

JOSEPH ALLEN POTKAY, Ph.D.**CONTACT INFORMATION**

Email jpotkay@umich.edu
 Address Research Service (151), 2215 Fuller Rd, Ann Arbor, MI 48105
 Website https://www.researchgate.net/profile/Joseph_Potkay

RESEARCH INTERESTS

Medical microsystems; MEMS; microfluidics; microfabricated artificial organs; microfluidic artificial lungs; implantable sensors; micro gas chromatography devices and systems.

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

2019 - Research Assistant Professor, Department of Surgery, University of Michigan
 2016 - Adjunct Research Investigator, Electrical Engineering, University of Michigan
 2012 - Research Biomedical Engineer, VA Ann Arbor Healthcare System
 2010 - Investigator, Advanced Platform Technology Center – A VA Research Center of Excellence

2017 - 2019 Research Investigator, Department of Surgery, University of Michigan
 2013 - 2017 Adjunct Research Investigator, Department of Surgery, University of Michigan
 2015 - 2016 Visiting Scholar, Electrical Engineering, University of Michigan
 2011 - 2015 Research Assistant Professor, Department of Electrical Engineering and Computer Science, Case Western Reserve University

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

University of Michigan Nov 2013 –
Research Faculty Ann Arbor, MI

- Leading independent research programs in artificial lung technologies and micro gas chromatography systems.
- Managing a multi-disciplinary team consisting of undergraduate, graduate, post-graduate and professional engineers and scientists.
- Collaborating with local physicians and other research professionals in order to successfully advance the aforementioned projects and make them a clinical reality.

VA Ann Arbor Healthcare System July 2012 –
 Advanced Platform Technology Center (APT Center) Ann Arbor, MI
Investigator and Research Biomedical Engineer

- Leading an independent research program in Advanced Medical Microsystems.
- Investigating artificial lung and kidney devices harnessing advantages at the micro and nano scale.
- Managing a multi-disciplinary team consisting of undergraduate, graduate, post-graduate and professional engineers and scientists.
- Collaborating with local physicians and other research professionals in order to successfully advance the aforementioned projects and make them a clinical reality.

Louis Stokes Cleveland Veterans Affairs Medical Center Oct 2006 – Jun 2012
 Advanced Platform Technology Center (APT Center) Cleveland, OH
Investigator and Research Biomedical Engineer

- 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 Sep 2000 – Dec 2006
 Research Assistant / Doctoral Research 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, PCI-X, 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

- A. J. Thompson, S. Buchan, B. Carr, C. Poling, M. Hayes, U. Fernando, A. Kaesler, P. Schlanstein, F. Hesselmann, J. Arens, **J. A. Potkay**, A. Rojas-Pena, R. Bartlett, R. Hirschl, "Low-Resistance, Concentric-Gated Pediatric Artificial Lung for End-Stage Lung Failure", *ASAIO Journal*, Online First, June 6, 2019, doi: 10.1097/MAT.0000000000001018.
- A. J. Thompson, L. J. Ma, T. J. Plegue, **J. A. Potkay**, "Design Analysis and Optimization of a Single Layer PDMS Microfluidic Artificial Lung", *IEEE Transactions on Biomedical Engineering*, Vol. 66, No. 4, pp. 1082-1093, doi: 10.1109/TBME.2018.2866782, April 2019.
- T. J. Plegue, K. Kovach, A. J. Thompson, **J. A. Potkay**, "Stability of Polyethylene Glycol and Zwitterionic Surface Modifications in PDMS Microfluidic Flow Chambers", *Langmuir*, Vol. 34, No. 1, pp. 492-502, 2018, doi: 10.1021/acs.langmuir.7b03095.
- P. Fernando, A. J. Thompson, **J. A. Potkay**, H. Cheriya, J. Toomasian, A. Kaesler, P. Schlanstein, J. Arens, R. Hirschl, J. Bull, R. Bartlett, "A Membrane Lung Design Based on Circular Blood Flow Paths", *ASAIO Journal*, Vol. 63, No. 5, pp. 637-643, 2017, doi: 10.1097/MAT.0000000000000616.
- A. J. Thompson, L. H. Marks, M. J. Goudie, A. Rojas-Pena, H. Handa, **J. A. Potkay**, "A small-scale, rolled-membrane microfluidic artificial lung designed towards future large area manufacturing", *Biomicrofluidics*, Vol. 11, No. 2, 2017, DOI: 10.1063/1.4979676. *Finalist for Best Paper of 2017*.
- M. J. Goudie, E. J. Brisbois, J. Pant, A. Thompson, **J. A. Potkay**, and H. Handa, "Characterization of an S-nitroso-N-acetylpenicillamine-based nitric oxide releasing polymer from a translational perspective", *International Journal of Polymeric Materials and Polymeric Biomaterials*, Vol. 65, No. 15, 2016, pp. 769-778, doi: 10.1080/00914037.2016.1163570.
- J. M. Trahanas, L. J. Witer, F. Alghanem, B. S. Bryner, A. Iyengar, J. R. Hirschl, M. J. Hoenerhoff, **J. A. Potkay**, R. H. Bartlett, A. Rojas-Pena, G. Owens, M. L. Bocks, "Achieving Twelve Hour Normothermic Ex situ Heart Perfusion: An Experience of Forty Porcine Hearts", *ASAIO Journal*, Vol. 62, No. 4, 2016, pp. 470-476, doi: 10.1097/MAT.0000000000000382.

