Induced Charge Electroosmosis," 2006, \$149,768 (University of Louisville subcontract amount)

ECE 333/334 Electronics/Electronics Laboratory: Summer 2013, Fall 2014.

ECE 412, Introduction to Embedded Systems: Fall 2014, Spring 2015.

ECE 500, Introduction to Microfluidics: New course I prepared, first taught in Spring 2010.

ECE 100: Freshman Enrichment Experience: Developed new "Gadget Lab" module for ECE 101, taught in Spring 2008, 2009, 2010, 2011, 2012, 2013.

ECE 322: (University of Louisville)/ETE 322 (Murray State University): Introduction to ECE Computing Tools. Local section for University of Louisville and distance-learning section for Murray State University. Fall 2007, Fall 2008 (Louisville only), Spring 2009 (co taught Spring 2009 with S. McNamara), Fall 2009, Fall 2010, Fall 2011, Fall 2012, Fall 2013.

ECE 473: Introduction to Electromagnetic Fields and Waves: Spring 2007, Fall 2008, Fall 2009 (distance learning with WKU and local with U of L), Fall 2010 (WKU and U of L), Fall 2011, Fall 2013, Spring 2014, Spring 2015.

ECE 569: Intermediate Electromagnetic Fields and Waves: Spring and Fall 2006, Spring 2009.

ENGR 100: Developed electrical engineering introductory lab project for 400 first-year engineering students in University of Louisville's "Introduction to Engineering" course (2006, 2007, 2008, 2009, 2010)

## Service Activities - University/School/Department

On Institute for Product Realization Learning Factory committee for Speed School, 2014  
On Distinguished Faculty Nomination Committee for Speed School, 2014.  
On departmental assessment committee, 2012-  
On ECE ABET Committee in 2010  
On Bioengineering faculty search committee, 2013.  
On department faculty search committee, 2008-9 and another one in 2010.  
On University Research Profile committee, 2008.  
On ECE Department Chair search committee, 2007-8.

Presentation about newly developed Gadget Lab freshman enrichment course on 4/22/10 at the Departmental Retreat

Sponsored two Capstone teams, one in 2008 on a MEMS device controller (Ryan Wolff, Brian Goessling, and Tom Lucas), and one in 2010 on developing a microfluidic fuel cell lab module (Frank Thomas, Nicolas Smith, Michael DeVeau and Anthony Webb)

## Professional Activities and Society Memberships

Session chair, American Physical Society meeting, Microfluidic Devices II, March 2010.

Textbook Reviewer, Electromagnetics topic area, Pearson Education/Prentice Hall, 2009  
Manuscript Reviewer, *IEEE Transactions on Instrumentation and Measurement*  
Manuscript Reviewer, *Lab-on-a-Chip*  
Manuscript Reviewer, *Langmuir*  
Manuscript Reviewer, *Biosensors and Bioelectronics*  
Proposal Reviewer, National Science Foundation (Nanomanufacturing)  
Proposal Reviewer, National Science Foundation, Interdisciplinary Graduate Education, Training, and Research (IGERT)  
Member, IEEE (member 90373361)

Reviewed book *Introduction to Sensors* by John Vetelino and Aravind Reghu, IEEE Instrumentation and Measurement Society Magazine, 2011 (in press)

## Outreach and Service Activities

Created Trilife learn-to-solder project for grade school and up.  
Details at <http://blipworks.github.io/trilife/>. Workshops using this kit were given at the Kentucky Science Center in summer 2014 and spring 2013, as well as other venues including the 2014 Detroit Maker Faire. > 200 total participants to date.

Prepared activities for Kentucky ScienceCenter NanoDays yearly since 2009, and E-Expo, since 2010.

Developed and maintain photoresist thickness calcuator at <http://harnettlab.org/su8calc> as a resource for microfabrication engineers

Active in LVL1 ([lv11.org](http://lv11.org)). 2009-present. Louisville's "MakerSpace" is an organization that can help us recruit and retain students in electrical engineering. Publicize LVL1 events on campus and offer lab tours to LVL1 members.

Presented sensor work with two summer undergraduates at the 2010 Detroit Maker Faire, (July 30-Aug 1) demonstrating our open-source sediment sensor project to 250 visitors over two days

Hosted Research Experience for Teachers (RET) participant Elizabeth Mansfield on summer 2010 microfluidics project to build demonstration devices for classrooms.

Participated in interviews for IEEE web/radio broadcast on wireless sensors on the Ohio River, June 2009. The radio show was broadcast on NPR in fall 2009.

