

IGOR PAPROTNY

851 S. Morgan M/C 154
1115 SEO
Chicago, IL. 60607
USA

phone: (312) 996 1924
fax: (312) 996 6465
email: paprotny@uic.edu

- | | | |
|-------------------------------|--|------------------------|
| Assistant Professor | University of Illinois, Chicago
Dept. of Electrical and Computer Engineering | Jul. 2013 – current |
| Scientist and Lecturer | University of California, Berkeley
Berkeley Sensor & Actuator Center,
Center for Information Technology Science in the Interest of Society,
Berkeley i ⁴ Energy Center, Lawrence Berkeley National Laboratory (Affiliate Scientist) | Oct. 2011 – Jul. 2013 |
| PostDoc | University of California, Berkeley
Berkeley Sensor and Actuator Center (BSAC),
Center for Information Technology Science in the Interest of Society (CITRIS) | Oct. 2008 – Sep. 2011 |
| Ph.D. | Dartmouth College (part time in res. at Duke University)
Department of Computer Science | Sept. 2001 – Aug. 2008 |
| | PhD Thesis: Design, Fabrication and Control of Multi-microbotic Systems for Microassembly | |
| MS | Arizona State University
Department of Industrial Engineering | Jan. 1999 – May 2001 |
| | Ms. Thesis: A Methodology for Synthesizing Distributed Embodiment in Homogenous Multi-agent Systems (2001 IIE National Research Award) | |
| BS | Arizona State University
Department of Industrial Engineering
(Suma Cum Laude) | Aug. 1996 – Dec. 1998 |
| Dipl. Eng. | NKI College of Engineering, Norway
Mechatronics | Aug. 1992 – May 1995 |

Publications

Books

I. Paprotny and S. Bergbreiter Eds. "Small-Scale Robotics. From Nano-to-Millimeter-Sized Robotic Systems and Applications." in **Lecture Notes in Computer Science: State-of-the-Art Survey**, Springer Verlag, 2014

Journals and Book Chapters

O. Mahdavi-pour; A. Jain; J. Sabino; P. Wright; R. M. White; M. R. Shahan; C. E. Seaman; L. D. Patts; I. Paprotny, "Opto-Dielectrometric Sensor for Measuring Total Incombustible Content in Underground Coal Mines," in **IEEE Sensors Journal**, in press, doi: 10.1109/JSEN.2017.2740947

R. Majumdar and I. Paprotny, "Configurable Post-Release Stress-Engineering of Surface Micro-Machined MEMS Structures," in **Journal of Microelectromechanical Systems (J.MEMS)**, 2017 26(3), pp: 671-678. DOI: 10.1109/JMEMS.2017.2689679

M. T. Humayun, M. Sainato, R. Divan, R. A. Rosenberg, A. Sahagun, L. Gundel, Paul A. Solomon and I. Paprotny. "Effects of O₂ plasma and UV-O₃ assisted surface activation on high sensitivity metal oxide functionalized multiwalled carbon nanotube CH₄ sensors," **Journal of Vacuum Science & Technology A: Vacuum, Surfaces, and Films** 35, 061402 (2017); doi: <http://dx.doi.org/10.1116/1.4993579>

M. T. Humayun, R. Divan, L. Stan, D. Rosenmann, D. Gosztola, L. Gundel, P. A. Solomon, and I. Paprotny. "Ubiquitous Low-cost Functionalized Multi-Walled Carbon Nanotube Sensors for Distributed Methane Leak Detection," **IEEE Sensors J.**, 16(24), 2016: 8692-9, 8692-9, 10.1109/JSEN.2016.2581832.

M. T. Humayun, R. Divan, Y. Liu, L. Gundel, P. A. Solomon, and I. Paprotny "Novel chemoresistive CH₄ sensor with 10 ppm sensitivity based on multi-walled carbon nanotubes (MWCNTs) functionalized with SnO₂ nanocrystals," **Journal of Vacuum Science and Technology A (JVST A)**, 34, 01A131, 2016, DOI:<http://dx.doi.org/10.1116/1.4936384>

L. M. Miller, A. D. T. Elliott, P. D. Mitcheson, E. Halvorsen, I. Paprotny, and P. K. Wright. "Maximum Effectiveness of Piezoelectric Energy Harvesters When Coupled to Interface Circuits," **IEEE Sensors J.**, 16(12), pp. 4803 – 4815, 2016. (**among top 50 downloads – IEEE Sensors J., November 2017**)

M. T. Humayun, R. Divan, L. Stan, A. Gupta, D. Rosenmann, L. Gundel, P. A. Solomon, and I. Paprotny, "ZnO Functionalization of Multi-walled Carbon Nanotubes for Methane Sensing at Single PPM Concentration Levels," **Journal of Vacuum Science and Technology B (JVST B)**, 33, 06FF01 (2015), DOI:<http://dx.doi.org/10.1116/1.4931694>.

S. Ward, V. Foroutan, R. Majumdar, O. Mahdavi-pour, S. A. Hussain, and I. Paprotny, "Towards Microscale Flight: Fabrication, Stability Analysis, and Initial Flight Experiments for 300 μm \times 300 μm Sized Untethered Microfliers," **IEEE Transactions on Nanobioscience**, 14(3), 2015: 323 - 331.

N. Illiev and I. Paprotny, "Spatial Self-localization Methods for Low Power Wireless Sensor Networks", **IEEE Sensors J.**, vol.15, no.10, pp.5971-5987, Oct. 2015 (**among top 50 downloads – IEEE Sensors J., November 2015**)

D S Nguyen, I Paprotny, P Wright, R White, "MEMS capacitive flow sensor for natural gas pipelines," **Sensors and Actuators A: Physical**, vol. 231, pp. 28 – 34, 2015.

I Paprotny and S. Bergbreiter, "Small-Scale Robotics : An Introduction." in **Small-Scale Robotics. From Nano-to- Millimeter-Sized Robotic Systems and Applications**. Springer Verlag, pp. 1 – 15, 2014.

C. G. Levey, I. Paprotny, B. R. Donald "MicroStressBots: Species Differentiation in Surface Micromachined Microrobots." in **Small-Scale Robotics. From Nano-to-Millimeter-Sized Robotic Systems and Applications**. Springer Verlag, pp. 66 – 80, 2014.