- **J. A. Potkay**, “Reply to the ‘Comment on “The promise of microfluidic artificial lungs”” by G. Wagner, A. Kaesler, U. Steinseifer, T. Schmitz-Rode and J. Arens”, *Lab Chip*, 2016, 16, DOI: 10.1039/C5LC01508A”, *Lab on a Chip*, Vol. 16, 2016, pp. 1274 - 1277.
- K. M. Kovach, M. A. LaBarbera, M. C. Moyer, B. L. Cmolik, E. van Lunteren, A. Sen Gupta, J. R. Capadona, **J. A. Potkay**, “*In Vitro* Evaluation and *In Vivo* Demonstration of a Biomimetic, Hemocompatible, Microfluidic Artificial Lung”, *Lab on a Chip*, Vol. 15, 2015, pp. 1366 - 1375.
- **J. A. Potkay**, “The Promise of Microfluidic Artificial Lungs”, *Lab on a Chip*, Vol. 14, No. 21, 2014, pp. 4122 – 4138.
- 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*, Vol. 102, No. 12, 2014, pp. 4195-205.
- **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. Magnosta, 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.
- **J. A. Potkay**, “Long term, implantable blood pressure monitoring systems,” *Biomedical Microdevices*, Vol. 10, No. 3, June 2008, pp. 379-392.
- **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.
- 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.
- 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.
- 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.

CONFERENCE PUBLICATIONS

- C. Zhan, M. Akbar, R. Hower, J. Wang, N. Nuñovero, **J. Potkay**, E. Zellers, “Integrated multi-vapor micro collector-injector (μ COIN) for μ GC”, *Solid-State Sensors, Actuators and Microsystems Conference (Transducers)*, June 2019.
- M. Akbar, N. Nuñovero, R. Hower, C. Zhan, **J. Potkay**, E. Zellers, “A Micro Collector Injector (μ COIN) for μ GC Systems,” *Technical Digest, 2018 Solid-State Sensors, Actuators & Microsystems Workshop*, Hilton Head , SC, June 3-7, 2018, pp. 291-294. (Poster acceptance rate: 65 out of 133 submissions)
- S. Majerus, H. Chong, D. Ariando, J. Lerchbacker, **J. A. Potkay**, K. M. Bogie, C. Zorman, “Vascular graft pressure-flow monitoring using 3D printed MWCNT-PDMS strain sensors” *Technical Digest for 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Honolulu, HI, USA, July 17-21, 2018.
- J. Wang, Changhua Zhan, E. T. Zellers, **J. A. Potkay**, “Micro vapor extractor for on-site determinations of volatile organic compounds in water and biofluids,” *Technical Digest of the 19th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2017)*, Kaohsiung, Taiwan, June 2017, pp. 668-671. **Oral presentation.** (Oral acceptance rate: 204 out of 938 submissions)
- S. Majerus, J. Dunning, **J. A. Potkay**, K. M. Bogie, “Flexible, structured MWCNT/PDMS sensor for chronic vascular access monitoring” *2016 IEEE Sensors Conference*, Orlando, FL, Oct 30 – Nov 2, 2016. **Oral presentation.**
- 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)
- 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.
- **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.
- 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. A. 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

- A. J. Thompson, L. Ma, M. Jeakle, T. Major, **J. A. Potkay**, "Assessing Hemocompatibility of a Small-Scale Microfluidic Artificial Lung," *ASAIO 2019 Annual Meeting Abstracts*, *ASAIO Journal*: May/June 2019 – Volume 65 – p 1-147, doi: 10.1097/MAT.0000000000001007, *oral*.

