Curriculum Vitae
Jennifer M. Blain Christen
Electrical, Computer, and Energy Engineering
June 27, 2016

Education:

9/99 - 5/07 Johns Hopkins University, Baltimore, MD - Ph.D. Electrical Engineering
Dissertation: Hybrid integration of silicon/silicone microsystems: a closed-loop autonomous micro-incubator
9/99 - 12/00 Johns Hopkins University, Baltimore, MD - M.S. Electrical Engineering
9/94 - 5/99 Johns Hopkins University, Baltimore, MD - B.S. Electrical Engineering

Professional Experience:

1/08 - present Assistant Professor, School of Electrical, Computer & Energy Engineering
Arizona State University, Tempe, AZ
Tenure Extensions: 2010, 2011, 2013
11/06 - 12/07 Post-Doctoral Researcher, Department of Immunogenetics
Johns Hopkins School of Medicine, Baltimore, MD
9/99 - 10/06 Graduate Research Assistant, Electrical and Computer Engineering
Johns Hopkins University, Baltimore, MD

Current Funding Sources

Source/ID	Title	Investigators	Dates	Total	Duration
NIH/NCI 12088418	Rapid Point of Care Detection of HPV-Associated Malignancies	Anderson PI (60%) Blain Christen co-PI (40%)	Anticipated award – pending final documentation	$3,454,054	5 years
NSF/CNS-CISE-REU-1659871	REU Site: Sensor, Signal and Information Processing Devices and Algorithms	Spanias PI (50%) co-PI Blain Christen (50%)	1/24/17 – 1/23/20	$299,923	3 years
ASU-Mayo	ASU Mayo Team Science – Brain Mapping	Raupp PI (20%) Blain Christen co-PI (80%)	7/1/16 – 6/30/19	$450,000	3 years
NSF/ECCS-1554690	CAREER: Adapting Flexible Display Technology for Optogenetic Peripheral Nerve Stimulation	Blain Christen PI	2/1/16 – 1/41/21	$500,000	5 years
NSF/IIS-1521904	SCH: INT: Disposable High Sensitivity Point of Care Immunosensor for Multiple Disease and Pathogen Detection	Blain Christen PI (60%), Anderson co-PI (40%)	8/1/15 – 7/31/19	$1,824,432	4 year
NSF/CCF-	EAGER: Adaptive Performance	Blain Christen PI	9/1/14 –	$49,999	1 year

1453854	Models of Sensing Systems for Design Space Exploration	(34%), Ozev co-PI (33%), Ogras co-PI (33%)	8/31/16		(+1 year NCE)
Advanced Tear Diagnostics LLC	Tear Biomarker Diagnostic Device	La Belle PI (60%), Blain Christen co-PI (20%), Spano co-PI (20%)	9/1/14 – 6/30/2017	$496,196	2 year
ASU/TRIF-EF99335	ASU Internal Seed Grant Funding	Blain Christen PI	7/1/14-6/31/16	$75,000	2 years

Awards:

- ASU Biodesign Symposium – "Best Engineering" Poster Award 2016
- IEEE Phoenix Section "Outstanding Pre-College Educator" for "Pre-College Initiatives for Grades 6 – 12 on Bio-Electronics workshops and Research" 2016
- IEEE SSCS Extra Subsidy Award for IEEE Phoenix Section SSSCS Chapter 2013 & 2015 for educational outreach initiatives
- Top Five Percent Faculty at the Ira A. Fulton Schools of Engineering 2012 (teaching award)
- Transactions on Biomedical Circuits and Systems Best Paper Award 2007-2010
- Science Foundation Arizona Grand Challenges Summit 1st place poster award 2010
- STIMESI MultiMEMS Design Contest, Advanced Category 1st place 2008
- National Science Foundation Graduate Teaching Fellows in K-12 Education 2005-2006
- National Science Foundation Graduate Research Fellowship 2001-2004
- Grant Recipient for the Undergraduate Engineering Research Opportunities Program Sponsored by General Electric Faculty for the Future 1998
- Maryland Scholars Award 1997

Research Products:

Publications: In our field, typically supervised scholars are listed in order of highest contribution followed by faculty in increasing order of participation, PI last. My directly supervised scholars are indicated: undergraduate students underlined, graduate students boldface, post-docs asterisks, and other scholars working under my direction double underlined.