<http://spectrum.ieee.org/slideshow/energy/environment/sensors-to-determine-health-of-streams>

<http://spectrum.ieee.org/podcast/green-tech/geothermal-and-tidal/undoing-the-handiwork-of-centuries-past>

Presented electronic product "dissections" at Kentucky Science Center during 2008 Engineering Day (~75 participants) and 2009 Cub Scout engineering activity (~150 participants each of 2 days)

## Students

*Ph. D. Students*

*Current:*

Jasmin Beharic

*Graduates:*

Silpa Kona, Thomas M. Lucas, Evgenia V. Moiseeva, Yehya M. Senousy

*Previous Student:*

Tyrone F. Hill (MIT), Research Intern I supervised on a summer microfluidics project at Sandia in 2004.

*Masters Students (M.S.)*

Thomas M. Lucas: Summer 2010 Masters thesis: Microbubble Control and Applications

Brian A. Goessling: Summer 2010 Masters thesis: Bistable MEMS Actuators

Rebecca Scott: Summer 2010 Masters thesis: Microfluidic Cytometer

*Independent Study Masters and B.S. Students*

W. Reese Sexton: Summer 2014 independent study (ECE 593) Analog Interface Module

Jordan Meyer: Summer 2014 independent study (ECE 593): Nanoporous Electroosmotic Pump

Martin Dombi: Summer 2014 independent study (ECE 593): Polymer Actuator Tester

Sherman Dowell: Summer 2014 independent study (ECE 593) Acoustic Signal Generator

Dejan Berek: Spring 2014 independent study (ECE 593): Wireless course module  
Michael Ray: Summer 2013 independent study (ECE 693): Wireless Shape Sensor  
Zachary Russo: Fall 2012 independent study (ECE 593): Digital Switch Detection  
Paul Faget: Summer 2012 independent study (ECE 699): Sensor Data Aggregator  
Cory Franklin: Spring 2012 independent study (ECE 693): Cell counter system  
Jasmin Beharic: Spring 2012 independent study (ECE 593): LabVIEW for a microfluidic system  
Andrew Gish: Spring 2011 independent study (ECE 593): Flow Control System for Microfluidics  
Benjamin Williams: I contributed materials, supplies and guidance to Dr. Andrew Dozier's Spring 2011 independent study course, Microfluidic Fuel Cell Analysis  
Thomas M. Lucas: Spring 2010 independent study: Microbubble Control and Applications  
Brian A. Goessling: Spring 2010 independent study: Bistable MEMS Actuators  
Brian A. Goessling: Summer 2009 Independent Study project: Micro Actuators  
Alexander Schultz: Spring 2009 Independent Study project: Microfluidics Lab Demos  
Nitin Matnani: Fall 2008 independent study student: Power Conservation in Wireless Sensors  
Nick Blumenthal: Summer 2007, Spr 09 Independent Study: Sensor Auto-Sequencing  
Yehya M. Senousy: ECE 693, 2006: Induced-Charge Electroosmosis Devices  
Silpa Kona: ECE 693, 2006: Nanomaterial Growth

*Sponsored Research Students (paid undergraduate research assistants):*

Isaac Gebru, Caleb Sheehan, Trent Lowry, Michael Dorsey, Nolan Park, Eric Cutler, Sam Ellis, Elijah Lamppin, Matthew Barnes (2012-2013 Makerspace Co-op Students)  
Marie Hensley (Summer 2012 Research Scholar: Confocal microscopy of microfluidic systems)  
Maisha Cox (Fall 2010 Research Scholar: hydrogel printing)  
Cory Franklin (Summer 2010 Co-Op/REU: photosensors for sediment tracking)  
Benjamin Zinninger (Summer 2010 Co-Op/REU: flow sensors for sediment tracking)  
Adrian Fletcher (Summer 2009 Research Scholar: flow cytometer)  
Brent Casper (Summer 2009 REU student: heavy metal sensors)  
Matthew Schueler (Summer 2009 REU student: erosion sensors)  
Kristy Hopf (Summer 2008 REU student: flow sensors)  
Sarah Courtney (Summer 2007 Research Experience for Undergraduates (REU) student: turbidity sensors)

*High School Students:*

Mark Kubiak, Manual High School, science fair project on capacitive detection of bistable switches, fall 2013/spring 2014  
Tiffany Liu, Manual High School, science fair project on microfluidics, fall 2007

## **Collaborations**

Cornell University: Baird, B., Craighead, H. G., Ober, C. K., Senaratne, W., Sengupta, B.  
LabSmith, Inc: Cummings, E. B.

Sandia National Laboratories: Barrett, L. M., Brazzle, J. D., Caton, P. F. Crocker, R. W., Davalos, R. V., Domeier, L. A., Ellis, C. R., Fiechtner, G. J., Goods, E. B., Hachman, J. T., Hunter, M. C., Kanouff, M., Lee, E. S., Morales, A. M., Mosier, B. P., Patel, K. D., Seethambal, S. M., Shepodd, T. Simmons, B. A., Skulan, A., Robinson, D., Rognlien, J. L., Wiedenman, B.