- A. Thompson, S. Buchan, B. Carr, P. Fernando, A. Kaesler, P. Schlanstein, F. Hesselmann, J. Arens, **J. Potkay**, A. Rojas-Pena, R. Bartlett, R. Hirschl, "Development of a Pumpless Artificial Lung for Pediatric and Neonatal End Stage Lung Failure", ASAIO 2019 Annual Meeting Abstracts, ASAIO Journal: May/June 2019 – Volume 65 – p 1-147, doi: 10.1097/MAT.0000000000001007, *oral*.
- L. Ma, A. Thompson, **J. Potkay**, "Determining the Influence of Channel Height on Clotting in Microfluidic Artificial Lungs," Microfluidics in Biomedical Sciences Training Program Annual Symposium, Ann Arbor, MI, May 2019, *poster*.
- R. Hower, C. Zhan, M. Akbar, J. Wang, **J. Potkay**, E. Zellers, "Integrated Micro Collector-Injector (μ COIN) for μ GC Systems," Microfluidics in Biomedical Sciences Training Program Annual Symposium, Ann Arbor, MI, May 2019, *oral*.
- A. Thompson, S. Buchan, B. Carr, P. Fernando, A. Kaesler, P. Schlanstein, F. Hesselmann, J. Arens, **J. Potkay**, J. Toomasian, A. Rojas-Pena, R. Bartlett, R. Hirschl, "Modeling And Optimization Of A Pediatric Artificial Lung Based On Circular Blood Flow Paths", ASAIO 64th Annual Conference, Washington, DC, June 13-16, 2018.
- E. Abada, D. Sarode, Z. Iqbal, **J. Potkay**, S. Roy, "Investigation Of Polyethylene Glycol (PEG) Coatings On Polydimethylsiloxane (PDMS) For Membrane Oxygenator Applications", ASAIO 64th Annual Conference, Washington, DC, June 13-16, 2018.
- C. Zhan, M. Akbar, N. Nuñovero, L. Zhong, R. Hower, **J. Potkay**, E.T. Zellers, "Microfabricated passive preconcentrator for microscale gas chromatographic VOC analysis", Pittsburgh Conference & Exposition, Orlando, FL, Feb 21 – Mar 1 2018.
- C. Zhan, M. Akbar, N. Nuñovero, L. Zhong, R. Hower, **J. Potkay**, E.T. Zellers, "Passive micro-sampler with facilitated on-site analysis for multi-vapor worker exposure monitoring", EHS Symposium, University of Michigan, Ann Arbor, Spring 2018.
- D. Romary, A. J. Thompson, K. Forbes, A. Prater, P. Yerramill, T. Johnson, W. Lynch, R. Hirschl, R. Bartlett, **J. A. Potkay**, A. Rojas-Pena, "Ovine Testing of Servo-Controlled Lung Assist Device for Chronic Lung Disease," 28th Annual ELSO Conference, Baltimore, MD, September 2017, *poster presentation*.
- C. Zhan, M. Akbar, N. Nuñovero, L. Zhong, R. Hower, **J. Potkay**, E.T. Zellers, "Microfabricated Passive Preconcentrator for Microscale Gas Chromatograph Systems", Wireless Integrated MicroSensing and Systems (WIMS2), University of Michigan, Ann Arbor, Fall 2017.
- M. Akbar, N. Nunovero, R. Hower, **J. Potkay** and E. T. Zellers "A micro progressively heated injector (μ PHI) for enhanced μ GC performance," Wireless Integrated MicroSensing and Systems (WIMS2), University of Michigan, Ann Arbor, Fall 2017.
- A. J. Thompson, P. Fernando, T. Johnson, M. H. Song, J. Toomasian, A. Rojas-Pena, R. H. Bartlett, **J. A. Potkay**, "Servo Regulation of Artificial Lung Sweep Gas to Meet Patient Metabolic Needs," ASAIO 63rd Annual Conference, Chicago, IL, June 21-24, 2017, *oral presentation*.
- L. J. Ma, A. J. Thompson, **J. A. Potkay**, "Optimization of a Small Scale, PDMS Microfluidic Artificial Lung," ASAIO 63rd Annual Conference, Chicago, IL, June 21-24, 2017, *oral presentation*.
- T. J. Plegue, K. Kovach, A. J. Thompson, **J. A. Potkay**, "Stability of PEG and Zwitterionic Surface Modifications on PDMS," ASAIO 63rd Annual Conference, Chicago, IL, June 21-24, 2017, *poster presentation*.
- R. Ukita, **J. A. Potkay**, K. E. Cook, "The Advancing Front Model is Effective at Modeling Oxygen Transfer for Microchannel Artificial Lungs," ASAIO 63rd Annual Conference, Chicago, IL, June 21-24, 2017, *poster presentation*.
- M. Goudie, E. Brisbois, J. Pant, A. Thompson, **J. Potkay**, H. Handa, "Sterilization, Storage Stability, Physical and Biological Properties of an S-nitroso-N-acetylpenicillamine-Based Nitric Oxide Releasing Polymer", BMES 2016, Minneapolis, MN, Oct. 5-8, 2016, *poster presentation*.
- A. Thompson, M. Goudie, H. Handa, A. Rojas-Pena, **J. A. Potkay**, "Rolled Construction and Scalable Design of Cylindrical Microfluidic Artificial Lungs," ASAIO 2016, San Francisco, CA, June 15-18, 2016, *oral presentation*.
- A. Thompson, M. Goudie, H. Handa, A. Rojas-Pena, **J. A. Potkay**, "Scalable Design and Rolling Fabrication of Cylindrical Microfluidic Artificial Lungs," Wireless Integrated MicroSensing and Systems (WIMS²) Industrial Advisory Board Meeting, Ann Arbor, MI, May 18, 2016, *poster presentation*.