Peer-Reviewed Journal Publications:

Since Employment at ASU:

B.A. Katchman[1], J.T. Smith*[1], **U. Obahiagbon**, S. Kesiraju, Y.K. Lee, B. O'Brien, K. Kaftanoglu, J.M. Blain Christen, K.S. Anderson, "Application of Flat Panel Display Technology for the Point-of-Care Detection of Circulating Cancer Biomarkers", Scientific

Reports, 6, 29057, June 2016 ([1] authors contributed equally), DOI:10.1038/srep29057 **[Nature – Scientific Reports impact factor 5.58]**

J.T. Smith*, A. Shah, Y.K. Lee, B. O'Brien, D.E. Kullman, A. Sridharan, J. Muthuswamy, J.M. Blain Christen, "Optogenetic Neurostimulation of Auricular Vagus using Flexible OLED Display Technology to Treat Chronic Inflammatory Disease and Mental Health Disorders", Electronics Letters, pp. 2, March 2016, DOI: 10.1049/el.2015.3450 **[featured article including "head lights" technology highlight,** DOI:10.1049/el.2016.1532**]**

J.T. Smith*, B.A. Katchman, D.E. Kullman, **U. Obahiagbon,** Y.K. Lee, B.P. O'Brien, G.B. Raupp, K.S. Anderson, J.M. Blain Christen, "Application of Flexible OLED Display Technology to Point-of-Care Medical Diagnostic Testing", Journal of Display Technology, Vol. 12, Issue 3, pp. 273 – 280, September 2015, DOI: 10.1109/JDT.2015.2479457 **[designate popular article, top 50 based on downloads – currently 23rd most downloaded paper]**

J.T. Smith*, E. Bawolek, Y.K. Lee, B. O'Brien, M. Marrs, E. Howard, M. Strnad, J.M. Blain Christen, M. Goryll, "Application of Flexible Flat Panel Display Technology to Wearable Biomedical Devices", Electronics Letters, Vol. 51, No. 17, pp. 1312 – 1314, August 2015, DOI: 10.1049/el.2015.1497 **[featured article with Interview pp. 1298,** DOI:10.1049/el.2015.2700**]**

S. Shah, J.T. Smith*, J.M. Blain Christen, "Biosensing Platform on a Flexible Substrate", Sensors and Actuators B: Chemical, Vol. 210, pp. 197 – 203, April 2015, DOI: 10.1016/j.snb.2014.12.075 **[impact factor 4.10]**

H. Wang, **T. Luo,** Y. Fan, **Z. Lu,** H. Song, J.M. Blain Christen, "A Self-Powered Single-Axis Maximum Power Direction Tracking System with an On-Chip Sensor", Solar Energy, Vol. 112, pp. 100-107, February 2015, DOI: 10.1016/j.solener.2014.11.019 **[impact factor 3.69]**

J.T. Smith*, B. O'Brien, Y.K. Lee, E. Bawolek, J.M. Blain Christen, "Application of Flexible OLED Display Technology for Electro-Optical Stimulation and/or Silencing of Neural Activity" Journal of Display Technology, Vol. 10, No. 6, pp 514 – 520, June 2014, DOI: 10.1109/JDT.2014.2308436 **[designate popular article based on downloads – within top 11 since publication, top 3 for over a year]**

H. Wang, **T. Luo, Z. Lu,** H. Song, J.M. Blain Christen, "CMOS Self-Powered Monolithic Light-Direction Sensor with Digitized Output" Optics Letters, Vol. 39, No. 9, pp. 2618 - 2621, May 2014, DOI: **10.1364/OL.39.002618** **[impact factor 3.29]**

D. Welch, J.M. Blain Christen, "Real-Time Feedback Control of pH within Microfluidics Using Integrated Sensing and Actuation" Lab on a Chip, Vol. 14, pp. 1191 – 1197, January 2014, DOI: 10.1039/C3LC51205C **[impact factor 6.12]**

H. Wang, **T. Luo,** H. Song, J.M. Blain Christen, "On-Chip Sensor for Light Direction Detection" Optics Letters, Vol. 38, No. 22, pp. 4554 - 4557, November 2013, DOI: **10.1364/OL.38.004554 [impact factor 3.18]**

D. Welch, S. Shah, S. Ozev, J.M. Blain Christen, "Experimental and Simulated Cycling of ISFET Electric Fields for Drift Reset", Electron Device Letters, Vol. 34, No. 3, pp. 456-458, March 2013, DOI: 10.1109/LED.2013.2240648

D. Welch, J.M. Blain Christen, "Seamless Integration of CMOS and Microfluidics using Flip Chip Bonding" Journal of Micromechanics and Microengineering, Vol. 23, Issue 3, pp. 1-7, March 2013, DOI: 10.1088/0960-1317/23/3/035009

D. Welch, J. Georgiou, J.M. Blain Christen, "Fully Differential Current-Mode MEMS Dual-Axis Optical Inclination Sensor", Sensors and Actuators A, Vol. 192, pp. 133-139, April 2013, DOI: 10.1016/j.sna.2012.12.001

X. Qui, **D. Welch**, J.M. Blain Christen, J. Zhu, J. Oiler, C. Yu, Z. Wang, H. Yu, "Reactive Nanolayers for Physiologically Compatible Microsystem Packaging" Journal of Materials Science: Materials in Electronics, pp. 123-127, August 2009, DOI: 10.1007/s10854-009-9957-5

Before Employment at ASU:

J.M. Blain Christen, A.G. Andreou, "Design, Fabrication, and Testing of a Hybrid CMOS/PDMS Microsystem for Cell Culture and Incubation", *IEEE Transactions on Biomedical Circuits and Systems,* Volume 1, Number 1, pp. 3-18, March 2007, *Invited Paper,* DOI: 10.1109/TBCAS.2007.893189 **[Best Paper Award including all papers 2007-2010, 61 citations]**

