Peter E. Gaskell

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Research & Teaching Interests

Hands-On Engineering Education ❖ Design / Build / Test ❖ Platforms for Robotics Education

Autonomous Navigation ❖ Control of Autonomous Systems ❖ Real-Time Computer Vision

Optical Sensing ❖ Battery Technologies ❖ Embedded Systems ❖ Audio Electronics

Education

Ph.D., Electrical & Computer Engineering, McGill University 2017

– Thesis: "Nanocomposite Silicon and Graphene Composite Negative Electrode Materials for Li-Ion Batteries"

M.Eng., Electrical & Computer Engineering, McGill University 2009

– Thesis: "Optical Measurements of Graphene and Thin Graphite Films on Low Index Substrates"

B.S., Physics, University of Oregon 2004

Positions

Lecturer III, University of Michigan 2017-Present

Adjunct Research Investigator, University of Michigan 2019-Present

Research and Development Engineer, University of Michigan 2014-2017

Research Assistant, McGill University 2007-2014

Laboratory Technician, University of Oregon 2004-2007

Research Assistant, California Institute of Technology S2002, S2003

Publications

Peer Reviewed

G. Zeb, **P. E. Gaskell**, Y. N. Kim, G. Jalani, X. Xiao, T. Szkopek, and M. Cerruti, "The importance of covalent coupling in the synthesis of high performance composite anodes for lithium ion batteries," *RSC Advances*, vol. 6, no. 51, pp. 45,519-45,524, 2016

W. Dickerson, N. Hemsworth, **P. E. Gaskell**, E. Ledwosinska, and S. T, "Bolometric response of free-standing reduced graphene oxide films," *Applied physics letters*, vol. 107, no. 24, 2015

J. Guillemette, S. S. Sabri, B. Wu, K. Bennaceur, **P. E. Gaskell**, M. Savard, P. L. Levesque, F. Mahvash, A. Guermoune, M. Siaj et al., "Quantum hall effect in hydrogenated graphene," *Physical review letters*, vol. 110, no. 17, p. 176801, 2013

G. Zeb, **P. E. Gaskell**, X. T. Le, X. Xiao, T. Szkopek, and M. Cerruti, "Decoration of graphitic surfaces with sn nanoparticles through surface functionalization using diazonium chemistry," *Langmuir*, 2012

E. Ledwosinska, **P. E. Gaskell**, A. Guermoune, M. Siaj, and T. Szkopek, "Organic-free suspension of large-area graphene," *Applied Physics Letters*, vol. 101, no. 3, pp. 033 104-033 104, 2012

W. Strupinski, K. Grodecki, A. Wysmolek, R. Stepniewski, T. Szkopek, **P. E. Gaskell**, A. Gruneis, D. Haberer, R. Bozek, J. Krupka et al., "Graphene epitaxy by chemical vapor deposition on sic," *Nano letters*, vol. 11, no. 4, pp. 1786-1791, 2011

P. E. Gaskell, H. S. Skulason, W. Strupinski, and T. Szkopek, "High spatial resolution ellipsometer for characterization of epitaxial graphene" *Optics letters*, vol. 35, no. 20, pp. 3336-3338, 2010

H. S. Skulason, **P. E. Gaskell**, and T. Szkopek, "Optical reflection and transmission properties of exfoliated graphite from a graphene monolayer to several hundred graphene layers," *Nanotechnology*, vol. 21, no. 29, p. 295709, 2010

P. E. Gaskell, J. J. Thorn, S. Alba, and D. A. Steck, "An open-source, extensible system for laboratory timing and control," *Review of Scientific Instruments*, vol. 80, no. 11, pp. 115 103-115 103, 2009

P. E. Gaskell, H. S. Skulason, C. Rodenchuk, and T. Szkopek, "Counting graphene layers on glass via optical reflection microscopy," Applied physics letters, vol. 94, no. 14, pp. 143 101-143 101, 2009

In Review

J. Paredes, P. Sharma, B. Ha, M. Lanchares, E. M. Atkins, **P. E. Gaskell**, and I. Kolmanovsky, "Development, implementation, and experimental outdoor evaluation of quadrotor controllers for computationally limited embedded systems," *Annual Reviews in Control*, 2020.