- A. Thompson, M. Goudie, H. Handa, A. Rojas-Pena, **J. A. Potkay**, “Scalable Design and Rolling Fabrication of Cylindrical Microfluidic Artificial Lungs,” Microfluidics in Biomedical Sciences Training Program Annual Symposium, Ann Arbor, MI, May 4, 2016, *poster presentation*.
- J. Wang, **J. Potkay**, E. T. Zellers, “Microfabricated Vapor Extractor (μ VE) for Aqueous Volatile Organic Compounds (VOCs) Analysis by Micro-GC”, Microfluidics in Biomedical Sciences Training Program Annual Symposium, Ann Arbor, MI, May 2016.
- J. Wang, **J. Potkay**, E. T. Zellers, “Micro-Scale Vapor Extractor for Micro-GC Analysis of VOCs in Aqueous Phase”, Poster Session, UM COHSE Research Symposium, Ann Arbor, MI, March 2016.
- J. Wang, **J. A. Potkay**, and E. T. Zellers, “Micro-Scale Vapor Extractor for Micro-GC Analysis of VOCs in Biofluids,” PITTCON 2016, Atlanta, GA, March 6-10, 2016.
- J. Wang, **J. Potkay**, E.T. Zellers, “Microfabricated Vapor Extractor Chip for Micro-Scale Gas Chromatographic Analysis of VOCs in Water and Biofluids”, Oral Presentation, ANACHEM/SAS Symposium, Livonia, MI, November, 2015.
- J. Wang, **J. Potkay**, E.T. Zellers. “A Micro-Scale Vapor Extractor (μ VE) for μ GC Analysis of VOCs in Aqueous Media” Poster Session, The Karle Symposium, Ann Arbor, MI, August, 2015.
- J. Wang, E.T. Zellers, **J. Potkay**, “A Micro-Scale Vapor Extractor (μ VE) for μ GC Analysis of VOCs in Water and Biofluids” Poster Session, Center for Wireless Integrated MicroSensing & Systems, University of Michigan, Ann Arbor, MI, May, 2015.
- 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 - ACTIVE

- “Automated control of artificial lung systems to meet patient metabolic needs”, VA RR&D Merit, 11/1/19 – 10/31/22, \$900,000 total direct costs, **Principal Investigator**.
- “Human-scale microfluidic artificial lung for Veteran rehabilitation”, VA Technology Transfer Office Assistance Program Grant, 5/1/2019 – 9/30/20, \$117,800 direct costs, **Principal Investigator**.
- “Human-scale microfluidic artificial lung”, NIH NHLBI R01, 2/15/2019 – 1/31/23, \$2,662,580 total costs, **Principal Investigator**.

- “A Wearable CO₂ Removal Device for Veteran Rehabilitation from Lung Disease”, VA RR&D SPIRE, 4/1/18 – 3/31/20, \$200,000 total direct costs, **Co-Investigator**.
- “Portable CO₂ servoregulation system for membrane lungs”, NIH R21, 4/1/2018 – 3/31/2020, \$275,000 total direct costs, **Principal Investigator**.
- “Pediatric Implantable Artificial Lung”, NIH R01 SNAP Grant, 9/1/2017 – 5/31/2022, \$2,491,848 total direct costs, PI: Hirschl, **Co-Investigator**.
- “Toward 3D Printed Microfluidic Artificial Lungs for Veteran Rehabilitation”, Rehabilitation R&D SPIRE, Department of Veterans Affairs, 7/1/2017 – 9/30/2020, \$199,959 total direct costs, **Principal Investigator**.
- “Advanced Microscale Collector-Injector (μCOIN)”, Subaward from ODNI-IARPA through SRI International, 8/1/2019 – 07/31/2021, \$1,699,997 total costs, **Co-Principal Investigator**.
- “Advanced Platform Technology Center of Excellence”, VA RR&D Center of Excellence, 3/1/2015 – 2/28/2020, \$500,000 per year direct costs, PI: Triolo, **Investigator**.

RESEARCH GRANTS - COMPLETED

- “Wireless graft patency monitoring using PDMS-based flexible pulsation sensors”, VA VISN 10 SPARK Grant, 7/1/2017 – 6/30/2018, \$20,000, **Co-Investigator**.
- “Microscale Collector-Injector (μCOIN)”, IARPA-Wide Research (Seedlings) Grant, 2/1/2017 – 10/31/2018, \$1,473,000 total costs, **Co-Principal Investigator**.
- “Toward portable microchannel artificial lungs for veteran rehabilitation”, Rehabilitation R&D Merit Review Award, Department of Veterans Affairs, 4/1/2015 – 9/31/2018, \$824,944, **Principal Investigator**.
- “Passive Micro-Sampler with Facilitated On-Site Analysis for Multi-Vapor Worker Exposure Monitoring”, 2016 University of Michigan Center for Occupational Health & Safety Engineering (COHSE) NIOSH Pilot Project Research Training Program (PPRT), 7/1/2016 – 6/30/2017, \$17,200, **Co-Principal Investigator**.
- “Wireless graft patency monitoring using PDMS-based flexible pulsation sensors”, Innovation Incentive Award, Advanced Platform Technology Center, Department of Veterans Affairs, 10/1/2015 – 9/30/2016, \$12,000, **Co-Investigator**.
- “Microsystem Technology for On-Site Biological Monitoring of Occupational VOC Exposures”, 2014 University of Michigan Center for Occupational Health & Safety Engineering (COHSE) NIOSH Pilot Project Research Training Program (PPRT), 7/1/2014 – 6/30/2015, \$19,983, **Principal Investigator**.
- “A Universal MEMS Interface for μGC Analysis of Volatile Water Contaminants and Disease Biomarkers”, 2014 University of Michigan WIMS² Seedling Program, 6/1/2014 – 9/31/2015, \$27,000, **Principal Investigator**.
- “Ex vivo Characterization of a Microfabricated Artificial Lung”, Rehabilitation R&D Merit Review Award, Department of Veterans Affairs, 4/1/2011 – 3/31/2014, \$828,635, **Principal Investigator**.
- “Nanoporous Polymer Membranes for Portable Artificial Kidneys”, VISN 10 Research Initiative Program, Department of Veterans Affairs, 9/1/2011 – 8/31/2012, \$10,000, **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, \$25,000, **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, \$193,600, **Principal Investigator**.
- “A High Efficiency, Micromachined Artificial Lung,” VISN 10 Research Initiative Program, Department of Veterans Affairs, 10/1/2007 – 9/30/2008, \$10,000, **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, \$73,415, **Co-Investigator and author**.