Peer Reviewed Conference Publications:

In our field, generally conference publications have 3 to 5 peer reviews with acceptance rates above 33% and below 50%

Since Employment at ASU:

U. Obahiagbon, D. Kullman, J. Smith, B. Katchman, **H. Arafa,** K. Anderson, J. Blain Christen, "Characterization of a compact and highly sensitive fluorescence-based detection system for point-of-care applications", 2016 IEEE Healthcare Innovation Point-of-Care Technologies Conference (HI-POCT), Cancun, 2016, pp. 117-120, DOI: 10.1109/HIC.2016.7797711 **[Best Student Paper Award]**

J. Smith, U. Obahiagbon, R. Ewaisha, B. Katchman, K. Kaftanoglu, **H. Arafa, D. Kullman,** K. Anderson, J. Blain Christen, "Low-cost disposable fluorescence-based biorecognition

system architecture for multiplexed point-of-care molecular diagnostics", 2016 IEEE Healthcare Innovation Point-of-Care Technologies Conference (HI-POCT), Cancun, 2016, pp. 154-157, DOI: 10.1109/HIC.2016.7797720

H. Arafa, U. Obahaigbon, D. Kullman, F.-J. Dominguez, A. Magee, J. Blain Christen, "Characterization and application of a discrete quartz extended-gate ISFET for the assessment of tumor cell viability", 2016 IEEE Healthcare Innovation Point-of-Care Technologies Conference (HI-POCT), Cancun, 2016, pp. 62-65, DOI: 10.1109/HIC.2016.7797697

R. Sampath Kumaran, B. Greger, J.M. Blain Christen, "Design and Evaluation of a Low Cost Intracranial Pressure Monitoring System", 38th Annual International conference of the IEEE Engineering in Medicine and Biology Society (EMBC), August 2016, pp. 4483-4486, DOI: 10.1109/EMBC.2016.7591723

T. Luo, L. Li, V. Ghorband, Y. Zhan, H. Song, J. Blain Christen, "A portable impedance-based electrochemical measurement device", 2016 IEEE International Symposium on circuits and Systems (ISCAS), pp. 2891-2894, DOI: 10.1109/ISCAS.2016.7539197

D. Mahalanabis, M. Sivaraj, S. Chen, **S. Shah, S.**, H.J. Barnaby, M.N. Kozicki, J.M. Blain Christen S. Vrudhula, "Demonstration of Spike Timing Dependent Plasticity in CBRAM Devices with Silicon Neurons", 2016 International Symposium on Circuits and Systems (ISCAS), May 2016, pp. 2314-2317, DOI: 10.1109/ISCAS.2016.7539047

F. Karabacak, **U. Obahiagbon,** U. Ogras, S. Ozev, J.M. Blain Christen, "Making Unreliable Chem-FET Sensors Smart via Soft Calibration", 2016 17th International Symposium on Quality Electronic Design (ISQED), May 2016, pp. 456 – 461, March 2016

J.T. Smith*, E.W. Forsythe, D.R. Allee, J.M. Blain Christen, "Adaptive Digital X-ray Detector for High Sensitivity Medical Fluoroscopy Imaging", 2015 International Symposium on Biomedical Circuits and Systems Oct. 2015

D. Welch, J.M. Blain Christen, "MEMS Optical Position Sensor for Sun Tracking", 2015 International Symposium on Circuits and Systems, pp. 1874 - 1878 May 2015

H. Arafa, **S. Shah,** J.M. Blain Christen, "An integrated System for Continuous Assessment of Intercellular pH", Biomedical Circuits and Systems Conference (BioCAS), 2014 IEEE, pp. 332-335, October 2014

T. Luo, H. Wang, H. Song, J.M. Blain Christen, "CMOS-Based On-Chip Electrochemical Sensor", Biomedical Circuits and Systems Conference (BioCAS), 2014 IEEE, pp. 332-335, October 2014

J.T. Smith*, B. Katchman, Y.K. Lee, B. O'Brien, E. Bawolik, J. Blain Christen, "Disposable

Point-Of-Use Optical Biosensor for Multiple Biomarker Detection", Biomedical Circuits and Systems Conference (BioCAS), 2014 IEEE, pp. 332-335, October 2014

A. Ravi, R.M.A. Krishna, J.M. Blain Christen, "Modeling and Simulation of Dual Application Capacitive MEMS Sensor", Proceedings of the 2014 COMSOL Conference, pp. 1-4, Boston, MA, September 2014

H. Song, **C. Chen, M.W. Lin, K. Li,** J.M. Blain Christen, "A Neural Rehabilitation Chip with Neural Recording, Peak Detection, Spike Rate Counter, and Biphasic Neural Stimulator", System-on-Chip Conference (SOCC) 2014 27th IEEE International, pp. 415-419, September 2014

