

JOSEPH ALLEN POTKAY, PH.D.

CONTACT INFORMATION

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RESEARCH INTERESTS

Medical microsystems; MEMS; Microfluidics; Microfabricated artificial organs; Biocompatible sensor and actuator systems; Energy harvesting; Implantable power generators; Implantable pressure sensors.

EDUCATION

Ph.D. in Electrical Engineering Dec 2006
University of Michigan Ann Arbor, MI
Dissertation: *A Low-Power Pressure- and Temperature-Programmed Separation System for a Micro Gas Chromatograph*
Thesis Advisor: *Kensall D. Wise, Ph.D.*

M.S. in Electrical Engineering May 2002
University of Michigan Ann Arbor, MI
Major/Minor: Circuits and Microsystems / Solid State Devices GPA 8.4/9.0 (A = 8.0)

B.S.E. in Computer Engineering June 2000
University of Cincinnati Cincinnati, OH
Valedictorian GPA 4.0/4.0

POSITIONS AND EMPLOYMENT

2013 - Adjunct Research Investigator, Department of Surgery, University of Michigan
2012 - Research Biomedical Engineer, VA Ann Arbor Healthcare System
2011 - Research Assistant Professor, Department of Electrical Engineering and Computer Science, Case Western Reserve University
2010 - Investigator, Advanced Platform Technology Center – A VA Research Center of Excellence
2006 - 2012 Research Biomedical Engineer, Louis Stokes Cleveland VA Medical Center
2006 - 2010 Associate Investigator, Advanced Platform Technology Center – A VA Research Center of Excellence
2000 - 2006 Research Assistant, Department of Electrical Engineering and Computer Science, University of Michigan
2002 - 2006 Teaching Assistant, EECS 425: Integrated Microsystems Laboratory, University of Michigan
2003 - 2004 President and Vice President, Student Leadership Committee, Center for Wireless Integrated Microsystems, University of Michigan
2002 - 2003 Mentor, Detroit Area Pre-College Engineering Program, Center for Wireless Integrated Microsystems, University of Michigan
2002 Educational chair, Student Leadership Committee, Center for Wireless Integrated Microsystems, University of Michigan
1998 - 1999 Computer Engineering Co-op, Compaq Computer Corporation, Shrewsbury, MA

1997 - 1998 Electrical and Computer Engineering Co-op, Keithley Instruments, Solon, OH

PROFESSIONAL EXPERIENCE

VA Ann Arbor Healthcare System

Advanced Platform Technology Center (APT Center)

Investigator and Research Biomedical Engineer

July 2012 –
Ann Arbor, MI

- Developing an independent research program in Advanced Medical Microsystems.
- Investigating artificial lung and kidney devices harnessing advantages at the micro and nano scale.
- Collaborating with local physicians and other research professionals and managing engineers in order to successfully advance the aforementioned projects and make them a clinical reality.

Case Western Reserve University

Department of Electrical Engineering and Computer Science

Research Assistant Professor

July 2011 –
Cleveland, OH

- Building an independent, vibrant research program in biomedical microsystems.

Louis Stokes Cleveland Veterans Affairs Medical Center

Advanced Platform Technology Center (APT Center)

Investigator and Research Biomedical Engineer

Oct 2006 – Jun 2012
Cleveland, OH

- Developed an independent research program utilizing microsystems/MEMS and advanced sensor and actuator systems to benefit veteran health.
- Researched the use of MEMS and micromachining to fabricate a miniature artificial lung with high efficiency.
- Invented and investigated an implantable power sources that are capable of safely harvesting energy from the body. The device scavenged energy from arterial expansion and contraction.
- Conceived of and researched a smart vascular graft capable of being wirelessly interrogated.
- Collaborated with local physicians and other research professionals and managing engineers in order to successfully advance the aforementioned projects and make them a clinical reality.