F.L. Burghardt, A.C. Waterbury, I. Paprotny, L.M. Miller, P. Minor, R. Send, Q. Xu, R.M. White, and P.K. Wright, "A Design Methodology for Energy Harvesting: With a Case Study on the Structured Development of a System to Power a Condition Monitoring Unit," **Energy Harvesting and Systems: Materials, Mechanisms, Circuits and Storage**, 2014, DOI: 10.1515/ehs-2013-0001.

Paprotny, I., F. Doering, P.A. Solomon, R.M. White, and L. Gundel, "Microfabricated Air-Microfluidic Sensor for

Personal Monitoring of Airborne Particulate Matter: Design, Fabrication, and Experimental Results.” **Sensors and Actuators (A: Physical)**, 2013; A201: 506 – 516.

Nguyen, S.D., E. Halvorsen, and I. Paprotny, “Bistable springs for wideband MEMS energy harvesters.” **Applied Physics Letters**, 2013; 102(2): 023904.

Xu, Q., Seidel, M., Paprotny, I., R. M. White, and P. K. Wright “Centralized Electric Current Monitoring System Using PEM AC Current Sensors.” **IEEE Sensors J.**, (invited submission), 2013 13(3): 1055-1064.

Paprotny, I., C.G. Levey, P.K. Wright, and B.R. Donald, Turning-rate Selective Control: A New Method for Independent Control of Stress-engineered MEMS Microrobots. in **Robotics: Science and Systems VIII**, P. Newman, N. Roy, S. Shrinivasa (Eds.), 2013.

¹Donald, B. R., C. Levey, I. Paprotny, and D. Rus. Planning and Control for Microassembly using Stress-engineered MEMS Microrobots. **International Journal of Robotics Research (IJRR)**, 2013, 32(2): 218-246.

Paprotny, I., Q. Xu, W.W. Chan, R. M. White, and P. K. Wright. Electromechanical Energy Scavenging from Current-carrying Conductors, **IEEE Sensors J.**, 2013; 13(1): 190-201.

¹Donald, B. R., C. Levey, I. Paprotny, and D. Rus. Simultaneous Control of Multiple MEMS Microrobots, in **Springer Tracts on Advanced Robotics Vol. 57: Algorithmic Foundations of Robotics VIII**, Chirikjian, G.S.; Choset, H.; Morales, M.; Murphey, T. (Eds.), 2010: 69 - 84.

¹Donald, B. R., C. Levey, and I. Paprotny. Planar Microassembly by Parallel Actuation of MEMS Microrobots. **Journal of Microelectromechanical Systems (J.MEMS)**, 2008; 17(4): 789 – 808.

¹Donald, B. R., C. Levey, C. McGray, I. Paprotny, and D. Rus. A Steerable, Untethered, 250 x 60 μm MEMS Mobile Micro-Robot. in **Springer Tracts on Advanced Robotics Vol. 28: Robotics Research**, Thrun, Sebastian; Brooks, Rodney A.; Durrant-Whyte, Hugh (Eds.), 2007: 337 – 357.

¹Donald, B. R., C. Levey, C. McGray, I. Paprotny, and D. Rus. An Untethered, Electrostatic, Globally-Controllable MEMS Micro-Robot. **Journal of Microelectromechanical Systems (J.MEMS)**, 2006; 15(1):1-15

Refereed Conferences and Workshops

Sainato, M., M. T. Humayun, L. Gundel, P. Solomon, L. Stan, R. Divan, I. Paprotny, “Parts Per Million CH₄ Chemoresistor Sensors Based on Multi Wall Carbon Nanotubes/Metal-oxide Nanoparticles.” in the **Proceedings of the 15th Annual IEEE Conference on Sensors (IEEE SENSORS 2016)**, October 30 – November 2nd 2016, Orlando, FL.

Paprotny I., R. Majumdar, M. T. Humayun, A. DiVenere, S. An, S. Rajoria, R. Mohan, N. Farajpour, R. Jain, and M. Sheth, “Single Semester Problem-Oriented MEMS Course using a Simplified Quasi-Surface Micromachining Fabrication Process (UIC SOI),” in the **Technical Digest of the Hilton Head Workshop 2016: A Solid-State Sensors, Actuators and Microsystems Workshop**, June 2016 (Open Poster)

Fahimi D., O. Mahdavi-pour, T. Cados, T. Kirchstetter, P. Solomon, R. M. White, L. Gundel, and I. Paprotny, “MEMS Air-Microfluidic Lab-on-a-chip Sensor for Personal Monitoring of Airborne Particulate Matter.”, in the **Technical Digest of the Hilton Head Workshop 2016: A Solid-State Sensors, Actuators and Microsystems Workshop**, June 2016

S. A. Hussain, A. Klitzke, R. Majumdar, and I. Paprotny, “Analysis and Experimental Results of Untethered Flight of Stereolithographically Printed MEMS Microfliers.”, in the **Technical Digest of the Hilton Head Workshop 2016: A Solid-State Sensors, Actuators and Microsystems Workshop**, June 2016

Majumdar, R. and I. Paprotny, “Lithography-free Self-reconfigurable Post-release Stress-Engineering for Field-Reconfigurable Programmable MicroStressBots.”, in the **Technical Digest of the Hilton Head Workshop 2016: A Solid-State Sensors, Actuators and Microsystems Workshop**, June 2016

Md Humayun, R. Divan, L. Stan, D. Rosenmann, D. Gosztola, L. Gundel, P. A. Solomon, I. Paprotny, “Functionalized Multi-Walled Carbon Nanotube based Sensors for Distributed Methane Leak Detection”, in the **Proceedings of the 14th Annual IEEE Conference on Sensors (IEEE SENSORS 2015)**, November 1-4 2015, Busan, South Korea.

Mahdavi-pour, O., T. Mueller-Sim, D. Fahimi, S. Croshere, V. Zegna, J. Sabino, P. Pillatsch, J. Merukh, P. A. Solomon, P. Wright, R. M. White, L. Gundel, and I. Paprotny. “Distributed Sensors for Automated Control of Total Incombustible Content (TIC) of Dust Deposited in Underground Coal Mines” in **the Proceedings of the 14th Annual IEEE Conference on Sensors (IEEE SENSORS 2015)**, November 1-4 2015, Busan, South Korea.

