

Peter E. Gaskell

Ford Motor Company Robotics Building
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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. Sij 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. Sij, 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. Wyszomolek, 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
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Other Awards and Fellowships

Faculty Award, University of Michigan Robotics Institute	2021
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William and Rhea Seath Engineering Innovation Award, McGill University	2015
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Mentorship, Supervision, and Advising

Staff

Jonathan Ward, Research & Development Engineer	F2020-Present
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Fang-Yi Chen, Research Assistant	S2020
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Graduate Students

Sai Prakash Reddy Chalavindala, M.S., University of Michigan	F2019-Present
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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
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Developed a hardware in the loop simulation for an educational robotic manipulator.

Sagar Israni, M.S., University of Michigan	W2019
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Continued development of VULCAN autonomous wheel chair. Co-supervised with B. Kuipers.

William Hampton M.S., University of Michigan	W2019
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Integrated 3D LIDAR onto mobile robots for outdoor mapping and localization.

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