University of Michigan

Research Assistant / Doctoral Research

Sep 2000 – Dec 2006
Ann Arbor, MI

- Dissertation Summary: Developed a low-power pressure-programmable separation system for a micro gas chromatograph (μ GC). This research: 1) used system-based design to develop a high-performance μ GC column, in an etched-back silicon-on-glass structure; 2) developed a low-power, low-mass, dielectric μ GC column with integrated heaters, temperature sensors and pressure sensors; 3) developed a low-power electrostatically latching thermopneumatic microvalve enabling pressure programming; 4) integrated the μ GC column and valve into the environmental monitor under development in the National Science Foundation's Engineering Research Center (ERC) in WIMS.
- Microfabrication: Gained a working knowledge of semiconductor and MEMS cleanroom processing and characterization including lithography, chemical vapor deposition (CVD), physical vapor deposition (PVD), thermal oxidation, plasma etching, wet etching, surface and thin-film metrology, electron beam microscopy, electroplating, stress measurement and management, and wafer bonding.
- System-Based Device Design: The column and valve were designed according to the constraints and performance of the entire μ GC system including the flow and pressure constraints of the micropump, dead volume, the flow requirements of the preconcentrator and sensor array, device interfacing and packaging, and targeted analysis time, sensitivity and power.

- Sensors and Actuators: Designed, fabricated, and tested various sensors and actuators including resistive temperature sensors, capacitive pressure sensors, capacitive position sensors, resistive heaters and a hybrid thermopneumatic and electrostatic actuator.
- Theory & Modeling: Developed and applied analytical models to the design of the column and valve and utilized them to gain a fundamental understanding of the device design and tradeoffs. Verified the theory using Finite Element Analysis (FEA) in ANSYS.
- System Integration and Collaboration: Assisted in the development of a microfabricated fluidic and electrical substrate for the integration of the various components of the environmental monitor. Collaborated with researchers in multiple disciplines including Chemistry, Aerospace Engineering, and Mechanical Engineering in order to facilitate device interfacing and integration into the system. Required team cooperation, clear communication of device specifications, and individual accountability.
- Test Equipment Design and Construction: Specified, procured, calibrated and operated equipment for testing the flow, pressure, flow, speed and power of MEMS devices. Utilized LabView to automate testing. Gained experience with pressure, temperature and flow measurement and calibration.

University of Michigan

Jan 2002 – Apr 2006

EECS 425: Integrated Microsystems Laboratory

Ann Arbor, MI

Teaching Assistant

- Mentored the design, fabrication, and testing of circuits and microsystems based on EDNMOS and a silicon-on-glass dissolved wafer process. Communicated device issues and tradeoffs, validated designs, and supported simulation and testing.
- Assisted in the development of the multi-sensor process and the circuit and device fabrication.
- Occasionally assisted in presenting lectures.

Center for Wireless Integrated Microsystems

Jan 2002 – Dec 2004

Student Leadership Committee

Ann Arbor, MI

President and Vice President

- As president, oversaw all student activities within the WIMS center. Served as liaison between students and faculty, co-leading SLC-faculty meetings and communicating the conclusions to WIMS students. Motivated WIMS students to actively participate in education, outreach, and social events, fostering interaction and team growth within the center. As vice president, supported the president in all duties and responsibilities.

Mentor, Detroit Area Pre-College Engineering Program

- Mentored underrepresented minority students once a week over a six week period. Supported the students' work on programmable robots and discussed and taught basic science, encouraging their interest in WIMS and engineering.

Educational Chair

- Managed and coordinated all student education and outreach activities in the WIMS center. Collaborated with the Ann Arbor Hands-On Museum to develop a WIMS exhibit teaching the public about MEMS and their applications.

Compaq Computer Corporation

Mar 1998 – Sep 1999

Alpha Chipset Verification Group

Shrewsbury, MA

Computer Engineering Co-op

- Worked full-time on the Alpha Development Group's chipset verification team for two six-month periods between school quarters. Performed the verification, testing and coverage of the AGP, PCI, PCIX, and multiprocessor portions of the chipset. Acquired a thorough knowledge of the Alpha architecture, probability theory, the PCI and AGP protocols and multiprocessor theory. Communicated verification issues to chipset designers and worked with them to resolve problems.