H. Song, **Z. Lu, T. Luo, J.M.** Blain Christen, "A CMOS Self-Powered Monolithic Light Direction Sensor with SAR ADC", System-on-Chip Conference (SOCC) 2014 27th IEEE International, pp. 58-62, September 2014

H. Arafa, L. Kreigh, J.M. Blain Christen, "Autonomous System for Continuous Measurement of pH for the Assessment of Cancer Cell Proliferation", Engineering in Medicine and Biology Society (EMBC), 2014 36th Annual International Conference of the IEEE, pp. 332-335, August 2014

S. Shah, H. Arafa, J.M. Blain Christen, "An On-Chip System to Monitor the pH of Cell Culture Media", Engineering in Medicine and Biology Society (EMBC), 2014 36th Annual International Conference of the IEEE, pp. 2745-2748, August 2014

Z. Lu, K. Cheung, T. Luo, H. Song, J.M. Blain Christen, "A Self-Powered 2-Dimensional Motion Detection Chip", Engineering in Medicine and Biology Society (EMBC), 2014 36th Annual International Conference of the IEEE, August 2014

S. Shah, K.S. Anderson, J. Hasler, J.M. Blain Christen, "Floating Gate ISFET for Therapeutic Drug Screening of Breast Cancer Cells", 2014 International Symposium on Circuits and Systems, June 2014

T. Luo, H. Wang, H. Song, J.M. Blain Christen, "CMOS Potentiostat for Chemical Sensing Applications", 2013 IEEE Sensors Conference, November 2013

S. Shah, J.M. Blain Christen, "Pulse Width Modulation Circuit for ISFET Drift Reset". 2013 IEEE Sensors Conference, November 2013

D. Welch, J.M. Blain Christen, "CMOS Biosensor System for On-Chip Cell Culture with Read-Out Circuitry and Microfluidic Packaging", Engineering in Medicine and Biology Society (EMBC), 2012 34th Annual International Conference of the IEEE, August 2012

D. Welch, J.M. Blain Christen, “On-Chip Cell Culture Biosensing with Microfluidic Feedback Control”, In Life Science Systems and Applications Workshop (LiSSA), 2011 IEEE/NIH, pp. 39-42, IEEE, April 2011

A.G. Andreou, Z. Zhang, R. Ozgun, E. Choi, Z. Kalayjian, M. Marwick, J.M. Blain Christen, L. Tung, “Contactless Fluorescence Imaging with a CMOS Image Sensor”, 2011 IEEE International Symposium on Circuits and Systems, May 2011

D. Welch, J.M. Blain Christen, “A Multiparametric Biosensor Array for On-Chip Cell Culture with Feedback Controlled Microfluidics”, 2011 IEEE International Symposium on Circuits and Systems, May 2011

J. Song, D. Welch, J.M. Blain Christen, “A Fully-Adjustable Dynamic Range Capacitance Sensing Circuit in a 0.15 um 3D SOI Process”, 2011 IEEE International Symposium on Circuits and Systems, May 2011

P. Abshire, A. Bermak, R. Berner, G. Cauwenberghs, S. Chen, J.M. Blain Christen, T. Constandinou, E. Culurciello, M. Dandin, T. Datta, T. Delbruck, R. Dudek, A. Eftekhar, R. Etienne-Cummings, G. Indiveri, M.K. Law, B. Linares-Barranco, J. Tapson, W. Tang, Y. Zhai, “Confession Session: Learning from Others Mistakes”, 2011 IEEE International Symposium on Circuits and Systems, May 2011

D. Welch, J.M. Blain Christen, “On-Chip Biosensing with Microfluidic Feedback Control”, IEEE/NIH 5th Life Science Systems and Applications Workshop (LiSSA 2011), April 2011

S. Herman, J.M. Blain Christen, "Fabrication and Characterization of a Silicone Fluorescent Oxygen Sensor" 2010 IEEE Biomedical Circuits and Systems Conference, November 2010

J. Song, D. Welch, J.M. Blain Christen, “Amplification Circuit and Microelectrode Array for HL-1 Cardiomyocyte Action Potential Measurement, 2010 IEEE International Symposium on Circuits and Systems, May 2010

D. Welch, S. Herman, S. Sen, J. Georgiou, J.M. Blain Christen, “Microfluidic Tilt Sensor Using Optical Detection”, 2009 IEEE Circuits and Systems for Medical and Environmental Applications Workshop, December 2009

S. Herman, J.M. Blain Christen, “A Microfluidic Device for Two-Dimensional Trapping of Cells and Microparticles”, 2009 IEEE Circuits and Systems for Medical and Environmental Applications Workshop, December 2009

S. Herman, J.M. Blain Christen, “Integrated Nanostructured Optical Filters for Biological Applications”, 2009 IEEE Circuits and Systems for Medical and Environmental Applications Workshop, December 2009

D. Welch, S. Herman, S. Sen, J. Georgiou, J.M. Blain Christen, "An Optoelectronic/Microfluidic Inclination Sensor for Vestibular Implants", 2009 IEEE Biomedical Circuits and Systems Conference, November 2009

