**Samuel J. Dickerson, Ph.D.**

1206 Benedum Hall

Department of Electrical and Computer Engineering

University of Pittsburgh

Pittsburgh, PA 15261, USA

(412) 624 – 2163

dickerson@pitt.edu

**Professional Interests**

• Cyber-Physical Systems

• Internet-of-Things

• Engineering Education Research

• Mixed-Signal Integrated Circuits

**•** Nanoscale Computing

• Biomedical Circuits and Systems

• Lab-on-Chip devices

• Electronic Design Automation

**Education**

**Ph.D., Electrical Engineering 2012**

University of Pittsburgh, Pittsburgh, PA, USA

**Dissertation:** Dielectrophoresis Based Methods for Separating Particles on Lab-on-Chip Platforms

**M.S., Electrical Engineering 2007**

University of Pittsburgh, Pittsburgh, PA, USA

**Thesis:** Design of a 3D Integrated Circuit for Manipulating and Sensing Biological Nanoparticles

**B.S., Computer Engineering 2003**

University of Pittsburgh, Pittsburgh, PA, USA

**Program Emphasis:** Computer Science and Embedded Systems

**Professional Positions Held**

**Director, Computer Engineering Undergraduate Program January 2018 - Present**

University of Pittsburgh

*Department of Electrical and Computer Engineering*

*Pittsburgh, PA, USA*

**Assistant Professor September 2015 - Present**

University of Pittsburgh

*Department of Electrical and Computer Engineering*

*Pittsburgh, PA, USA*

**President and Co-founder June 2013 – June 2015**

Nanophoretics LLC

*Monroeville, PA, USA*

**Communications IC Design Engineer (Intern) May 2005 – August 2005**

IBM (*T.J. Watson Research Center)*

*Communications Circuits and Systems Group*

*Yorktown Heights, NY, USA*

**Communications IC Design Engineer (Intern) May 2004 – August 2004**

IBM (*T.J. Watson Research Center)*

*Communications Circuits and Systems Group*

*Yorktown Heights, NY, USA*

**Embedded Systems Engineer (Co-Op) April 2002 – August 2002**

Compunetix

Video Systems Division

Monroeville, PA, USA

**Embedded Systems Engineer (Co-Op) August 2001 – January 2002**

Compunetix

Video Systems Division

Monroeville, PA, USA

**Network Engineer (Co-Op) January 2001 – May 2001**

Marconi Communications (acquired by Ericsson)

Global Managed Services Group

Cranberry, PA, USA

**PC/LAN Support (Intern) May 2000 – August 2000**

United States Steel

IT Department

Clariton, PA, USA

**Funded Proposals**

***Current***

***Project:*** “Systematic Use of Simulation in the Electrical and Computer Engineering Classroom to Drive Reflection and Metacognition”