- Designed and implemented MBTA, a software tool used to run and monitor multiple tests on multiple servers. Project duties included GUI design, CGI scripting and software programming and testing. Verified tool through rigorous component/function testing and “in-field” use.
- Nominated for a “Most Outstanding Intern” award for exceptional individual achievement.

Keithley Instruments

Jan 1997 – Dec 1998

4200-SCS Product Development Team

Solon, OH

Electrical and Computer Engineering Co-op

- Worked full-time during alternating quarters of school and work on the 4200-SCS product development team. The 4200-SCS is a wafer-level semiconductor characterization system.
- Designed the main control unit for a prototype arbitrary waveform generator for the 4200-SCS. This involved data transfer, memory interfacing, DAC control and timing analysis of a PCI-based FPGA design. Delivered a functional prototype of the device.
- Built and tested prototype circuits, including a step-down power supply and fan controller.
- Performed the thermal analysis and contributed to a thermally-efficient design for the 4200-SCS.
- Developed a low-current test suite in order to compare the performance of the 4200-SCS to several competitors. Utilized GPIB instrument control, GUI design and computer programming.

PEER-REVIEWED JOURNAL PUBLICATIONS

- K. Kovach, J. R. Capadona, A. Sen Gupta, and **J. A. Potkay**, “The Effects of PEG-Based Surface Modification of PDMS Microchannels on Long-Term Hemocompatibility,” *Journal of Biomedical Materials Research: Part A*, accepted pending revision.
- **J. A. Potkay**, “A simple, closed-form, mathematical model for gas exchange in microchannel artificial lungs,” *Biomedical Microdevices*, Vol. 15, No. 3, 2013, pp. 397-406.
- **J. A. Potkay** and K. D. Wise, “A Hybrid Thermopneumatic and Electrostatic Microvalve with Integrated Position Sensing,” *Micromachines*, Vol. 3, No. 2, 2012, pp. 379-395.
- **J. A. Potkay**, M. Magnetta, A. Vinson, and B. Cmolik, “Bio-inspired, efficient, artificial lung employing air as the ventilating gas,” *Lab on a Chip*, Vol. 11, No. 17, 2011, pp. 2901 - 2909. (Citations: 9)
- **J. A. Potkay**, “Long term, implantable blood pressure monitoring systems,” *Biomedical Microdevices*, Vol. 10, No. 3, June 2008, pp. 379-392. (Citations: 34)
- **J. A. Potkay**, G. R. Lambertus, R. D. Sacks, and K. D. Wise, “A Low Power Pressure- and Temperature-Programmable Micro Gas Chromatography Column,” *IEEE Journal of Micro Electro Mechanical Systems (JMEMS)*, Vol. 16, No. 5, Oct. 2007, pp. 1071-1079. (Citations: 38)
- M. Agah, **J. A. Potkay**, G. R. Lambertus, R. D. Sacks, and K. D. Wise, “High-Performance Temperature-Programmed Microfabricated Gas Chromatography Columns,” *IEEE Journal of Micro Electro Mechanical Systems (JMEMS)*, Vol. 14, No. 5, 2005, pp. 1039-1050. (Citations: 75)
- C.-J. Lu, W. H. Steinecker, W.-C. Tian, M. Agah, **J. A. Potkay**, M. C. Oborny, J. Nichols, H. Chan, J. Driscoll, R. D. Sacks, S. W. Pang, K. D. Wise, and E. T. Zellers, “First Generation Hybrid MEMS Gas Chromatograph,” *Lab on a Chip*, Vol. 5, 2005, pp. 1123-1131. (Citations: 146)
- G. Lambertus, A. Elstro, K. Sensenig, **J. A. Potkay**, M. Agah, S. Scheuering, K. D. Wise, F. Dorman, and R. D. Sacks, “Design, Fabrication, and Evaluation of Microfabricated Columns for Gas Chromatography,” *Analytical Chemistry*, v 76, n 9, Boston, Mass., May 1, 2004, pp. 2629-2637. (Citations: 101)