A. Kargar, J.M. Blain Christen, "Theoretical Investigation of Silicon Nanowire pH Sensor", Biomedical Robotics and Biomechatronics, 2008, BioRob 2008. 2nd IEEE RAS & EMBS International Conference on, pp. 765-769, October 2008

Before Employment at ASU:

B.I. Iglehart, P.O. Pouliquen, J.M. Blain Christen, "Ultra-High Ratio Dilution Microfluidic System for Single Strand DNA Isolation", 2008 IEEE International Symposium on Circuits and Systems, May 2008

J.M. Blain Christen, A.G. Andreou, "Self-Biased Operational Transconductance Amplifier in 0.18 micron 3D SOI-CMOS", *2007 IEEE International Symposium on Circuits and Systems*, May 2007

J.M. Blain Christen, B.I. Iglehart, A.G. Andreou, "Localized Closed-Loop Temperature Control and Regulation in Hybrid Silicon/Silicon Life Science Microsystems", *2007 IEEE International Symposium on Circuits and Systems*, May 2007 **[Student Paper Contest Honorable Mention]**

J.M. Blain Christen, A.G. Andreou, "Design, Analysis and Implementation of Integrated Micro-Thermal Control Systems", *2007 IEEE International Symposium on Circuits and Systems*, May 2007

J.M. Blain Christen, A.G. Andreou "Hybrid Integration for Autonomous, Closed-loop Cell Culture and Incubation", *Proceedings of The Second Annual Meeting of American Academy of Nanomedicine*, September 2006

J.M. Blain Christen, A.G. Andreou, "Hybrid Silicon/Silicone (Polydimethylsiloxane) Microsystem for Cell Culture", *Proceedings of The 28th Annual International Conference of the IEEE Engineering in Medicine and Biology Society,* September 2006

J.M. Blain Christen, A.G. Andreou, "Integrated PDMS/CMOS Microsystem for Autonomous Incubation and Imaging in Cell Culture Studies", *Proceedings of the IEEE/NLM Life Science Systems and Applications (LSSA) Workshop 2006, NIH*, July 2006

J.M. Blain Christen, A.G. Andreou, "CMOS Heater Array for Incubation Environment Cellular Study", *Proceedings of the 48th Midwest Symposium on Circuit and Systems*, Volume 2, pp. 1786 - 1789, August 2005

J.M. Blain Christen, C.E. Davis, M. Li, A.G. Andreou, "Design, Double Sided Post-Processing, and Packaging of CMOS Compatible Bio-MEMS Device Arrays", *IEEE International Symposium on Circuits and Systems, Volume: 1, 26-29*, p. I-665 - I-668, May 2002

J.M. Blain Christen, C.E. Davis, M. Li, A.G. Andreou, "Robust Polymeric Techniques for Design, Post-Processing and Packaging of Bio-MEMS Devices", *Proceedings from the 10th meeting of the Symposium on Polymers for Microelectronics*, p. 700-703, May 2002

D.H. Goldberg, P.O. Pouliquen, J.M. Blain Christen, E. Culurciello, A.G. Andreou, "Acoustic MEMS Integrated Sensor Arrays", *35th Annual Conference on Information Sciences and Systems*, March 2001

J.M. Blain Christen, C.E. Davis, M. Li, A.G. Andreou, "Robust Techniques for Design, Post-Processing, and Packaging for CMOS-Based Bio-MEMS Arrays," *MEMS Alliance Fall 2001 Special Topics Symposium*, 2001

Patents (Provisional, PCT - international provisional, and Full)

Since Employment at ASU:

Joseph Smith*, Michael Goryll, **Sahil Shah**, Jennifer Blain Christen, John Stowell, 2014, "Large Area Multi-Analyte ISFET TFT Biosensors on Low Cost Unbreakable and Flexible Plastic Substrates", Provisional Patent Filed May 13, 2014, "System & Method for Ion-Selective, Field Effect Transistor on Flexible Substrate", **Full Patent** filed May 13, 2015

Joseph Smith*, Barry O'Brien, Yong-Kyun Lee, Edward Bawolek, Jennifer Blain Christen, "Integrated High-Resolution Untethered Flexible Cortical Implant", Provisional Patent Filed January 1, 2014; PCT Filed January 13, 2015

Joseph Smith*, David Allee, Yong-Kyun Lee, Benjamin Katchman, Jennifer Blain Christen, John Stowell, 2014, "Flexible Optical Biosensor for Point of Use Multi-Pathogen Detection", Provisional Patent Filed May 1, 2014, PCT filed May 1, 2015

Joseph Smith*, Emmett Howard, Jennifer Blain Christen, 2014, "Deformable Electronic Device and Methods of Providing and Using Deformable Electronic Device", Provisional Patent Filed December 22, 2014; **Full Patent** Filed December 22, 2015

Joseph Smith*, Emmett Howard, Jennifer Blain Christen, Yong-Kyun Lee, 2014, "Electronic Device and Method of Providing and Using Electronic Device", Provisional Patent Filed February 12, 2015; **Full Patent** Filed January 26, 2016