¹ Authors are listed in alphabetic order - lead researcher is underlined

D.S. Nguyen, P. Pillatsch, I. Paprotny, P. Wright, and R. White, "MEMS Flow Sensors with Silicon-Carbide Erosion Resistant Coating," in the **Proceedings of the 14th Annual IEEE Conference on Sensors (IEEE SENSORS 2015)**, pp. 991-994, 1-4 Nov. 2015

D.S. Nguyen, P. Pillatsch, Y. Zhu, I. Paprotny, P. Wright, and R. White, "MEMS-Based Capacitive Pressure Sensors with Pre-Stressed Sensing Diaphragms," in the **Proceedings of the 14th Annual IEEE Conference on Sensors (IEEE SENSORS 2015)**, pp. 1184-1187, 1-4 Nov. 2015

Md Humayun, R. Divan, L. Stan, A. Gupta, D. Rosenmann, L. Gundel, P. Solomon & I. Paprotny, "ZnO Functionalization of Multi-walled Carbon Nanotubes for PPM Level Methane Sensing", in **the 59th International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication (EIPBN 2015)**, 2015, San Diego, USA (invited poster presentation)

R. Majumdar, V. Foroutan, and I. Paprotny, "Post-Release Stress-Engineering of Surface-Micromachined MEMS Structures Using Evaporated Chromium and *In-Situ* Fabricated Reconfigurable Shadow Masks." in the Proceedings from the **28th IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2015)**, Estoril, Portugal.

V. Foroutan, R. Majumdar, O. Mahdavi-pour, S. P. Ward, and I. Paprotny, "Levitation of Untethered Stress-Engineered Microflyers using Thermophoretic (Knudsen) Force.", in the **Technical Digest of the Hilton Head Workshop 2014: A Solid-State Sensors, Actuators and Microsystems Workshop**, (2014), pp: 105-106. (podium presentation)

Nguyen, S., D, I. Paprotny, R.M. White, P.K. Wright. In-Plane Capacitive MEMS Flow Sensor for Low-Cost Metering of Flow Velocity in Natural Gas Pipelines, **the 27th IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2014)**, San Francisco, CA.

Send, R., Q. Xu, W. Ku, I. Paprotny, R.M. White, P.K. Wright. Granular Radio Energy-sensing Node (GREEN): A 0.53 cm³ wireless stick-one node for non-intrusive energy monitoring, **the 12th Annual IEEE Conference on Sensors (IEEE SENSORS 2013)**, Baltimore, MD. (podium presentation)

Paprotny, I., C.G. Levey, P.K. Wright, and B.R. Donald, Turning-rate Selective Control: A New Method for Independent Control of Stress-engineered MEMS Microrobots. in the **2012 Robotics Science and Systems Conference (RSS 2012)**, July 9-13, Sydney, Australia.

Doering, F., I. Paprotny, and R.M. White. MEMS Air-Microfluidic Sensor for Portable Monitoring of Airborne Particulates. in the Technical Digest of the **15th Solid-State Sensor and Actuator Workshop**, SC, June 2012, Hilton Head Isl., SC.

Xu, Q., Seidel, M., Paprotny, I., White, R. M., and Wright, P. K. Integrated Centralized Electric Current Monitoring System Using Wirelessly Enabled Non-Intrusive AC Current Sensors. in **the 10th Annual IEEE Conference on Sensors (IEEE SENSORS 2011)**, 28-31 October 2011, Limerick, Ireland. (*best student paper award*)

Paprotny I., F. Doering, and R.M. White. MEMS Particulate Matter (PM) Monitor for Cellular Deployment, in **the 9th Annual IEEE Conference on Sensors (IEEE SENSORS 2010)**, November 1-4 2010, Waikoloa, HI.

¹Donald, B. R., C. Levey, I. Paprotny and D. Rus. Simultaneous Control of Multiple MEMS Microrobots. in **the Workshop on Algorithmic Foundations of Robotics (WAFR)**, December 6-9, 2008, Guanajuato, Mexico. **Refereed Conferences and Workshops (cont.)**

¹Donald, B. R., C. Levey, and I. Paprotny. Assembly of Planar Structures by Parallel Actuation of MEMS Microrobots. in **the Technical Digest of the 2008 Solid-State Sensor and Actuator Workshop**, Hilton Head Isl., SC.

¹Donald, B. R., C. Levey, C. McGray, I. Paprotny, and D. Rus. A Steerable, Untethered, 250 x 60 μm MEMS Mobile Micro-Robot. in **the 12th International Symposium of Robotics Research (ISRR)**, October 12-15, 2005, San Francisco, CA.

Other Conferences and Workshops

Mahdavi pour, O., Dorsa Fahimi, Apoorva Jain, Igor Paprotny, "Development and Evaluation of MEMS Air-Microfluidic Particle Focusing Systems." to appear in **the 36th Annual Conference of the American Association of Aerosol Research (AAAR 2017)**, Raleigh, NC, October 2017

Mahdavi pour, O., John Sabino, Michael R. Shahan, Clara E. Seaman, Larry D. Patts, Paul Wright, Igor Paprotny, "Experimental Evaluation of Opto-Dielectrometric Sensors for Monitoring of Total Incombustible Content (TIC) in Underground Coal Mines." to appear in **the 36th Annual Conference of the American Association of Aerosol Research (AAAR 2017)**, Raleigh, NC, October 2017.

Hajizadehmothlagh, M., Omid Mahdavi pour, Igor Paprotny, "Modeling and Optimization of Wearable Personal Dust Exposure Monitor (WPDEM) for Underground Mines." to appear in **the 36th Annual Conference of the American Association of Aerosol Research (AAAR 2017)**, Raleigh, NC, October 2017.

Fahimi, D., Shravan Nagarjun Rangaraj, Omid Mahdavi pour, Igor Paprotny "Dual Differential MEMS PM2.5 Mass Sensor: Mitigating Temperature and Humidity Effects through Dual Alternating Thermophoretic Precipitation." to appear in **the 36th Annual Conference of the American Association of Aerosol Research (AAAR 2017)**, Raleigh, NC, October 2017.