CONFERENCE PUBLICATIONS

- A. Vinson and **J. A. Potkay**, “Self-formed, naturally-optimized microfluidic channels in polydimethylsiloxane (PDMS),” *Technical Digest of the Solid-State Sensors, Actuators and Microsystems Workshop (Hilton Head)*, Hilton Head Island, SC, June 3-7, 2012, pp. 243-246. Poster presentation. (Poster acceptance rate: 89 out of 252 submissions)
- **J. A. Potkay**, “A high efficiency micromachined artificial lung,” *The 15th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2009)*, Denver, Colorado, June 2009, pp. 2234-2237. **Oral presentation.** (Oral acceptance rate: 216 out of 1306 submissions)

- **J. A. Potkay** and K. R. Brooks, "An arterial cuff energy scavenger for implanted microsystems," *The 2nd International Conference on Bioinformatics and Biomedical Engineering (ICBBE2008)*, Shanghai, China, May 16-18, 2008, pp. 1580-1583. Poster presentation.
- E.T. Zellers, S. Reidy, R.A. Veeneman, R. Gordenker, W.H. Steinecker, G.R. Lambertus, H. Kim, **J.A. Potkay**, M.P. Rowe, Q. Zhong, C. Avery, H.K.L. Chan, R.D. Sacks, K. Najafi, and K.D. Wise, "An Integrated Micro-Analytical System for Complex Vapor Mixtures," *Solid-State Sensors, Actuators and Microsystems Conference (Transducers 2007)*, Lyon, France, June 10-14, 2007, pp. 1491 – 1496.
- **J. A. Potkay**, G. R. Lambertus, R. D. Sacks, and K. D. Wise, "A Low-Power Temperature- and Pressure-Programmable μ GC Column," *Solid-State Sensors, Actuators and Microsystems Workshop (Hilton Head)*, Hilton Head Island, SC, June 4-8, 2006, pp. 144-147. Poster presentation. (Poster acceptance rate: 66 out of 205 submissions)
- **J. A. Potkay** and K. D. Wise, "An Electrostatically Latching Thermopneumatic Microvalve with Closed-Loop Position Sensing," *Proceedings of the Eighteenth Annual IEEE Conference on Micro Electro Mechanical Systems (MEMS)*, Miami, Florida, January 2005, pp. 415-418. Poster presentation. (Poster acceptance rate: 176 out of 750 submissions)
- **J. A. Potkay**, J. A. Driscoll, M. Agah, R. D. Sacks, and K. D. Wise, "A High-Performance Microfabricated Gas Chromatography Column," *Proceedings of the Sixteenth Annual IEEE Conference on Micro Electro Mechanical Systems (MEMS)*, Kyoto, Japan, January 19-23, 2003, pp. 395-398. Poster presentation.
- M. Agah, **J. A. Potkay**, A. Elstro, G. Lambertus, R. D. Sacks, and K. D. Wise, "A High-Performance Temperature-Programmed Gas Chromatography Column," *Proceedings of the Solid-State Sensors, Actuators, and Microsystems Workshop*, Hilton Head Island, SC, June 6-10, 2004, pp. 302-305.
- E. T. Zellers, W. H. Steinecker, G. R. Lambertus, M. Agah, C. -J. Lu, H. K. Chan, **J. A. Potkay**, M. C. Oborny, J. Nichols, A. Astle, H. Kim, M. P. Rowe, J. Kim, L. W. Da Silva, J. Zheng, J. Whiting, R. D. Sacks, S. W. Pang, M. Kaviany, P. L. Bergstrom, A. J. Matzger, J. Kurdak, L. P. Bernal, K. Najafi, and K. D. Wise, "A Versatile MEMS Gas Chromatograph for Environmental Vapor Mixture Analysis," (Invited) *Proceedings of the Solid-State Sensors, Actuators, and Microsystems Workshop*, Hilton Head Island, SC, June 6-10, 2004, pp. 61-66.
- E. T. Zellers, K. D. Wise, H. K. Chan, S. W. Pang, L. W. Da Silva, M. Kaviany, J. Kim, C. Kurdak, Y. Lu, D. M. Aslam, J. Zheng, M. Agah, **J. A. Potkay**, J. Zhong, M. C. Oborny, W. H. Steinecker, J. Nichols, M. P. Rowe, A. J. Matzger, G. R. Lambertus, A. Elstro, J. Whiting, R. D. Sacks, and P. L. Bergstrom, "Materials and Processing Challenges Related to the Fabrication of a MEMS Micro Gas Chromatograph," *Symposium on Materials, Mechanisms, and Systems for Chemical and Biological Detection and Remediation*, San Francisco, CA, April 2004.
- M. Agah, **J. A. Potkay**, J. A. Driscoll, R. D. Sacks, M. Kaviany, and K. D. Wise, "Thermal Behavior of High-Performance Temperature-Programmed Microfabricated Gas Chromatography Columns," *Technical Digest of the 12th International Conference on Solid-State Sensors*, Boston, MA, June 8-12, 2003, pp. 1339-1342.
- Edward T. Zellers, K. D. Wise, K. Najafi, D. Aslam, R. B. Brown, Q. Y. Cai, J. Driscoll, M. Flynn, J. Giachino, R. Gordenker, M. D. Hsieh, C. T.-C. Nguyen, P. Bergstrom, J. Drelich, C. Friedrich, E. Gamble, M. Kaviany, C. J. Lu, A. Matzger, M. Oborny, S. Pang, **J. Potkay**, R. Sacks, W.-C. Tian, W. Steinecker, J. Whiting, Q. Zhong, "Determinations of Complex Vapor Mixtures in Ambient Air with a Wireless Microanalytical System: Vision, Progress, and Homeland Security Applications," *Technical Digest of the IEEE Conference on Technologies for Homeland Security*, Waltham MA, IEEE, Boston, pp. 92-95, November 13-14, 2002.