Joseph Smith*, Benjamin Katchman, Dixie Kullman, Karen Anderson, Jennifer Blain Christen, "Disposable High Sensitivity Point-of-Care Immunosensors for Multiple Disease and Pathogen Detection", Provisional Patent Filed March 3, 2015

Joseph Smith*, Michael Goryll, Dixie Kullman, Jitendren Muthuswamy, Jennifer Blain Christen, “Non-Invasive Transcutaneous Vagus Nerve Optogenetic Stimulator”, Provisional Patent Filed April 1, 2015; **Full Patent** Filed March 31, 2016

Benjamin Katchman, Karen Anderson, Joseph Smith*, Jennifer Blain Christen, “Rapid Point-of-Care Fluorescent Immunoassay for Identification of Biomarkers in Patient Biofluid Samples”, Provisional Patent Filed June 3, 2015; PCT Filed May 6, 2015

Teaching Activities:

Since Employment at ASU:

Arizona State University, Tempe, AZ

Introduction to Microelectromechanical Systems EEE 528 (fall 08, spring 11 - 16)
Includes CAD, FEM, and design project

Engineering Microfluidic Devices EEE/MAE 598 (spring 09)
Original course co-taught with mechanical engineering

Fundamentals of CMOS and MEMS EEE 435 (fall 09, fall 12, fall 14, fall 15, fall 16)
Microfabrication cleanroom course with three hour labs, three sessions per week

Circuits I EEE 202 *(*spring 10, fall 10)

Low Power Bioelectronics EEE 521 (spring 11 - 16) **[Newly developed course]**
low power analog circuit design, sensorimotor systems anatomy and physiology, biomedical applications and instrumentation, Cadence labs and projects

Before Employment at ASU:

Johns Hopkins University, Baltimore, MD

Advanced Topics in Fabrication and Microengineering (spring 2007)
Course Development and Instructional Staff

What is Engineering? (fall 2005, fall 2006)
Assistant Instructor

Undergraduate Senior Research Project (fall 2004 – spring 2006)
Graduate Research advisor for 5 student projects, 13 students

Electronics Design Laboratory (spring 2002)
Teaching Assistant

Microfabrication Laboratory (fall 1999-fall 2002)
Teaching Assistant

Students and Scholars Supervised

Total of 4 high school, 7 undergraduate, 9 masters, 8 Ph.D., 1 post-doc, 2 visiting faculty

High School Student

Graduated

Ishon Sivansh 2014 - 2015
Ishitha Jagadish 2014 – 2015
Hany Arafa, 2011 – 2013

Undergraduate Students

Current

Hany Arafa 2013 - present
Hwee Lee 2015 - present

Graduated

Heather Martin 2014 – 2015
Irene Khan 2013- 2015
JooHo Lee, 2011 – 2012
Christopher Gardner, 2010 - 2013
Christopher Kady, 2010 – 2011

Masters Students

Current

Vishal Ghorband 2014 – present
Thesis Topic: VLSI CMOS-based Portable EIS for Biomedical Applications

Graduated

Jonathan Garich 2014 – 2016
Thesis Topic: A Low-Cost, Minimally Invasive MEMS Piezoresistive Pressure Sensor for Epidural Intracranial Pressure Studies and Integration with Electrocorticography Arrays
Samantha Munoz 2015 – 2016
Thesis Topic: System Analysis and Design of a Low-Cost Monitor for Minimally Invasive Recording of Intracranial Pressure
Ranjani Sampath Kumaran 2014 – 2015
Thesis Topic: Intracranial Pressure Monitoring System
Sahil Shah – 2012 –2014
Thesis Topic: Drift Mitigation in Ion Sensitive Field Effect Transistors
Samiha Mamun, 2010 – 2011
Thesis Topic: Comprehensive Testing and Performance Analysis of Sensors in Lab-On-A Chip for Biomedical Applications
Stephen Herman 2008 – 2010
Thesis Topic: An Integrated Silicon Optoelectronic Fluorescence Assay
Jianan (Jason) Song 2008 – 2011
Thesis Topic: Analog and Mixed-Signal Circuit Design Techniques for Bioelectrical Signals
Sahana Sen, 2008 – 2010
Thesis Topic: Integrated Sensors for Biological and Biomedical Applications

Ph.D. Students

Current

Xiaochen Peng, 2016 (starting September) *Co-Advised with Hongjiang Song
Thesis Topic: Neuromorphic Circuit Architectures for Stroke Rehabilitation

Nicholas Fritz, 2016 (starting September)
Thesis Topic: Self-Calibration Techniques for Neural Interfaces
Hongwu Jiang, 2016 – present
Thesis Topic: Electrochemical Systems for Point-of-Care Diagnostics
Jonathan Garich, 2016 – present
Thesis Topic: Optogenetics for Bioelectronic Medicine
Uwadiae Obahiagbon, 2014 – present
Thesis Topic: Point of Care Diagnostics
Meng-Wei Lin, 2014 – present *Co-Advised with Hongjiang Song
Thesis Topic: Neural Interface Circuits for Stimulation and Recording