RESEARCH COLLABORATORS

- Robert Bartlett, M.D., Professor Emeritus, Surgery, University of Michigan
- Edward Zellers, Ph.D., Professor, Environmental Health Sciences and Chemistry, University of Michigan
- Alvaro Rojas-Pena, M.D., Research Investigator, Surgery, University of Michigan
- Ronald Hirschl, M.D., Professor, Pediatric Surgery, University of Michigan

- Michael Holinstat, Ph.D., Associate Professor, Pharmacology, University of Michigan
- Hitesh Handa, Ph.D., Assistant Professor, Engineering, University of Georgia
- Steve Majerus, Ph.D., Research Investigator, Louis Stokes Cleveland VA Medical Center
- Kath Bogie, Ph.D., Research Scientist, Louis Stokes Cleveland VA Medical Center
- Anirban Sen Gupta, Ph.D., Associate Professor of Biomedical Engineering, Case Western Reserve University
- Jeffrey Capadona, Ph.D., Associate Professor of Biomedical Engineering, Case Western Reserve University
- Keith Cook, Ph.D., Associate Professor, Biomedical Engineering, Carnegie Mellon
- Brian Cmolik, M.D., Section Chief of Cardio Thoracic Surgery, L. Stokes Cleveland VA Medical Center
- Erik van Lunteren, M.D., Pulmonary Physician, L. Stokes Cleveland VA Medical Center

IN THE NEWS

- Payley, Tyler. WTOL Channel 11 in Toledo news story: "Doctor at Ann Arbor VA hospital developing 3-D printed lungs for veterans," 21 Nov 2018.
- Richman, Mike. "Breathing easier: Researchers strive to make 3D-printed artificial lung to help Vets with respiratory disease." VA Research Currents, August 2018. <<https://www.research.va.gov/currents/0818-Researchers-strive-to-make-3D-printed-artificial-lung-to-help-Vets-with-respiratory-disease.cfm>> (This story was republished on various news sites including 3dprint.com, 3dprintingindustry.com, COPD News Today, and DOTMed.com)
- Jackson, Beau. "Veterans Affairs investigates healing potential of 3D printed lungs." 3D Printing Industry, August 2018. <<https://3dprintingindustry.com/news/veterans-affairs-investigates-healing-potential-of-3d-printed-lungs-137996/>>
- Saunders, Sarah. "Veterans Affairs Researchers Developing 3D Printed Artificial Lung to Help Treat COPD." 3DPrint.com, August 2018. <<https://3dprint.com/222212/va-3d-printed-artificial-lung/>>
- Wilson, Clare. "Artificial lungs in a backpack may free people with lung failure." *New Scientist*. March 2017. <<https://www.newscientist.com/article/2125422-artificial-lungs-in-a-backpack-may-free-people-with-lung-failure/>>
- 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>>.

PATENTS

- **J. A. Potkay**, A. Rojas-Pena, R. Bartlett, "Smart artificial lung and perfusion systems", PCT Patent Application PCT/US2019/037675, Filed June 18, 2019.
- **J. A. Potkay**, A. Rojas-Pena, R. Bartlett, "Smart artificial lung and perfusion systems", U.S. Provisional Patent Application 62/687,456, Filed June 20, 2018.

- **J. A. Potkay**, “Microfluidic diffusion devices, and methods of manufacturing and using same” U.S. Patent Application 32238303, Filed April 3, 2018.
- S. Majerus, J. Dunning, K. Bogie, **J. Potkay**, “Flexible, Structured MWCNT/PDMS Sensor for Chronic Vascular Access Monitoring”, U.S. Provisional Patent Application No. 62/572,279, October 13, 2017.
- **J. A. Potkay**, “Microfluid Artificial Lung,” U.S. Provisional Application No. 62/480,809, April 19, 2017.
- **J. A. Potkay**, “In Situ Energy Harvesting Systems for Implanted Medical Devices,” U.S. Provisional Application No. 61/170,102, April 16, 2009.
- K. D. Wise and **J. A. Potkay**, “Thermopneumatic Microvalve,” U.S. Patent 7,192,001, Mar 20, 2007.
- K. D. Wise, R. D. Sacks, K. T. Beach, **J. A. Potkay**, and M. Agah, “Separation Microcolumn Assembly for a Microgas Chromatograph and the Like,” U.S. Patent 6,838,640, Jan 4, 2005.