PRESENTED CONFERENCE ABSTRACTS

- K. M. Kovach, J. R. Capadona, A. Sen Gupta, and **J. A. Potkay**, "Post-Assembly PEGylation of a PDMS microchannel for enhancing hemocompatibility," Biomedical Engineering Society (BMES) Annual Meeting, Seattle, WA, Sept 25-28, 2013.
- K. Kovach, J. Capadona, A. Sen Gupta, and **J. Potkay**, "Post-Assembly PEGylation of a PDMS Microchannel for Enhancing Hemocompatibility," Research ShowCase, Case Western Reserve University, Apr 12-13, 2013.
- A. Vinson, M. Magnetta, and **J. Potkay**, "Advanced Medical Microsystems Laboratory," Research Week, L. Stokes Cleveland VA Medical Center, Cleveland, OH, 2011.

- S. Shah and **J. Potkay**, “Developing and Implantable Occlusion Sensor for Vascular Grafts,” Irwin H. Lepow Day, Cleveland, OH, 2010. **Awarded “Best Research Poster”**.
- **J. Potkay**, “Advanced Medical Microsystems Laboratory,” Research Week, L. Stokes Cleveland VA Medical Center, Cleveland, OH, 2010.
- **J. Potkay**, “Microfabricated Artificial Lungs for Veteran Rehabilitation,” Research ShowCase, Case Western Reserve University, 2010.
- S. Shah and **J. Potkay**, “Developing and Implantable Occlusion Sensor for Vascular Grafts,” Research ShowCase, Case Western Reserve University, 2010.
- **J. Potkay**, “High Efficiency, Micromachined Artificial Lung”, VA National Research Week, Washington, D.C., 2009.
- **J. Potkay**, “A High Efficiency Microfabricated Artificial Lung,” Research ShowCase, Case Western Reserve University, 2009.
- **J. A. Potkay** and K. Brooks, “Flexible, Implantable Pressure Sensors for Functional Electrical Stimulation Systems,” *The 38th Neural Interfaces Conference (NIC 2008)*, Cleveland, OH, June 16-18, 2008. Poster presentation.
- **J. Potkay**, “An Arterial Cuff Energy Harvester for Implanted Microsystems,” Research ShowCase, Case Western Reserve University, 2008.