***Source:*** National Science Foundation

**Program:**  Research Initiation in Engineering Formation

***Role:*** Principal Investigator

**Other Participants:** Renee Clark (Co-Principal Investigator), University of Pittsburgh

***Amount:*** $200,000

***Dates:*** September 2018 – August 2020

***Project:*** “Propagation of Active Learning Within the Swanson School of Engineering”

***Source:*** University of Pittsburgh

**Program:**  Innovation in Education Award

***Role:*** Co-Principal Investigator

**Other Participants:** Renee Clark (Principal Investigator), University of Pittsburgh

***Amount:*** $15,000

***Dates:*** May 2018 – May 2019

***Project:*** “Development and Implementation of a Real-Time Tutor Sourcing Application”

***Source:*** University of Pittsburgh

**Program:**  Personalized Education Grants

***Role:*** Co-Principal Investigator

**Other Participants:** Robert Kerestes (Principal Investigator), University of Pittsburgh

***Amount:*** $10,000

***Dates:*** May 2018 – May 2019

***Project:*** “Sensing and Computing with Oscillating Chemical Reactions”

***Source:*** National Science Foundation

**Program:** Integrated NSF Support Promoting Interdisciplinary Research and Education (Track 1)

***Role:*** Co-Principal Investigator

**Other Participants:** Anna Balasz (Principal Investigator), University of Pittsburgh

***Amount:*** $700,000

***Dates:*** September 2013 – August 2018 (Co-Pi Role Commenced August 2016)

***Completed***

***Project:*** “Teaching Students to Innovate with the Internet-of-Things”

***Source:*** University of Pittsburgh

**Program:** Innovation in Education Award

***Role:*** Principal Investigator

***Amount:*** $10,000

***Dates:*** June 2016 – May 2017

***Project:*** “Very Fast Turnaround Screening of Bacteriological Pathogens”

***Source:*** Innovation Works

**Program:** Technology Commercialization Initiative, RFP21

***Role:*** Principal Investigator

***Amount:*** $100,000 + $50,00 In-Kind Match from Compunetix Inc.

***Dates:*** June 2013 – August 2014

***Project:*** “A Portable Lab-On-Chip Cytometer for CD4/CD8 Lymphocyte Counts”

***Source:***The Technology Collaborative

***Program:*** PA Assistive and Intelligent Systems Technology CommercializationInitiative Phase II

***Role:***Principal Investigator

**Other Participants:** Steven P. Levitan (Co-PI), Donald M. Chiarulli (Co-PI)

***Amount:***$25,000

***Dates:***September 2011 – June 2012

***Project:*** “Lab-On-Chip Instrumentation for Separation and Assay of Biological Particles”

***Source:***The Technology Collaborative

***Program:*** PA Assistive and Intelligent Systems Technology Commercialization Initiative Phase I

***Role:***Principal Investigator

**Other Participants:** Steven P. Levitan (Co-PI), Donald M. Chiarulli (Co-PI)

***Amount:***$5,800

***Dates:***November 2010 – December 2011

***Project:*** “A Portable Lab-On-Chip Cytometer”

***Source:***University of Pittsburgh

***Program:*** Big Idea Entrepreneurial Competition (1st Place Winner, New Product Idea)

***Role:***Principal Investigator

**Other Participants:** Steven P. Levitan (Co-PI), Donald M. Chiarulli (Co-PI)

***Amount:***$1,000

***Dates:***March 2009

**Patents**

**United States Patent #9,285,338 (Issued March 2016)**

Separation of Particles Using Multiplexed Dielectrophoresis

Samuel J. Dickerson, Donald M. Chiarulli, Steven P. Levitan

**United States Patent #8,278,188 (Issued October 2012**)

“Manipulation, detection and assay of small scale biological particles”

Donald M. Chiarulli, Steven P. Levitan, Samuel J. Dickerson

**US Patent Application #14/295,934 (Filed June 2014)**

“Method and Apparatus for Identifying Objects in a Plurality of Objects Using Dielectrophoresis”

*Samuel J. Dickerson*, Donald M. Chiarulli, Steven P. Levitan, Stefano Coraluppi, Craig Carthel

**Publications**

Dickerson, S, Clark, R.M., (2018). **A Classroom-Based Simulation-Centric Approach to Microelectronics Education**. Computer Applications in Engineering Education. Wiley.

Clark, R. M., & Dickerson, S. J. (2018). **A Case Study of Post-Workshop Use of Simple Active Learning in an Introductory Computing Sequence**. IEEE Transactions on Education. doi:10.1109/TE.2018.2808274

Yan Fang, Victor V. Yashin, Samuel J. Dickerson, Anna C. Balazs, “**Increasing Information Storage Capacity in Computing Devices Formed from Self-Oscillating Gels**”, 2018 Materials Research Society Spring Meeting & Exhibit, Phoenix, AZ, April 2-6, 2018.

Yan Fang, Victor V. Yashin, Samuel J. Dickerson, Anna C. Balazs, “**Detecting Spatial Defects in Colored Patterns with Coupled Self-Oscillating Gels**”, 2018 Materials Research Society Spring Meeting & Exhibit, April 2-6, 2018.

Fang, Y., Yashin, V.V., Dickerson, S.J., & Balazs, A.C. (2018). **Tuning the synchronization of a network of weakly coupled self-oscillating gels via capacitors**. Chaos, 28(5), 053106. doi: 10.1063/1.5026589.

Fang, Y., Yashin, V.V., Dickerson, S.J., & Balazs, A.C. (2018). **Detecting spatial defects in colored patterns using self-oscillating gels**. Journal of Applied Physics - Special Issue on New Physics and Materials for Neuromorphic Computation

Dickerson, S. J., Clark, R. M., & Jain, A. (2017). **No excuses: Use of simple active learning in electrical and computer engineering**. In ASEE Annual Conference and Exposition, Conference Proceedings Vol. 2017-June.

Dickerson, S. J. (2017). **Introducing the Internet-of-things to the next generation of engineers**. In ASEE Annual Conference and Exposition, Conference Proceedings Vol. 2017-June.

Schmidt, D. E., Sanchez, D. V. P., & Dickerson, S. J. (2017). **Increasing student engagement and motivation by replacing homework with assignment-quizzes**. In ASEE Annual Conference and Exposition, Conference Proceedings Vol. 2017-June.