INVENTION DISCLOSURES

- **J. A. Potkay**, A. Rojas Pena, R. Bartlett, “Smart artificial lung and perfusion systems,” University of Michigan Office of Technology Transfer Invention #2018-289, Feb 13, 2018.
- S. Majerus, K. Bogie, **J. A. Potkay**, “Flexible pulsation sensor,” VHA Invention # 2017-023, Feb 2, 2017.
- **J. A. Potkay**, E. Zellers, “Microscale Collector-Injector (uCOIN) Technologies for Passive Environmental Vapor Sampling”, University of Michigan Office of Technology Transfer Invention #7372, Feb 1, 2017.
- **J. A. Potkay**, “3D printed microfluidic artificial lung,” VHA Invention # 2016-117, May 3, 2016.
- **J. A. Potkay** and E. Zellers, “A microsystem to extract volatile compounds from liquid media,” University of Michigan Invention # 6260, May 30, 2014.
- **J. A. Potkay**, “Manufacturing technology to create large area microfluidic devices,” VHA Invention 2014-274, Sept 15, 2014.
- **J. A. Potkay** and J. R. Capdona, “Nanoporous polymer membrane based on polymer-nanocomposite technology,” VHA Invention #12-262, June 7, 2012.
- **J. A. Potkay**, “Highly integrated multi-layer microfluidics,” VHA Invention #12-189, Feb. 27, 2012.
- **J. A. Potkay**, “A method to simply and efficiently improve the mechanical biocompatibility of microfluidic channels,” VHA Invention #12-188, Feb. 27, 2012.
- **J. A. Potkay**, Ronald J. Triolo, and Gilles Pinault, “Smart, instrumented vascular grafts,” Submitted to VHA, June 29, 2009.
- **J. A. Potkay**, “An implantable, pressure-based, hybrid energy harvesting microsystem,” VHA Invention #09-106, Aug 14, 2009.
- **J. A. Potkay**, “A high-efficiency, micromachined artificial lung,” VHA Invention #07-134, July 12, 2007.
- **J. A. Potkay**, “Miniature, Flexible, Biocompatible Sensor Arrays,” VHA Invention #07-133, July 12, 2007.
- **J. A. Potkay**, “A Miniature, Flexible, Arterial Cuff for Implantable Power Generation,” VHA Invention #08-080, Apr. 8, 2008.

INVITED TALKS/SEMINARS

- **J. A. Potkay**, “Recent Advancements in Microfluidic Artificial Lungs,” *ASAIO 65th Annual Conference*, San Francisco, CA, June 26-29, 2019.
- **J. A. Potkay**, “Recent Advancements in Microfluidic Artificial Lungs,” *FY2019 Enhancing Transplant Care for Veterans Conference*, VA National Surgery Office, Salt Lake City, UT, Feb 6-7, 2019.
- **J. A. Potkay**, “Next Generation Artificial Lungs using Microfluidic Technology,” *VA Research Week, VA Ann Arbor Healthcare System*, Ann Arbor, MI, May 19, 2016.
- **J. A. Potkay**, “The Promise of Microchannel Artificial Lungs,” *VA Research Week, VA Ann Arbor Healthcare System*, Ann Arbor, MI, May 21, 2015.
- **J. A. Potkay**, “Artificial Lungs: An Engineering Perspective,” *UM ECLS Research Seminar Series*, Ann Arbor, MI, Feb 2015.
- **J. A. Potkay**, “A Universal MEMS Interface for μ GC Analysis of Volatile Water Contaminants and Disease Biomarkers,” *WIMS2 Industrial Advisory Board Meeting, University of Michigan*, Ann Arbor, MI, May 6, 2015.

- **J. A. Potkay**, “The Promise of Microchannel Artificial Lungs,” *Microfluidics in Biomedical Sciences Training Program Seminar Series, University of Michigan, Ann Arbor, MI, January 13, 2014.*
- **J. A. Potkay**, “Advanced Medical Microsystems for Veteran Health,” *Advanced Medical Microsystems for Veteran Health, 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