Graduated

Tao Luo, 2012 – 2015
Thesis Topic: Innovative techniques for electrochemical sensing in CMOS
David Welch, 2008 – 2013
Thesis Topic: Seamless Integration of CMOS Bioelectronics

Post-Doctoral Research Scholar

Joseph T. Smith 2016 - present
NOTE: Dr. Smith started research in my laboratory while employed by the Arizona State University Flexible Electronics and Display Center. All biomedical research was performed in my laboratory including point of care and neural interface

Other Scholars

Dixie Kullman – 2012 - present
RET participant and community college instructor with extensive research experience in diagnostics and microsurgery.
Research Topic: Point of Care Diagnostics
HongYi Wang – 2012 – 2013
Visiting scholar from Xi'an Jiaotong University under the China Scholarship Council State Scholarship Fund.
Research Topic: Chopper Techniques for Biosensor Arrays

Service Activities:

Educational Outreach:

Since Employment at ASU:

Bioelectronics Workshops 2012 – present
Greater Phoenix Area, AZ
Developed original workshops on bioelectronics using Backyard Brains neural and EMG systems with hands-on activities, local students grades 4 – 12.
Awarded IEEE Phoenix Section Outstanding Pre-College Educator award for Pre-College Initiatives and 2 IEEE Subsidy Awards

National Nanotechnology Infrastructure Network National Science Foundation
Research Experience for Undergraduates 2009 – present
Arizona State University, Phoenix, AZ
7 students (one underrepresented minority, seven female), students spent the summer performing independent research projects
Resulted in 1 conference publications, 1 conference paper under review

National Nanotechnology Infrastructure Network National Science Foundation
Research Experience for Teachers mentor 2012 – 2014, 2016 - present
Arizona State University, Phoenix, AZ
2 teachers (one female), community college instructors spend the summer performing research and developing curriculum
Resulted in 2 journal publications, 1 provisional patent, 1 full patent

High School Engineering Research Program 2012 - 2014
Arizona State University, Tempe, AZ
Thirteen high school students (5 groups) did research in my lab on (a) neural response of discoid cockroaches (b) sensors for long-term cell culture studies (c) self-powered motion detection (d) autonomous monitoring of cultured breast cancer cell viability (e) low-cost disposable lenses for point of care diagnostics system
Resulted in 2 conference publications

Broadcom Masters International 2013, 2016
Arizona State University, Tempe, AZ
Provided a bioelectronic workshop for international middle school students

SEE@ASU Faculty Participant 2014 – present (7 sessions)
Arizona State University, Tempe, AZ
Summer Engineering Experience –on-campus engineering camp with hands-on team activities for high school seniors considering engineering majors

Siemens Competition in Math, Science & Technology Judge, 2014 - 2016
Silver Spring, MD
Judged each of 4 stages for national competition, including on-site

Barrett Summer Scholars program instructor, 2009 - 2011
Arizona State University, Tempe, AZ
Taught a summer half-day engineering class for 8th and 9th grade student

Summer Workshop on Microfluidics, INTI National Laboratory 2008
Buenos Ares, Argentina 2008
Hands-on Summer Workshop on Microfluidics for Argentine University Students

Before Employment at ASU:

ACCE Volunteer Tutor 2006-2007
Academy for College and Career Exploration, Baltimore, MD
Worked with inner city high school students to encourage and help prepare students to pursue higher education

BIGSTEP (Broader Impact from Graduate Students Transferring Engineering Principles) 2005-2006
Johns Hopkins University Center for Educational Outreach, Baltimore, MD
Worked with faculty and participating schools to develop and maintain programs to encourage student to pursue higher education in STEM fields

Inventors of the Future Program 2005-2006
Washington Mathematics Science Technology Public Charter High School
Washington D.C.
Organized event kick-off, reviewed student projects, worked with faculty to organize the program and judged the final presentations

Sensor Networks Project 2005-2006
Red Lake School, Red Lake, MN
Bimidji Middle School, Bimidji MN
Bugonaygeshig Tribal School, Leech Lake, MN
Baltimore Polytechnic School, Baltimore, MD
Curriculum development using Crossbow Motes deployed at the schools.
Developed complementary curriculum with Lego Mindstorm RCX units

Arizona State University Service Activities:

University Level Service

Medical 3D Printing - Faculty Mentor for Student Club 2016
Biological Design Graduate Program Executive Committee 2010 - 2012

Schools of Engineering Level Service

New Faculty Cohort Peer Mentor 2013-2014
FURI (Fulton Undergraduate Research Initiative) Mentor 2011 - 2015
Five students (one underrepresented minority), year-long research projects
Resulted in 1 conference paper
Obama Scholars Mentor - 2010-2011
Biweekly mentoring of financially disadvantaged, underrepresented minority students

School Level Service (equivalent to department level service)