RESEARCH GRANTS - AWARDED

- “Ex vivo Characterization of a Microfabricated Artificial Lung”, Rehabilitation R&D Merit Review Award, Department of Veterans Affairs, 4/1/2011 – 3/31/2014, **Principal Investigator**.
- “Nanoporous Polymer Membranes for Portable Artificial Kidneys”, VISN 10 Research Initiative Program, Department of Veterans Affairs, 9/1/2011 – 8/31/2012, **Principal Investigator**.
- “Instrumented Vascular Grafts for Advanced Detection of Impending Graft Failure”, The Cleveland VA Medical Research and Education Foundation, 12/1/2009 – 12/30/2011, **Principal Investigator**.
- “Acute and Chronic Performance of an Implanted Power Source”, Rehabilitation R&D Career Development Award, Department of Veterans Affairs, 4/1/2009 – 3/31/2011, **Principal Investigator**.
- “A High Efficiency, Micromachined Artificial Lung,” VISN 10 Research Initiative Program, Department of Veterans Affairs, 10/1/2007 – 9/30/2008, **Principal Investigator**.
- “March Plasma Systems CS1701F RIE Plasma System”, Advanced Platform Technology Center Large Equipment Grant, Rehabilitation R&D, Department of Veterans Affairs, 5/16/2008, **Co-Investigator and author**.

RESEARCH GRANTS - PENDING

- “Scaling limits of microchannel blood filtration units for artificial kidneys”, Rehabilitation R&D SPIRE Award, Department of Veterans Affairs, 1/1/2014 – 12/31/2015, **Principal Investigator**.
- “Polymer Nanoporous Membranes for Artificial Kidney Applications”, NSF ECCS, 6/01/14 - 5/31/17, **Principal Investigator**.
- “Toward portable microchannel artificial lungs for veteran rehabilitation”, Rehabilitation R&D Merit Review Award, Department of Veterans Affairs, 10/1/2014 – 9/30/2018, **Principal Investigator**.

RESEARCH COLLABORATORS

- Jeffrey Capadona, Ph.D., Assistant Professor of Biomedical Engineering, Case Western Reserve University
- Brian Cmolik, M.D., Section Chief of Cardio Thoracic Surgery, L. Stokes Cleveland VA Medical Center
- Pedram Mohseni, Ph.D., Assistant Professor of Electrical Engineering, Case Western Reserve University
- Anirban Sen Gupta, Ph.D., Assistant Professor of Biomedical Engineering, Case Western Reserve University
- Harihara Baskaran, Ph.D., Associate Professor of Chemical Engineering, Case Western Reserve University
- Erik van Lunteren, M.D., Pulmonary Physician, L. Stokes Cleveland VA Medical Center
- Christian Zorman, Ph.D., Associate Professor of Electrical Engineering, Case Western Reserve University