Fahimi, D., Omid Mahdavi pour, John Sabino, Lisa Soderlind, Nobuhiko Fukushima, Hide Nagai, Richard White, Igor Paprotny "Experimental Evaluation of a Wearable, Bluetooth Enabled, Direct- Reading MEMS PM2.5 Mass Sensor." to appear in **the 36th Annual Conference of the American Association of Aerosol Research (AAAR 2017)**, Raleigh, NC, October 2017.

Paprotny, I. and M. Žefran, "Finite State Machine (FMS) addressable MEMS microrobots: A new paradigm for controlling large numbers of MEMS microrobots," to appear in the Proceedings of The International Conference on Manipulation, Automation, and Robotics at Small Scales (MARSS 2017), Montreal, Canada, June 2017.

Lechowicz, J., Ocola, L., Divan, R., Paprotny, I. (2017, July) Zinc Oxide Infiltration of Two-Photon Polymerized Structures. in **The AVS 17th International Conference on Atomic Layer Deposition (ALD 2017)**, Denver, CO

Sainato, M., Divan, R., Stan, L., Liu, Y., and Paprotny, I. (July 2017), Highly sensitive VOCs sensor based on Atomic Layer Deposition of TiO₂ on carbon nanotubes, in **The 17th International Conference on Atomic Layer Deposition (ALD 2017)**, Denver, Colorado, USA, July 15-18 2017.

Sainato, M., Sahagun, A., Divan, R., Stan, L., Humayun, M. T. and Paprotny, I. (June 2017) Metal-oxide Nanocrystals/Carbon Nanotubes Heterostructure Sensors for Selective Sensing of Hydrocarbons (VOCs + CH₄), in **The 61st international conference on Electron, ion, and photon beam technology and nanofabrication (EIBPN 2017)**, Orlando, USA, may 30th-June 2nd 2017.

Omid Mahdavi pour, John Sabino, Timothy Mueller-Sim, Michael R. Shahan, Clara E. Seaman, Paul A. Solomon, Paul Wright, Richard White, Lara Gundel, Larry D. Patts, Igor Paprotny. "Opto-Dielectrometric Sensors for Automated Control of Total Incombustible Content in Underground Coal Mines." in **Proc. of the 35th Annual Conference for the American Association of Aerosol Research (AAAR 2016)**, Portland, OR.

Dorsa Fahimi, Omid Mahdavi pour, Paul A. Solomon, Lara Gundel, Richard White, Igor Paprotny. "PM Badge: A Wearable, Low-Power, Cellular-Enabled, Direct-Read Mass MEMS PM2.5 Sensor." in **Proc. of the 35th Annual Conference for the American Association of Aerosol Research (AAAR 2016)**, Portland, OR.

Seiran Khaledian, Dorsa Fahimi, Troy Cados, David Woolsey, Omid Mahdavi pour, Paul A. Solomon, Thomas Kirchstetter, Lara Gundel, Richard M. White, and Igor Paprotny. "Optimization of Air-Microfluidic Circuits for Microfabricated Direct-Read Mass PM2.5 Sensors." in **Proc. of the 34th Annual Conference for the American Association of Aerosol Research (AAAR 2015)**, Minneapolis, MI.

Omid Mahdavi pour, Timothy Mueller-Sim, Dorsa Fahimi, Croshere Skot, Pilatsch Pit, Jusuf Merukh, Valentino Zegna, Paul A. Solomon, Paul Wright, Richard M. White, Lara Gundel, and Igor Paprotny. "Performance of Wireless Distributed Sensors for Automated Control of Float Dust in Underground Coal Mines," in **Proc. of the 34th Annual Conference for the American Association of Aerosol Research (AAAR 2015)**, Minneapolis, MI.

Md Humayun, L. Stan, R. Divan, Y. Liu, I. Paprotny, "Atomic Layer Deposition of ZnO Nanoparticles on Multi-Walled Carbon Nanotubes (MWCNTs) as a Functionalization Compound for Methane Sensing Application", in the **15th International Conference on Atomic Layer Deposition 2015**, Portland, Oregon, USA (oral presentation)

Omid Mahdavi-pour, Ben Gould, Dorsa Fahimi, David Liederman, Spencer Ward, Duy Son Nguyen, David Woolsey, Paul A. Solomon, Richard M. White, Lara A. Gundel, and Igor Paprotny "How Small Can We Go: Exploring the Limitations and Scaling laws of Air-Microfluidic Particulate Matter Sensors." In **Proc. 33rd Conference for the American Association for Aerosol Research (AAAR 2014)**, October 20-24, Orlando, FL.

V. Sudula and I. Paprotny. "WI-PATCH: Stick-On Wireless Sensor Platform for Continuous Monitoring of Human Physiology," In **Proc. 7th Int. Conference on Pervasive Technologies Related to Assistive Environments**, 2014, Rhodes, Greece, May 27 – 30, 2014.

R. Majumdar, V. Foroutan, I. Paprotny. "Tactile sensing and compliance in MicroStressBot assemblies," **Proc. SPIE 9116**, Next-Generation Robots and Systems, 911604, 2014.

Levey, C., I. Paprotny, and B. R. Donald. Microrobot Species: a Surface MEMS Perspective, in the Proceedings of **2013 IEEE International Conference on Robotics and Automation (ICRA2013)**, May 6 – 10, 2013.

Xu, Q., R. Send, I. Paprotny, R.M. White, and P.K. Wright, Self-Powered Stick-on Wireless Sensor Node for Monitoring of Over-head Power Lines. In the proceedings of **IEEE Energy Conversion Congress and Expo (ECCE 2013)**, September 15-19, 2013.

Paprotny, I., A. Waterbury, V.R. Challa, Q. Xu, D.P. Arnold, S. Sanders, and P.K. Wright. Piezoelectrodynamical Gyration: Analysis, Experiments, and Applications to Wireless Power Transfer. In the proceedings of **POWERMEMS 2012**, December 2-5, 2012.