Presentations

Peer-reviewed

V. Edwards, **P. E. Gaskell**, and E. Olson, "Calibrating mixed reality for scalable multi-robot experiments", in *Proceedings of the 17th International Conference on Autonomous Agents and MultiAgent Systems*, 2018, pp. 2183-2185

P. F. D. Donato, **P. E. Gaskell**, and E. M. Atkins, "Small unmanned aircraft systems for project-based engineering education," in *AIAA Scitech Forum, AIAA Information Systems*, 2017, p. 1377

P. E. Gaskell, R.-E. Gaskell, J. W. Hong, and T. Szkopek, "Graphene oxide based materials as acoustic transducers: A ribbon microphone application case study," in *137th Audio Engineering Society Convention*, October 2014

K. Hu, G. Zeb, **P. E. Gaskell**, Y. Kim, X. Xiao, M. Cerruti, and T. Szkopek, "Enhanced performance of sn/graphene composite anodes by surface treatment", in *Meeting Abstracts of The Electrochemical Society. The Electrochemical Society*, 2013, pp. 1015-1015

R.-E. Gaskell, **P. E. Gaskell**, and G. Massenburg, "Distortions in audio op-amps and their effect on listener perception of character and quality," in *131st Audio Engineering Society Convention*, vol. 1, 2012

H. S. Skulason, **P. E. Gaskell**, and T. Szkopek, "Optical reflection and transmission properties from a graphene monolayer to graphite," in *Conference on Lasers and Electro-Optics. Optical Society of America*, 2010

P. E. Gaskell, H. S. Skulason, and T. Szkopek, "Optical reflectometry and ellipsometry measurements of graphene and thin graphitic films on bulk low-index substrates," in *3rd International Nanoelectronics Conference. IEEE*, 2010, pp. 1305-1306

H. S. Skulason, **P. E. Gaskell**, C. Rodenchuk, and T. Szkopek, "Counting graphene layers on glass by optical reflection microscopy," in *APS March Meeting*, March 2009, p. 25002

Invited

P. E. Gaskell "History and Evolution of Microphone Pre-Amplifier Circuits" *Audio Builders Workshop*, Boston, March 2016

Honors and Awards

Teaching Awards

Teaching Excellence Award, University of Michigan Robotics Institute 2019

Other Awards and Fellowships

William and Rhea Seath Engineering Innovation Award, McGill University 2015

Mentorship, Supervision, and Advising

Staff

Jonathan Ward, Research & Development Engineer F2020-Present

Fang-Yi Chen, Research Assistant S2020

Graduate Students

Sai Prakash Reddy Chalavindala, M.S., University of Michigan F2019-Present

Segmentation of LIDAR for indoor and outdoor navigation of VULCAN autonomous wheel chair. Co-supervised with B. Kuipers.

Fang-Yi Chen, M.S., University of Michigan F2019

Developed a hardware in the loop simulation for an educational robotic manipulator.

Sagar Israni, M.S., University of Michigan W2019

Continued development of VULCAN autonomous wheel chair. Co-supervised with B. Kuipers.

William Hamption M.S., University of Michigan W2019

Integrated 3D LIDAR onto mobile robots for outdoor mapping and localization.

Victoria Edwards M.S., University of Michigan F2017-W2018

Implemented multi-robot experiments in mixed-reality. Co-advised with E. Olson.

Undergraduate Students

Tianhong Wen, B.S., University of Michigan F2019 - W2020

Indoor and outdoor navigation using RGB-D sensors for VULCAN autonomous wheel chair. Co-supervised with B. Kuipers.

Cigdem Kokenoz, B.S., University of Michigan F2019 - W2020

Re-localization in indoor and outdoor environments for VULCAN autonomous wheel chair. Co-supervised with B. Kuipers.

Havel Lieu, Sum. Undergrad. Res. Exper., University of Michigan S2018

Updated motor drive system, hardware, and software for mobile robots used in indoor mapping and localization.