IN THE NEWS

- Dolgin, Elie. "Artificial Inspiration." [Article and interview]. *Nature*. Vol. 481, pp. S12-S14, 27 Sept 2012. < http://www.nature.com/nature/journal/v489/n7417_supp/pdf/489S12a.pdf>
- "Artificial lung design mimics nature." [Article and interview]. *VA Research Currents*. Sept 2011. < http://www.research.va.gov/resources/pubs/docs/va_research_currents_sept_11.pdf>
- Smock, Doug. "Artificial lung is microfluidics marvel." [Article and interview]. *Design News*. 04 Aug 2011. < http://www.designnews.com/author.asp?section_id=1392&doc_id=231870>
- Potkay, Joseph. Live interview with Randi Kaye. *The Big I. CNN*. 2 August 2011.
- Potkay, Joseph. Interview with Stacy Lipson. *Smart Planet. CBS Interactive*. 27 July 2011. < <http://www.smartplanet.com/blog/rethinking-healthcare/new-artificial-lung-breathes-like-a-real-one/5897>>.
- Potkay, Joseph. Live interview with John Dankowsky. *Where We Live. Connecticut Public Radio*. WNPR, Hartford. 27 July 2011.
- Case Western Reserve University. (2011). Artificial lung mimics real organ's design and efficiency [Press release]. Retrieved from http://www.eurekalert.org/pub_releases/2011-07/cwru-alm072511.php. (This press release was re-published by over 100 online news sites across the world including **CNET, Popular Science, PC World, ZDNet, Gizmag, Slashdot, and Science Daily.**)
- Sheahan, Holly. "No more oxygen for artificial lung." *Chemistry World*. 14 July 2011. < <http://www.rsc.org/chemistryworld/News/2011/July/14071101.asp>>.

INVITED SEMINARS

- **J. A. Potkay**, "Advanced Medical Microsystems for Veteran Health," *Department Colloquium, Electrical Engineering and Computer Science, Case Western Reserve University*, Cleveland, OH, March 30, 2010.
- **J. A. Potkay**, "Next generation, portable artificial lungs using micro- and nano-technologies," *Research Conference of the Division of Pulmonary and Critical Care Medicine*, Case Western Reserve University, Cleveland, OH, Feb. 3, 2010.
- **J. A. Potkay**, "Low power, fast, micro gas chromatography columns," *EECS 438, Case Western Reserve University*, Cleveland, OH, Nov 14, 2006.
- **J. A. Potkay**, "A low power pressure- and temperature-programmed separation system for a micro gas chromatograph," *Cleveland Functional Electrical Stimulation (FES) Center Seminar Series*, Cleveland, OH, June 22, 2006.

PROFESSIONAL ACTIVITIES

- | | |
|--|--------------|
| • Committee Member, Leadership Team, Advanced Platform Technology Center | 2011-present |
| • Grant reviewer, Innovation Incentive Grant, Advanced Platform Technology Center | 2012 |
| • Committee Member, Professional Standards Board, Cleveland VA Medical Center | 2008-2012 |
| • Grant reviewer for R&D Committee, Cleveland VA Medical Center | 2008-present |
| • Participant, Lower Limb Amputee Needs Assessment Workshop, Seattle, WA | October 2007 |
| • Participant, Wheelchair Tutorial by Dr. Richard Simpson, Cleveland VA Medical Center | October 2007 |
| • Technical Reviewer, IEEE Journal of Micro Electro Mechanical Systems (JMEMS) | 2007-present |
| • Technical Reviewer, IEEE Transactions on Biomedical Engineering (TBME) | 2007-present |
| • Technical Reviewer, Sensor Letters | 2008-present |
| • Technical Reviewer, International Journal of Telemedicine and Applications | 2010-present |
| • Technical Reviewer, Lab on a Chip | 2011-present |
| • Technical Reviewer, Biomicrofluidics | 2012-present |
| • Technical Reviewer, Biomedical Microdevices (BMMD) | 2012-present |
| • Technical Reviewer, The Engineering in Medicine and Biology Conference (EMBC) | 2011-present |
| • Technical Reviewer, IEEE Biomedical Circuits and Systems Conference (BioCAS) | 2011 |
| • Technical Reviewer, IEEE Journal on Emerging and Selected Topics in Circuits and Systems | 2011 |
| • Technical Reviewer, Chemical Engineering Research and Design | 2013 |