Paprotny, I., S. Sanders, and P.K. Wright. Broadband Energy Scavenging from Vibrations using an Eccentric Rotor Electromagnetic Generator. in *the Proceedings of POWERMEMS 2012*, December 2-5, 2012.

Paprotny I., D. Hustig-Schultz, J. Dominguez, R. Farley, P.A. Solomon, R.M. White, and L. Gundel. Prototype of Portable Cellphone-Connected Particulate Matter (PM) Sensor. in *the Proceedings of 31st Annual Conference of the American Association for Aerosol Research (AAAR 2012)*, October 8-12, 2012.

Paprotny I., F. Doering, P.A. Solomon, R.M. White, and L. Gundel. Measurements of Particulate Matter in Diluted Cigarette Smoke and Diesel Exhaust Emissions Using a MEMS-Based Microfluidic Sensor. in *the Proceedings of 31st Annual Conference of the American Association for Aerosol Research (AAAR 2012)*, October 8-12, 2012.

Paprotny I., M. Seidel, T.C. Nora, C. Morris, R. M. White, and P.K. Wright. Magnetic Probing of Concentric Neutral Wires in Energized Underground Power Distribution Cables. in *the Proceedings of 2012 IEEE International Symposium on Electrical Insulation (ISEI 2012)*, June 10-3, 2012.

Paprotny, I., E. Halvorsen, Q. Xu, W.W. Chan, R.M. White, and P.K. Wright. Non-linear Behavior of Cantilever-based Piezoelectric Energy Scavengers under Large Excitations. in *the Proceedings of POWERMEMS 2011*, November 15-18, 2011.

Nguyen, S. D., N.H.T. Tran, E. Halvorsen and I. Paprotny. Design and Fabrication MEMS Electrostatic Energy Harvester with Nonlinear Springs and Vertical Sidewall Electrets. in *the Proceedings of POWERMEMS 2011*, November 15-18, 2011.

Paprotny, I., F. Doering, M. Seidel, R. White, M. Sokolov, A. Umnov. Fabrication of a Miniaturized MEMS Particulate Matter (PM) Monitor in *the 10th Annual IEEE Conference on Sensors (IEEE SENSORS 2011)*, 28-31 October 2011, Limerick, Ireland. (*open poster*)

Apte, M., I. Paprotny, M. Ranjan, F. Doering, D. Woolsey, L. Gundel, and R White. Development and Testing of Real-time MEMS-Based Sensors for Airborne Particle Mass Concentrations. in *the Proceedings of the 30th Annual Conference of the American Association for Aerosol Research (AAAR 2011)*, October 3-7, 2011.

Gonzalez, G., I. Paprotny, R.M. White, and P.K. Wright. Novel Online RF technique for Detection of Water Trees in Underground Powered Distribution Cables. in *the Proceedings of 2011 IEEE International Symposium on Electrical Insulation (ISEI 2011)*, June 5-8, 2011.

Paprotny, I., R. M. White and P. K. Wright. Modeling, Design and Fabrication of (10 x 10 x 4 mm³) MEMS AC Energy Harvester for Smart Grid Applications. in *the Proceedings of POWERMEMS 2010*, November 30 – December 3 2010.

Xu, Q., I. Paprotny, R. M. White, and P. K. Wright. Energy Submetering for Circuit Breaker Panels Using MEMS or Mesoscale Passive Proximity Current Sensors. in *the Proceedings of POWERMEMS 2010*, November 30 –

December 3 2010.

Xu, Q., R. M. White, I. Paprotny, and P. K. Wright. Energy Improved Performance of Nonlinear Piezoelectric Energy Harvesters. *in the Proceedings of POWERMEMS 2010*, November 30 – December 3 2010.

Paprotny, I., E. S. Leland, C. Sherman, R. M. White, and P. K. Wright. Self-powered MEMS Sensor Module for Measuring Electrical Quantities in Residential, Commercial, Distribution and Transmission Power Systems, *in the Proceedings of the IEEE Energy Conversion Congress and Expo (ECCE 2010)*, September 12-16 2010, Atlanta, GA.

Paprotny, I., R. M. White, and K. Krishnan. RF Transmission-line Methods for In-service Probing of Concentric Neutral Wires in Underground Power Distribution Cables. *in the Proceedings of the 2012 IEEE International Symposium on Electrical Insulation (ISEI 2010)*, June 6-9 2010, San Diego, CA.

Seidel, M., I. Paprotny, R. M. White, and K. Krishnan. AMR Current Sensors for Evaluating the Integrity of Concentric Neutrals in In-Service Underground Power Distribution Cables. *in the Proceedings of the of the IEEE International Symposium on Electrical Insulation (ISEI 2010)*, June 6-9 2010, San Diego, CA.

Paprotny, I. B. R. Donald, C. Levey, and D. Rus. Microassembly using Stress-engineered MEMS Microrobots, *in the Proceedings of the 2010 IEEE International Conference on Robotics and Automation (ICRA2010)*, May 3 – 8 , 2010, (invited submission).

Paprotny, I., E. S. Leland, R. M. White and P. K. Wright. Optimization of a Die-sized (10x10x4 mm³) MEMS AC Energy Scavenger for Residential and Commercial Electricity End-use Monitoring. *in the Proceedings of POWERMEMS 2009*, December 1-4, 2009, Washington DC.

Paprotny, I. and W. Hellinck. (2002) Streamlining the Fab Design Process through Rapid Modeling and Design Environment (RMDE). *in the Proceedings of MASM 2002 : International Conference on Modeling and Analysis of Semiconductor Manufacturing*, Phoenix, AZ.

Paprotny, I. and J. Fowler, (2001). Emulating the Run-Time Behavior of a Conservative Distributed Semiconductor Manufacturing Simulation. *in the Proceedings of 2001 International Conference on Semiconductor Manufacturing Operational Modeling and Simulation (SMOMS01)*, Seattle, WA.

Paprotny, I., J. Shiau, Y. Huh, and G.T. Mackulak, (2000). Simulation Based Comparison of Semiconductor AMHS Alternatives: Continuous Flow vs. Overhead Monorail. *in the Proceedings of the IEEE 2000 Winter Simulation Conference*, Orlando, FL.