Senior Design Project Mentor 2010– present
34 students (6 female, 10 underrepresented minority), yearlong projects creating

original “products” including research, presentations, design, and fabrication

Capstone Mentor 2015 – 2016

7 students (2 female, 1 underrepresented minority), yearlong projects creating an original biomedical device, business plan and full FDA submission paperwork

MSE Exam Coordinator: Analog and Mixed Signals Concentration –2009-present

Responsible for assembling, proctoring, compiling grading results, and handling appeals for fall and spring semester examinations (approx. 200 students per year)

Graduate Committee Member for the following: Master’s Thesis Defense 15, PhD Qualifying Exam 5, PhD Comprehensive Exam 8, PhD Dissertation Defense 9

International Positions & Service Activities

Conference and Workshop Organizing Committee Service:

IEEE Symposium on Circuits and Systems (ISCAS) Organizing Committee, Demonstrations Co-Chair, Baltimore, MD 2017

IEEE Biomedical Circuits and Systems Conference (BioCAS) Organizing Committee, Tutorials Co-Chair, Paphos, Cyprus 2010

IEEE/NIH LiSSA Workshop Organizing Committee, Technical Co-Sponsorship Co-Chair, Bethesda, MD 2010

IEEE International Mixed-Signals, Sensors and Systems Test Workshop, Organizing Committee, Local Arrangements Chair, Scottsdale, AZ 2009

Microelectronics Packaging and Test Engineering Council (MEPTEC) Session Organizer, Revolutionary Concepts in Medical Electronics Session, Third Annual Medical Electronics Symposium 2008

NNIN Symposium Organic/Inorganic Interfaces and Health Science Applications Organizing Committee, January 2011

Journal Publication Service:

Associate Editor, Transactions on Biomedical Circuits and Systems, 2016 - present

Guest Editor, Transactions on Biomedical Circuits and Systems, ISCAS special issue 2015

Guest Editor, Journal on Emerging and Selected Topics in Circuits and Systems, Lab on CMOS special issue 2016

Reviewer for Nature Communications, IEEE Transactions on Biomedical Circuits and Systems, Sensors and Actuators, IEEE Electron Device Letters, IEEE Sensors, IEEE Transactions on Circuits and Systems II, IEEE Transactions on Very Large Systems Integration, IEEE Engineering in Medicine and Biology Conference, IEEE Life Science Systems and Applications, IEEE Journal of Signal Processing Systems, Special Issue on Circuits and Systems for Bio-Signals, Journal of Analog Integrated Circuits and Signal Processing, Journal of Signal Processing Systems, Journal of Medical and Biological Engineering, International Journal of Numerical Modelling: Electronic Networks, Devices and Fields

Technical Committee Service:

IEEE Biomedical and Life Sciences Circuits and Systems Technical Committee Secretary 2016-present
IEEE Biomedical Engineering Technical Field Award Committee 2011-2015
IEEE Circuits and Systems Biomedical and Life Sciences Circuits and Systems Technical Committee Member, 2007 – present (former member in each of two merged TCs)
IEEE Circuits and Systems Sensory Systems Technical Committee Member, 2007 – present
IEEE EAMTA Technical Committee Member 2009 - present
IEEE Symposium on Circuits and Systems Session Chair 2008, 2009, 2010, 2015, 2016
IEEE BioCAS session chair 2015

Conference Other Committee Service:

Challenges and Emerging Technologies in Heart Disease Treatment, 1st International Workshop on, Technical Program Committee Member, 2016
IEEE Symposium on Circuits and Systems Review Committee Member 2007 - present
IEEE Conference on Biomedical Circuits and Systems Review Committee Member, 2007 – present
IEEE Symposium on Circuits and Systems, BioCAS Best Paper Award Judge 2016
IEEE Symposium on Circuits and Systems Sensory Systems Best Paper Award Panel 2014 – 2015
IEEE Symposium on Circuits and Systems Demonstration Judge 2014, 2015, 2016
2012 5th International Conference on BioMedical Engineering and Informatics (BMEI) Program Committee
IEEE BioCAS Session Chair 2011 - present
IEEE International Symposium on Circuits and Systems, Session Chair, 2009 - present
IEEE EAMTA Review Committee Member 2009 - present

Local Positions and Service Activities

Since Employment at ASU:

Solid State Circuits Society Phoenix Chapter Treasurer 2015 - present
Solid State Circuits Society Phoenix Chapter University Liaison 2010-2015
Solid State Circuits Society Phoenix Chapter Vice President 2009-2010

Before Employment at ASU:

Chairperson, Robot Challenge Committee 1999-2001
Secretary, Johns Hopkins University Student Chapter 2000-2001
Chairperson, Johns Hopkins University Student Chapter 1998-1999
Secretary, Johns Hopkins University Student Chapter 1997-1999
Member, Baltimore Chapter 1996-2007
Member, Johns Hopkins University Student Chapter 1996-2006
Student Member 1996-present
IEEE Robot Challenge Mentor, Baltimore Chapter Spring 1999
IEEE Robot Challenge Volunteer, Baltimore Chapter Spring 1998