- Professional Memberships: IEEE, EMBS, ASAIO, EDS

HONORS AND AWARDS

- Interviewed by CNN, Public Radio, Nature Magazine, et al. regarding Artificial Lung Research 2011-2012
- Featured Research Project for September, Veterans Health Administration R&D Web Page 2011
- Presidential Early Career Award for Scientists and Engineers, Cleveland VA RR&D Nominee 2011
- Rehabilitation R&D Career Development Award, Department of Veterans Affairs 2009-2011
- Featured Investigator of the Year, Advanced Platform Technology (APT) Center – A VA Research Center of Excellence, Cleveland, OH 2011
- Best Research Poster Award, Irwin H. Lepow Student Research Day, CWRU 2010
- VA VISN10 Post-Doctoral Fellowship 2006-2008
- Top Reviewer, Journal of Micro Electro Mechanical Systems 2007
- Excellence in Engineering Fellowship Recipient, Sandia National Labs 2004-2006
- Research Fellow, Electrical Engineering Department, U. of Michigan 2000-2006
- Second Place, Design Contest, EECS 598: Analog to Digital Conversion Circuits 2002
- Valedictorian, Computer Engineering, U. of Cincinnati 2000
- Vorheis Scholarship recipient, U. of Cincinnati 1995-2000
- Babcock & Wilcox Scholarship recipient, U. of Cincinnati 1999-2000
- First Place, Senior Project Design Contest, U. of Cincinnati 2000
- Ohio Academic Scholarship recipient 1995
- Honor Societies: TBP, HKN, National Honor Society

MENTORING

- Sareen Shah, CWRU School of Medicine research program, “Instrumented vascular grafts for advanced detection of impending graft failure,” 06/2009-05/2012, Primary mentor.
- Abigail Vinson, CWRU School of Medicine research program, “Testing and biocompatibility of microfabricated artificial lungs,” 06/2010-03/2012.
- Michael Magnetta, CWRU School of Medicine research program, “Construction and gas exchange optimization of a microfabricated artificial lung,” 06/2010-05/2011, Primary mentor.
- Michael Suster, CWRU EECS post-doctoral researcher, “A high frequency dielectric spectroscopy biosensor,” 11/2011-06/2012, Co-mentor (Primary mentor: P. Mohseni).
- Kyle Kovach, M.S., Cleveland VA Medical Center Biomedical Engineer, “Blood compatible surface modifications for microchannel artificial lungs,” 05/2011-present, Primary manager.
- Michael LaBarbera, CWRU EECS Ph.D. student, “Micro- and nano- technologies for portable artificial kidneys,” 05/2012-present, Primary mentor.

VOLUNTEER WORK

- Participant and fundraiser, Cleveland Kidney Walk, 2011, National Kidney Foundation
- Participant, Great Strides – Cleveland Metroparks Zoo, 2011, Cystic Fibrosis Foundation
- Participant, Lake Erie Classic Charity Fishing Tournament to benefit the Cystic Fibrosis Foundation, 2008 - 2012

REFERENCES

1. **Ronald J. Triolo** Case Western Reserve University
Associate Professor of Orthopaedics and Biomedical Engineering
Director, Advanced Platform Technology Center, L. Stokes Cleveland VA Medical Center
 Motion Study Laboratory 151A, 10701 East Blvd, Cleveland, OH 44106
 Phone: (216)791-3800 x4138 • Fax: (216)231-3433 • E-mail: ronald.triolo@case.edu
2. **Kensall D. Wise** University of Michigan
William Gould Dow Distinguished University Professor Electrical Engineering and Computer Science

*J. Reid and Polly Anderson Professor of Manufacturing Technology
Director, NSF Engineering Research Center for Wireless Integrated MicroSystems
2401 EECS Bldg., 1301 Beal Avenue, Ann Arbor, MI 48109-2122
Phone: (734)764-3346 • Fax: (734)763-9324 • E-mail: wise@umich.edu*

3. **Khalil Najafi**

University of Michigan

*Chair, Electrical and Computer Engineering Division, Department of EECS
Arthur F. Thurnau Professor of Electrical Engineering and Computer Science
1301 Beal Avenue, Rm 2402 EECS, Ann Arbor, MI, 48109-2122
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4. **Jeffrey R. Capadona**

Case Western Reserve University

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CITIZENSHIP

United States