Dickerson, S. J. (2017**). A comprehensive approach to educating students about the Internet-of-Things**. In Proceedings - Frontiers in Education Conference, FIE Vol. 2017-October (pp. 1-7). doi:10.1109/FIE.2017.8190533

Fang, Y., & Dickerson, S. J. (2017). **Achieving swarm intelligence with spiking neural oscillators**. In 2017 IEEE International Conference on Rebooting Computing, ICRC 2017 - Proceedings Vol. 2017-January (pp. 1-4). doi:10.1109/ICRC.2017.8123632

Samuel. J. Dickerson, Steven P. Jacobs, Adrian M. Garcia, and David V. P. Sanchez, **“Joint Assessment and Evaluation of Senior Design Projects by Faculty and Industry,”** Proceedings of IEEE Frontiers in Education Conference, Erie, PA, October 12-15 2016.

Samuel J. Dickerson**, “Preparing Undergraduate Engineering Students for the Internet of Things,"** American Society for Engineering Education (ASEE) Annual Conference and Exposition, New Orleans, LA, June 26-29, 2016.

Samuel J. Dickerson, Stefano Coraluppi, Craig Carthel, Steven Levitan, Donald Chiarulli, **“A Multi-Target Tracking Sensor Platform for Dielectrophoresis-Based Characterization of Cells,”** *IEEE EMBS Healthcare Innovation and Point-Of-Care Technologies Conference (HICPT 2014)*, Seattle, WA, USA, October 8-10, 2014

Samuel J. Dickerson, Donald Chiarulli, Steven Levitan, Craig Carthel, Stefano Coraluppi, **“Dielectrophoresis-Based Classification of Cells Using Multi-Target Multiple-Hypothesis Tracking,”** *IEEE Engineering in Medicine and Biology Society Conference (EMBS 2014),* Chicago, IL, USA, August 26-30, 2014

Stefano Coraluppi, Craig Carthel, Samuel Dickerson, Donald Chiarulli and Steven Levitan, **“Feature-Aided Multiple-Hypothesis Tracking and Classification of Biological Cells*,”*** *IEEE International Conference on Information Fusion (FUSION 2014),* Salmanca, Spain, July 7-10, 2014

Alex M. Schaefer, Samuel J. Dickerson, Larry R. Foulke, Daniel G. Cole, Steven P. Levitan, **"Design of the PANTHER Desktop Nuclear Plant Simulator,"** *2012 ANS Annual Meeting , Nuclear Science and Technology: Managing the Global Impact of Economic and Natural Events*, ANS's Volume 106 of the 2012 Transactions, Chicago, Illinois, June 24-28, 2012

Samuel J. Dickerson, Steven P. Levitan and Donald M. Chiarulli. **“Isolating Particles on Lab-on-Chip Platforms using Time-Multiplexed Dielectrophoresis*.”*** *National Cancer Institute Conference on Cancer Detection and Diagnostic Technologies for Global Health*. Rockville, MD, August 22-23, 2011

Samuel J. Dickerson, Donald M. Chiarulli and Steven P. Levitan, **“Nondestructive Optical Assay Method for Nanoscale Biological Particles in Solution, ”** *IEEE Photonics Society Winter Topical Meetings 2011*, pp. 67-68, Keystone, CO, January 10-12, 2011

Larry R. Foulke, Steven P. Levitan, Samuel J. Dickerson, Jesse Randall, Anthony Pacella and David Helling**, “A Desktop Simulator for Nuclear Engineering Education, ”** American Nuclear Society Conference on Nuclear Training and Education 2011, Jacksonville, FL, February 6-9, 2011

Samuel J. Dickerson, Donald M. Chiarulli and Steven P. Levitan**, “3D Integrated Circuits for Lab-on-Chip Applications, *”*** *IEEE International 3D Systems Integration Conference 2009 (3DIC 2009)*, San Francisco, CA, September 28-30, 2009

Steven P. Levitan, Donald M. Chiarulli, Timothy P. Kurzweg, Jose A. Martinez, Samuel J. Dickerson, Michael M. Bails, David K. Reed, Jason M. Boles, **"CAD Tools for Multi-Domain Systems on Chips,"** (in) *Model-Based Design of Embedded Systems*, Eds. Chapter 20, CRC Press 2009

Donald M. Chiarulli, Samuel J. Dickerson and Steven P. Levitan, **“3D-IC BioChip fo Isolation, Purification and Assay of Virus-Scale Biomaterials,”** *Design Automation Conference , Workshop on Biochips to Interface and Monitor Human Biological Functions (DAC 2008)*, Anaheim, CA June 8th, 2008