- | | |
|--|-------------------|
| • Editorial Board Member, ASAIO Journal | July 2019-present |
| • Research and Development Committee Member, VA Ann Arbor Healthcare System | 2015-present |
| • Committee Member, Leadership Team, Advanced Platform Technology Center | 2011-present |
| • Conference Editorial Board, The Engineering in Medicine and Biology Conference (EMBC) | 2011-present |
| • Technical Reviewer on Technical Program Committee, IEEE Sensors 2017 Conference | 2017 |
| • Technical Program Committee, Transducers 2017 Conference | 2017 |
| • Grant reviewer, NIH Bioengineering R15 Academic Research Enhancement Award | July 2016 |
| • Grant reviewer, VA RRDS, Small Projects in Rehabilitation Research | Spring, Fall 2015 |
| • Grant reviewer, Innovation Incentive Grant, VA Advanced Platform Technology Center | 2012, 2014 |
| • Committee Member, Professional Standards Board, Cleveland VA Medical Center | 2008-2012 |
| • Grant reviewer for R&D Committee, Cleveland VA Medical Center | 2008-2012 |
| • 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, Journal of Membrane Science | 2019 |
| • Technical Reviewer, Sensors and Actuators B: Chemical | 2018-present |
| • Technical Reviewer, ASAIO Journal | 2017-present |
| • Technical Reviewer, Colloids and Surfaces A: Physicochemical and Engineering Aspects | 2018 |
| • Technical Reviewer, IEEE EMBS Micro and Nanotechnology in Medicine Conference | 2014 |
| • Technical Reviewer, Analyst | 2014, 2018 |
| • 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 |
| • Technical Reviewer, International Journal of Telemedicine and Applications | 2010 |
| • Technical Reviewer, Lab on a Chip | 2011-present |
| • Technical Reviewer, Biomicrofluidics | 2012-present |
| • Technical Reviewer, Biomedical Microdevices (BMMD) | 2009-present |
| • Technical Reviewer, Micromachines | 2015 |
| • Technical Reviewer, ACS Applied Materials & Interfaces | 2015 |
| • 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, ELSO | |

HONORS AND AWARDS

- Mentioned by name as an inspiring VA employee for my 3D printed artificial lung work by the Secretary of Veterans Affairs, Dr. Robert Wilkie, during his annual State of the Department of Veterans Affairs address to the U.S. Senate: https://www.va.gov/opa/speeches/2018/09_26_2018.asp Sept 2018
- Promoted to Senior Member of IEEE 2018
- Finalist for Best Paper Award of 2017, *Biomicrofluidics* 2018
- Artificial lung work listed as one of seven notable research accomplishments in VA history by VA Chief of Staff in a VA-wide email Nov 2015
- Best Research Poster, Wireless Integrated Microsensing & Systems (WIMS2) Spring IAB Meeting 2015
- 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

- Phil Spannagel, Undergraduate researcher, “Portable CO2 servoregulation system for membrane lungs,” 07/2019-present, Primary mentor.
- Mandy Mai, Undergraduate researcher, “Construction of rolled-membrane microfluidic artificial lungs,” 09/2019-present, Primary mentor.
- Emma Denatale, Undergraduate researcher, “3D printed microfluidic artificial lungs,” 09/2019-present, Primary mentor.
- Navid Shaikh, M.S. Engineer, “Portable CO2 servoregulation system for membrane lungs,” 07/2019-present, Primary mentor.
- Brandon Nikpreljevic, Undergraduate researcher, “Portable CO2 servoregulation system for membrane lungs,” 05/2019-present, Primary mentor.
- Alec Sunshine, Undergraduate researcher, “3D printed microfluidic artificial lungs,” 04/2019-present, Primary mentor.
- Elyse Fleck, Graduate researcher, “3D printed microfluidic artificial lungs,” 02/2019-present, Primary mentor.
- Alexandra McCann, Undergraduate researcher, “3D printed microfluidic artificial lungs,” 01/2019-05/2019, Primary mentor.
- Michael Dedecker, Undergraduate researcher, “Micro-milled microfluidics,” 10/2018-present, Primary mentor.
- Lauren Wich, Undergraduate researcher, “A water vapor condenser for an artificial lung control system,” 10/2018-05/2019, Primary mentor.
- Andrea Vallenilla, Undergraduate researcher, “A control system for a wearable artificial lung,” 10/2018-05/2019, Primary mentor.