Paprotny, I. and A.C. Roberts, (2000). Selecting Parallel and Distributed Simulation Synchronization Intervals: A Case Study. *in the Proceedings of the 12th European Simulation Symposium (ESS 2000)*, Hamburg, Germany.

Paprotny, I. and A.C. Roberts, (2000). An Approach to Self-Organization Using a Distributed Network of Nodes. *in the Proceedings of Western Multiconference 2000 on Communication Networks and Distributed Systems Modeling and Simulation*, San Diego, CA.

Paprotny, I., J. Yngve, G.T. Mackulak, and J.R. Gaskins, (2000). Applying Conservative Distributed Simulation to a Large Scale Automated Material Handling Design. *in the Proceedings of Western Multiconference 2000 on Communication Networks and Distributed Systems Modeling and Simulation*, San Diego, CA.

Paprotny, I., W. Zhao, and G.T. Mackulak, (1999). Reducing Model Creation Cycle Time by Automated Conversion of a CAD AMHS Layout Design. *in the Proceedings of the IEEE 1999 Winter Simulation Conference*, Phoenix, AZ.

Wu, S., J. Rayter, I. Paprotny, G.T. Mackulak, and J. Yngve, (1999). Increasing First Pass Accuracy of AMHS Simulation Output Using Legacy Data. *in the Proceedings of the IEEE 1999 Winter Simulation Conference*, Phoenix, AZ.

Theron, D.C., J. Rayter, I. Paprotny, and G.T. Mackulak, (1999). A Quantitative Approach for Minimizing Fab Cost of Ownership through Systems Integration, *in the Proceedings of the 10th Annual IEEE/SEMI Advanced Semiconductor Manufacturing Conference and Workshop*, Boston, MA.

Sokhan-Sanj, S., F.P. Lawrence, I. Paprotny, and G.T. Mackulak, (1998). Techniques for Reducing Simulation Model Cycle Time, *in the Proceedings of the Summer Computer Simulation Conference*, Reno, NV.

Paprotny, I., From CAD-Layout to Simulation Model, Introduction of an IGES to AutoMod-model converting algorithm, *in the Proceedings of the 1998 IIE Regional Student Conference*, USCLA, Los Angeles, CA.

Reports (selected)

Igor Paprotny, Paul K. Wright, Lara Gundel, Paul Solomon, Richard M. White, Omid Mahdavi-pour, Tim Mueller-Sim, John Sabino, Dorsa Fahimi, Valentino Zegna, David Liederman, Pit Pillatsch, Skot Croshere, Jusuf Merukh. "Sensors for Automated Control of Coal Dust (SACCD): Final Report," Contract 200-2013-57155, **Center for Disease Control and Prevention, National Institute for Occupational Safety and Health**, 1/8/2016

Paprotny, I., E. Elkind, L. Miller, I. Martinac, S. Wihera, and W.T. Hagen. (University of California, Berkeley). 2012. Summary and Assessment of California's Smart Grid Roadmap and Deployment Plans. **California Energy Commission**. Publication number (pending): CEC- 500-2014-076.

Paprotny, I., P. K. Wright, R. M. White, J. Evans, and T. Devine. (University of California, Berkeley). 2012. Fault Analysis in Underground Cables : Final Report. **California Energy Commission**. CEC-500-2013-094.

Magazines

White, R. M., I. Paprotny, F. Doering, W. E. Cascio, P. Solomon and L. A. Gundel. Sensors and Apps for Community- based Atmospheric Monitoring. **Air & Waste Management Association Environmental Managers Magazine**, May, 2012: 36-40. (invited submission)

Donald, B. R., C. Levey, C. McGray, I. Paprotny, and D. Rus. FEA in Microrobotics, **ANSYS Solutions Magazine**, Summer 2004.

Editor

"Small-Scale Robotics. From Nano-to-Millimeter-Sized Robotic Systems and Applications." **Lecture Notes in Computer Science: State-of-the-Art Survey**, Springer Verlag, 2014

Robotics J., *Special Issue: The Frontiers of Micro and Nanorobotic Systems*. 2014.

Conference/Workshop Organizer

Chair/lead organizer: IEEE RAS/NMRA Mobile Microrobotics Challenge 2016, held in conjunction with the **IEEE International Conference on Robotics and Automation (ICRA 2016)**, Stockholm, Sweden.

Chair/lead organizer: Enabling Air-Microfluidic Sensors, Inaugural Workshop for the Air-Microfluidics Group, Center for Air-Microfluidics, July 21st, 2015, Chicago, IL.

Co-organizer: IEEE RAS/NMRA Mobile Microrobotics Challenge 2014, 2015, held in conjunction with **the IEEE International Conference on Robotics and Automation (ICRA 2014 / ICRA 2015)**.

Chair/lead organizer: The Different Sizes of Small-Scale Robotics: from Nano-, to Millimeter-Sized Robotic Systems and Applications. Workshop to be held in conjunction with the **IEEE International Conference on Robotics and Automation (ICRA 2013)**, May 6, 2013.

Co-organizer: Portable and Inexpensive Sensor Technology for Air Quality Monitoring: The Future is Now. Special symposium to be held at the **32nd Annual Conference of the American Association for Aerosol Research (AAAR 2013)**, September 30-October 4, 2013.

Reviewer

Journals

Ad Hoc Networks

Journal of Sound and Vibration

Journal of Micro Electro Mechanical Systems (J.MEMS)

International Journal of Robotics Research (IJRR)

Sensors and Actuators A: Physical

Sensors and Actuators B: Chemical

PLOS One

Journal of Biomedical Materials Research: Part B - Applied Biomaterials

IEEE Transactions on Mechatronics

IEEE Transactions on Industrial Electronics

IEEE Robotics and Automation Letters (RA-L)

Journal of Micro-Bio Robotics

I. Paprotny

(1/3/2017)

Advanced Functional Materials
Autonomous Robots
Robotics
IEEE Sensors Journal
Sensors Online
Micromachines