Samuel J. Dickerson, Arnaldo J. Noyola, Steven P. Levitan and Donald M. Chiarulli**, “A 3D Integrated Circuit for Sensing Biological Nanoparticles,”** *Nanoelectronic Devices for Defense and Security Conference (NANO-DDS 2007)* , Crystal City, VA June 18-21, 2007

Samuel J. Dickerson, Donald M. Chiarulli, Steven P. Levitan, Arnaldo J. Noyola, **“Three-dimensional integrated circuits for lab-on-chip dielectrophoresis of nanometer scale particles,”** *SPIE Symposium on Micro and Nanofabrication, Photonics West: Integrated Optoelectronic Devices (MOEMS-MEMS 2007 )*, San Jose, CA, 20-25 January 2007

Donald M. Chiarulli, Sam Dickerson, Jason D. Bakos, Joel R. Martin, Steven P. Levitan, **"Efficient Optical Communications Using Multibit Differential Signaling,"** *SPIE Symposium on Optoelectronics, Photonics West: Photonics Packaging and Integration VIII*, Paper No. 6126-16, San Jose, CA, 21-26 January 2006

Steven P. Levitan, Jose A. Martinez, Michael M. Bails, Samuel J. Dickerson, Donald M. Chiarulli, **“Multi-level Co-Simulation of Mixed Technology Microsystems,”** *The 4th International IEEE New Circuits and Systems Conference (NEWCAS 2006),* pp. 205-208, Gatineau, Canada, June 18-21,2006

Steven P. Levitan, Donald M. Chiarulli, Sam Dickerson, Jason Bakos, Joel Martin, **"Power Efficient Communication Using Multi-Bit-Differential Signaling,"** Proc. *IEEE/LEOS 16th Annual Workshop on Interconnections within High-Speed Digital Systems*, Santa Fe,NM,May 8-11, 2005

**Student Supervision**

***PhD Students***

**Yan Fang**

Materials that Compute: Sensing and Computing with Oscillating Chemical Reactions

April 2016 – Current

**Joe Jezak**

Real-Time, Quantitative Parkinson’s Disease Assessments

September 2016 – Current

***Undergraduate Researchers***

**Ronen Orland,**

Simulation of Dielectrophoresis Microsystems

May 2018 – Present

**Siddharth Balakrishnan,**

Identification of Cells using Dielectrophoresis

May 2018 – Present

**Swaroop Akkineni,**

Next Generation Parkinson ’s Disease Assessments

January 2016 – April 2017

**Brandon Contino,**

Sustainable Internet-of-Things Waterways

May 2016 – August 2016

**Honors and Awards**

**2018 Innovation in Education Award,** University of Pittsburgh

**2016 National Academies of Engineering Invitee,** Frontiers of Engineering Education Symposium

**2016 Innovation in Education Award,** University of Pittsburgh

**2013 Pitt Innovator Award,** University of Pittsburgh

**2012 Best Research Assistant Award,** University of Pittsburgh

**2003 Graduated with magna cum laude honors,** University of Pittsburgh

**Professional Memberships**

**Member, Institute of Electrical and Electronic Engineers (IEEE)** 2001-Present

**Member, American Society for Engineering Education (ASEE)** 2015-Present

**Member, National Society of Black Engineers (NSBE)** 2016-Present

**Courses Taught**

COE 0132: Digital Logic

COE 0147: Computer Organization and Assembly Language Programming

ECE/COE 0257: Analysis and Design of Microelectronic Circuits

COE 0501: Digital Systems Laboratory

ECE 1238: Digital Electronics

ECE/COE 1150: Introduction to Computer Networks

ECE/COE 1170: Junior Design\*

ECE/COE 1270: Fundamentals of Electronic Prototyping\*

ECE/COE 1180: Introduction to Computational Modeling and Simulation

ECE/COE 1188: Cyber-Physical Systems\*

COE 1502: Advanced Digital Design

ECE/COE 1885: Departmental Seminar

ECE/COE 1896 Senior Design

ECE/COE 1898 Engineering Project

\*Developed as a brand-new course

**Media Coverage and Mentions**

<https://www.engineering.pitt.edu/News/2018/Innovation-in-Education/>

<https://www.engineering.pitt.edu/News/2018/Dickerson-Kerestes-ECE-Appointments/>

<https://www.engineering.pitt.edu/News/2016/Sam-Dickerson-ECE-1188/>

<https://www.engineering.pitt.edu/News/2016/Samuel-Dickerson-NAE-FOEE/>

**Professional Service Activities**

***Reviewer***

IEEE Transactions on Biomedical Circuits and Systems

ACM Transactions on Design Automation of Electronic Systems

International Journal of Computers and Applications

Embedded Systems Letters