- Evon Ereifej, PhD, VA RR&D Career Development Award Level II recipient, “Mimicking the Architecture and Modulus of Native Brain Tissue onto Neural Implants to Improve Biocompatibility”, 7/2018-present, CDA Mentor.
- Nicholas Nunu, Undergraduate researcher, “Construction of rolled-membrane microfluidic artificial lungs,” 09/2017-present, Primary mentor.
- Lindsay Ma, Undergraduate researcher, “Biologic considerations for microfluidic artificial lungs,” 08/2016-present, Primary mentor.
- Alex Thompson, Post-doctoral researcher, “Toward portable microfluidic artificial lungs for pulmonary rehabilitation,” 07/2015-present, Primary mentor.
- Junqi Wang, University of Michigan Chemistry Ph.D. student, “Design and testing of a microsystem to extract volatile compounds from liquid media,” 06/2014-present, Co-mentor (Primary mentor: E. Zellers) & dissertation committee member.
- Changhua Zhan, University of Michigan Chemistry Ph.D. student, “Fabrication of a Microsystem Technology for On-Site Biological Monitoring of Occupational VOC Exposures,” 09/2014-present, Co-mentor (Primary mentor: E. Zellers) & dissertation committee member.
- Kennedy Rogers, Undergraduate researcher, “Improving the biocompatibility of microfluidic artificial lungs,” 10/2018-01/2019, Primary mentor.
- Muhammad Akbar, University of Michigan Post-Doctoral Fellow, “A micro progressively heated injector for micro gas chromatography (μ GC) systems,” 04/2017-11/2018, Co-mentor (Primary mentor: E. Zellers).
- Ahmed Abbas, Undergraduate researcher, “Design an advanced water trap for a CO₂ servoregulation system for membrane lungs,” 09/2017-06/2018, Primary mentor.
- Patrick Roach, Undergraduate researcher, “Toward 3D printed micro gas chromatography columns,” 09/2017-08/2018, Primary mentor.
- Nicolás Nuñovero, University of Michigan Technician, “A control system for a μ GC collector injector technology,” 02/2017-08/2018, Co-mentor (Primary mentor: E. Zellers).
- Ashley Hilyard, Undergraduate researcher, “Hemocompatibility testing of microfluidic artificial lungs,” 09/2017-05/2018, Primary mentor.
- Marcus Goudie, Ph.D. student – University of Georgia, “Synergistic effect of nitric oxide release and protein resistant coating on hemocompatibility of microfluidic artificial lungs,” 07/2014-09/2017, Co-mentor (Primary mentor – H. Handa).
- Thomas Plegue, Undergraduate researcher, “Protein resistant PEG and zwitterion surface coatings for PDMS,” 06/2016-07/2017, Primary mentor.
- Lexuan Zhong, University of Michigan Post-Doctoral Fellow, “Adsorbents for a μ GC collector injector technology,” 02/2017-07/2017, Co-mentor (Primary mentor: E. Zellers).
- Mitchell Huffman, Undergraduate researcher, “Toward 3D printed micro gas chromatography systems,” 10/2016-05/2017, Primary mentor.
- Lucas Marks, Undergraduate researcher, “Laser machining for large area microfluidic networks,” 06/2016-02/2017, Primary mentor.
- Luana Silva, Undergraduate researcher, “A simple feedback control system for an artificial lung,” 10/2016-12/2016, Primary mentor.
- Kyle Kovach, M.S., Cleveland VA Medical Center Biomedical Engineer, “Blood compatible surface modifications for microchannel artificial lungs,” 05/2011-10/2014, Primary manager.
- Michael LaBarbera, CWRU EECS Ph.D. student, “Micro- and nano- technologies for portable artificial kidneys,” 05/2012-07/2014, 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).
- Michael Magnetta, CWRU School of Medicine research program, “Construction and gas exchange optimization of a microfabricated artificial lung,” 06/2010-05/2011, Primary mentor.
- Abigail Vinson, CWRU School of Medicine research program, “Testing and biocompatibility of microfabricated artificial lungs,” 06/2010-03/2012.
- Sareen Shah, CWRU School of Medicine research program, “Instrumented vascular grafts for advanced detection of impending graft failure,” 06/2009-05/2012, 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 - present

REFERENCES

1. **William (Rick) Weitzel, MD** VA Ann Arbor Healthcare System
Acting Chief of Staff, VA Medical Center
Professor, Nephrology, Internal Medicine, University of Michigan
Research (151), VA Ann Arbor Healthcare System, 2215 Fuller Rd, Ann Arbor, MI 48105
Phone: (734)222-7562 • Fax: (734)845-3241 • E-mail: weitzel@med.umich.edu
2. **Edward (Ted) Zellers, PhD** University of Michigan
Professor of Environmental Health Sciences and Chemistry
University of Michigan, Room M6543 SPH II, 1415 Washington Heights, Ann Arbor, MI 48109-2029
Phone: (734)936-0766 • Fax: (734)763-8297 • E-mail: ezellers@umich.edu
3. **Robert H. Bartlett, MD** University of Michigan
Professor of Surgery Emeritus & Extracorporeal Life Support Laboratory Director
MSRB II Room B560, 1150 W. Medical Center Dr, Ann Arbor, MI 48109
Phone: (734)615-5357 • Fax: (734)615-4220 • E-mail: robbar@med.umich.edu
4. **Alvaro Rojas-Pena, MD** University of Michigan
Assistant Research Scientist of Surgery & Extracorporeal Life Support Laboratory Manager
MSRB II Room B560, 1150 W. Medical Center Dr, Ann Arbor, MI 48109
Phone: (734)615-5357 • Fax: (734)615-4220 • E-mail: alvaror@med.umich.edu
5. **Kensall D. Wise, PhD** University of Michigan
Professor Emeritus, Electrical Engineering and Computer Science
William Gould Dow Distinguished University Professor Emeritus
2402 EECS Bldg., 1301 Beal Avenue, Ann Arbor, MI 48109-2122
Phone: (734)764-3346 • Fax: (734)763-9324 • E-mail: wise@umich.edu
6. **Ronald J. Triolo, PhD** Case Western Reserve University
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

CITIZENSHIP

United States