Conferences

IEEE MagCon 2016
Indoor Air 2014
IEEE/RSJ Intelligent Robots and Systems (IROS 2014)
IEEE International Conference on Robotics and Automation (ICRA 2014)
IEEE/RSJ Intelligent Robots and Systems (IROS 2013)
IEEE Energy Conversion Congress and Exposition (ECCE 2013)
IEEE International Conference on Robotics and Automation (ICRA 2013)
IEEE Energy Conversion Congress and Exposition (ECCE 2012, ECE 2016)
IEEE International Conference on Robotics and Automation (ICRA 2012)
IEEE 2011 Electrical Insulation Conference (EIC 2011)
Robotics Science and Systems 2009 (RSS 2009)

Grant Proposals

Innovation and Technology Commission, the Government of Hong Kong.
NSF Panel Review – Spring 2014, Spring 2015, Spring 2016, Summer 2016
Israel Science Foundation

Grants (PI)

Current

CDC NIOSH 2016 – 2018 - (\$343,534.00) - Active
NSF EAGER 2016 – 2018 – (\$256,365.00) - Active
Kanomax Inc. 2015 - 2017 – (\$331,533.00) - Active
Argonne National Laboratory, Center for Nanoscale Materials user agreement proposals, under Contract No. DE-AC02-06CH11357:
CNM 45213, "Substrate and stress-engineering optimization for independent control of untethered Finite State Machine (FMS) based Stress-engineered MEMS Microrobots (MicroStressBots)," 2015 – 2016 (extension pending)

CNM 45862, "Functionalized carbon nanotube based chemoresistive methane sensor," 2015 – 2016 (extension pending)

CNM 47251, "Infusion of 2-photon Stereolithographically Patterned Polymer Structures with ALD-deposited Oxides " 2016 – 2017

DoD/US ATI Instrumentation Grant – 2016 - (\$304,997.00) – 10% effort

Aclima Methane 2015 – 2016 - (\$96,000.00)

Alumni Research Award 2015 – (\$26,000.00)

Perkin Elmer 2015 - 2016 – (\$102,347.00)

LBNL 2014 - 2016 – (\$960,000.00, UIC part \$ 199,000.00)

NIOSH / CDC 2013 – 2015 - (\$495,000.00, UIC part. \$155,155.00)

CIEE 2013 - 2014 – (\$23,000.00)

Grants (co-author)

2010 CITRIS Seed Grant - (\$65,000.00)

CEC PIER Amd. #2 SECURE Cables - (\$440,000.00)

Intel PM – (\$90,000.00)

CEC Nat. Gas Pipelines – (\$478,475.00)

CEC PIER Ext. SECURE Cables – (\$1,200,000.00)

SULI 2012 – (\$21,000.00 w. DOE matching)

Patents

U.S. Patent Application No.: US16/26657

In-line MEMS Air-Microfluidic Concentrator and Guide for Airborne Particulate Matter (PM)

U.S. Patent Application No.: 051583-0720

Surface Pre-Treated Selective Functionalized Multi-Walled Carbon Nanotube (MWCNT) based Methane Sensor

U.S. Patent No.: 8,847,606, issued 9/30/2014

Method and System for Assessing Insulation Deterioration

U.S. Patent No.: 8,806,915, issued 8/19/2014

Microfabricated Particulate Matter Monitor

US 8723397 B2, Dynamically Adjusting Piezoelectric Current Sensors , issued 5/13/2014,

US 20120126804 A1, Apparatus and methods for detecting faulty concentric neutrals in live power distribution cable. Issued 5/24/2012,

Awards (selected)

2016	Top 25 th popular paper downloads, November 2016, IEEE Sensors Journal
2016	Nominated R&D100 Award
2015	Research Award, UIC College of Engineering
2015	Editors Selection – Journal Papers JVST A
2015	Top 50 th popular paper downloads, September 2015, IEEE Sensors Journal
2015	Invited Poster Presentation, EIPBN 2015
2014	Teaching Award, UIC College of Engineering
2011	Best Student Paper Award, IEEE SENSORS 2011
2009	Best Paper Award, BSAC IAB, Spring 2009
2003	SPOT-award, Symbol Technologies Inc.
2002	IIE National Graduate Thesis Award

Invited Presentations

Applications of 2-photo 3D Stereolithography to Aerial Microrobots and Air-Microfluidics, November 2016, American Vacuum Society Symposium, Nashville, TN.

Mobile Microrobots : Current Trends and Future Directions, Sensors Expo & Conference, June 26 2014 , Rosemont, IL

Next Generation Air Monitoring Workshop III, The Environmental Protection Agency (EPA), South Carolina, March 5-6th 2013 (podium presentation).

Next Generation Air Monitoring Workshop II, The Environmental Protection Agency (EPA), South Carolina, November 5-7th 2012 (poster).

MEMS Smart Grid Sensors, Sense This Conference, Hørsholm, Denmark, October 3rd 2012 (keynote).

Microassembly through Global Control Selective Response (GCSR): Controlling Many Robots through a Single, Global Control Signal. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2011), workshop 20 years of Microrobotics: progress, challenges, and future directions. September 2011.

Microassembly through Global Control Selective Response (GCSR): A New Paradigm for Simultaneous Control of Multiple Microrobots. Max-Planck Institute, Stuttgart, Germany, August 2011.

MEMS Sensors for the Smart Grid, MEPTec MEMS Symposium, May 2011.

Self-powered MEMS Wireless Sensors for Monitoring the Electric Power Grid, IEEE Power Electronics Society, January 2011.

Microassembly Using Parallel Controllable MEMS Microrobots, 2010 IEEE International Conference on Robotics and Automation (ICRA 2010), May 2010.

Herding Microrobots, Automation and Robotics Research Institute, University of Texas at Arlington, December 2006.

Popular Press

Herding Swarms of Microrobots. in *MIT Technology Review*, 4.29.2011.

One signal herds microbot swarm. in *MSNBC.com*, 4.29.2011.

Gross und Klein, in *Die Zeit, Zeit Wissen*, 04.2007

Big hopes for the smallest mobile machine, in *Discover Magazine*, 2006: 26 (2), p.16.