Robin Ryce, Undergrad. Res. Opp. Proj., University of Michigan S2018

Updated motor drive system, hardware, and software for mobile robots used in indoor mapping and localization.

Quan Usher, Undergrad. Res. Opp. Proj., University of Michigan W2018

Developed prototype hexapedal robotic system and implemented simple walking algorithms.

Justin Fu, Sum. Undergrad. Res. Exper., University of Michigan S2017

Mobile robotics project - assisted design of new mobile robotics platform for education. Interfaced and characterized new LIDAR sensors.

John Toto, Sum. Undergrad. Res. Exper., University of Michigan S2016

Mobile robotics project - developed a virtual maze environment for a physical robot to navigate. Co-supervised with E. Atkins.

Haroon Sayed, Sum. Undergrad. Res. Exper., University of Michigan S2015

Mobile robotics project - developed SLAM and autonomous navigation system in Python on a mobile robotics platform. Co-supervised with E. Atkins.

William Dickerson, Undergrad. Res. Proj., McGill University 2014

Developed bolometric sensors from reduced graphene oxide materials. Co-supervised with T. Szkopek.

Ahmad Sadin Kahn, Undergrad. Res. Proj., McGill University 2012

Designed low cost computer controlled analog lock-in amplifier for low temperature Hall effect measurements. Co-supervised with T. Szkopek.

Jean-Christian Lemay, Undergrad. Res. Proj., McGill University 2011

Built ultra-high vacuum chamber with residual gas analyzer for study of desorption of molecules from graphene materials. Co-supervised with T. Szkopek.

Industry Experience

Technical Advisory Board Member, ORA Sound 2016-Present

– Advising Montreal-based startup focused on graphene nanocomposite membranes for consumer loudspeakers

– Principle IP is based on patented material I developed at McGill University.

Co-founder and Principle Design Engineer, GKL Audio 2010-2016

– Designed basic electronics educational products for audio engineering students
– Created professional recording equipment drawn from a mixture of modern and vintage technology
– Developed end-to-end manufacturing processes: research, simulation, schematic design, PCB layout, prototyping, mechanical design, and manufacturing.

Service

University Service

Core Member, Robotics Institute 2017-Present

Member, Robotics Graduate Committee 2017-Present

Member, Ad-hoc committee for teaching lab and shop design 2017-2020

Member, Research and Development Engineer hiring committee 2020

Member, Robotics Lecturer hiring committee 2020

Member, Robotics Graduate Coordinator hiring committee 2016

Coordinator, renovation of classroom/offices/common spaces for Robotics in CSRB 2016

Other Academic Service

Reviewer

Review of Scientific Instruments, Audio Engineering Society, Journal of Aerospace Information Systems

Patents

P. E. Gaskell, R.-E. Gaskell, T. Szkopek, and J. W. Hong, "Method of forming an acoustic transducer" Patent US10390162B2, Aug. 20, 2019.

Teaching Experience

Instructor of Record

The University of Michigan

ROB 550: Robotic Systems Laboratory F17, W18, F18, W19, F19, W20, F20, W21

ROB 550 (Lab Sections): F14, F15, F16, W17, F17, W18, F18, W19, F19, W20, F20, W21

ROB 599/AERO 740: Experimental Unmanned Aerial Systems W19

Minicourse: Robotics Toolkit Workshop F17

Engineering Education Services: Course Support

The University of Michigan

ECSE 467: Autonomous Robots	W16, W17, W18, F18, W19, F19, W20, F20, W21
EECS 200: Electrical Engineering Systems Design	W19
ENGR 100: Intro to Autonomous Electronic Systems	F17
AERO 552/AERO 450: Flight Software Systems	W15, W16
ECSE 464: Hands On Robotics	W15, W16
AERO 205: Intro to Aero Engineering Systems	W15
ME 461: Automatic Control	W15

McGill University

McGill Robotics Team	F13, W14
MUSR 232: Introduction to Electronics,	F10, F11, F12, F13

Graduate Student Teaching Assistant

McGill University

ECSE 291: Electrical Measurements Lab	W12, W14
ECSE 200: Electric Circuits I	F10, F11
MIME 467: Electrical Properties of Materials	S10

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