At Dartmouth, a remote-controlled robot (you can see it if you squint), in *New York Times*, 11.10.2005

Tiniest remote-controlled robot created, in *New Scientist*, 9.16.2005

Inchworm-like robot smallest ever, in *MSNBC*, 9.15.2005

The worlds smallest robot, in *Popular Science*

Teaching Experience

Instructor

ECE 491 Mechatronic Systems Design Laboratory	Spring 2016
ECE 449 Microdevices and Micromachining Technology	Spring 2014, 2015, 2016
ECE 467 Introduction to VLSI Design	Fall 2013, Fall 2014
EE192 Mechatronics Design Laboratory (UC Berkeley)	Spring 2013
Group from the class won Freescale West and Freescale U.S. National autonomous car completions, sponsored by Freescale Semiconductor.	
Co-lecturer, MEMS Design (Vestfold University College)	Spring 2011
Guest Lecturer, MEMS Design (Vestfold University College)	Spring 2010, Spring 2009
Colloquium Lecturer, Mathematics, Physics (NKI College of Eng.)	Aug.1994 – May 1995
Colloquium Lecturer, Mathematics, Physics (NKI College of Eng.)	Aug.1993 – May 1994

Advising /Co-advising - Graduate

Postdoctoral:

Michela Sainato	CNT Gas Sensing	April 2016 - present
-----------------	-----------------	----------------------

Ph.D.:

Jacek Lechowicz	Neural Bio-robotics	May 2016 - present
Mandana Hajizademothlagh	Air-Microfluidics	May 2016 - present
Andrew Klitzke	Microrobotics / Air-Microfluidics	Aug. 2015 – present

Serian Khaledian	Air-Microfluidics	Oct. 2014 – Jun. 2015
Ameenuding Hussain	Microrobotics / Air-Microfluidics	Oct. 2014 – present
Tanim Humayun	CNT Sensors	Apr. 2014 – May 2016
Dorsa Fahimi	Air-Microfluidics	Jan. 2014 – present
Omid Mahdavi-pour	Air-Microfluidics	Sep. 2013 – present
Vahid Foroutan	Microrobotics / Air-Microfluidics	Sep. 2013 – May 2015
Ratul Majumdar	Microrobotics	Sep. 2013 – present
Nick Iliev	Wireless Sensors	Sep. 2013 – Oct. 2016
Christopher Sherman (UCB)	MEMS Current Sensor	May 2012 – July 2013
Qiliang (Richard) Xu (UCB)	Energy Harvesting from Energized Conductors	Oct. 2008 – July 2013
Giovanni Gonzales (UCB)	Interdigitated and RF Dielectrometry	Oct. 2008- August 2012
Duy Son Nguen (visiting) (UCB)	Electroding MEMS Energy Harvester	Jul.2010-Oct. 2010 May 2011-Aug. 2011

MS.:

John Sabino	Sensors/Microrobotics	Aug. 2015 – present
Nick Jacobs	Microrobotics	Jun. 2015 – May 2016
Emmanuel Onyema	Air-Microfluidics CMOS	Jan. 2014 – August 2014
Valentino Zegna	Air-Microfluidics Electronics	Dec. 2013 – August 2014
Fredrik Doering (UCB)	MEMS Particulate Matter Monitor	Aug. 2009 – May 2012
Erik Egeland (visiting) (UCB)	MEMS Voltage Sensor	Mar. 2010 – May 2010
Sanghoon Lee (UCB)	MEMS Particulate Matter Monitor	Jan.2009 - July.2009

Undergraduate.:

Alvaro Shagun	CNT Gas Sensing	Jun. 2016 - present
Kensei Yee	MEMS Microfliers	Summer 2016
Simapreet Gradhoke	MEMS Microfliers	Summer 2016
Christine Vi	Float Dust Monitor	Summer 2016
Koji Tran	Float Dust Monitor	Summer 2015
Giovanni Alanis	Float Dust Monitor	Summer 2015
Patrick Berger (UCB)	Smart Grid Assessment	Oct. 2011 – Dec.2012
Wai Wah Chan (UCB)	AC Energy Harvesting	Jan.2010 – Jun.2011
Nick Lo (UCB)	MEMS Microfluidic Particulate Matter (PM) Monitor	Jan.2009- Aug.2009

Science Undergraduate Laboratory Internship (SULI) – Lawrence Berkeley National Lab

Dawn Hustig-Schultz	MEMS Particulate Matter sensor	Jun. 2012 – Aug. 2012
Matthew Jew	MEMS Particulate Matter sensor	Jun. 2012 – Aug. 2012

Women in Science Program (WISP) – Dartmouth College

Ellen Pettigrew	Electroplated Microrobots	Jan.2006 – May.2006
Ellen Pettigrew	Carbon Nanotube - based Neural Networks	Aug.2004 – Mar.2005
Shara Feld	Electroplated Microrobots	Aug.2003 – Mar.2004

Research Experience for Undergraduates (REU) – Dartmouth College

Paul Robinson (UoF)	Nanotextured Protein Alignment Media	Summer 2005
Richard Rohl (Cornell)	Scratch-drive actuator tribology	Summer 2004

Teaching Assistantship

Fall 2003	Structure and Interpretation of Computer Programs (CS)
Winter 2002	Current Trends and Ethical Issues in Computer Science (CS)
Fall 2001	Algorithms (CS)
Fall 2000	Production Systems (IE)

Service

2016- present	IEEE Student Chapter Advisor
---------------	------------------------------

Professional Experience

Summer 2003	Intern, <i>Symbol Technologies</i> , Holsbrook, NY
Summer 2002	Intern, <i>Symbol Technologies</i> , Holsbrook, NY
Summer 2001	Researcher / Software Developer, <i>Brooks Automation</i> , Ghent, Belgium
Summer 2000	Intern, <i>PRI Automation</i> , Boston, MA
Jan.1999 – Jan.2000	Industrial Engineer, <i>PRI Automation</i> , Mesa, AZ
Jul.1995 – Apr.1996	Military Service, Corporal at <i>HSBSØ/SKBP</i> , Lillehammer, Norway

Software

Paprotny, I. *IGES Post-Processor.*, An automated conversion tool between AutoCAD and AutoMod simulation software, © *PRI Automation*, 1998 – 2001

Language Skills

Polish	<i>Native</i>
Norwegian	<i>Fluent</i>
English	<i>Fluent</i>
Swedish, Danish	<i>Conversational</i>
German	<i>Conversational</i>
French	<i>Limited</i>