ELECTRICAL AND COMPUTER ENGINEERING (ECE)

at the

University of Michigan

RECENT FACULTY PUBLICATIONS,
PATENTS, AND CURRENT STUDENTS
2018

UNIVERSITY OF
MICHIGAN

Graduate Offices

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ECE at Michigan is a top-ranked, world-class department that is pushing the boundaries of research in the most high-tech and innovative areas affecting society. Our faculty and students are relentless in their pursuit of excellence, and apply their knowledge and skills to the needs of society.

At Michigan ECE, students learn, create, play, make lifelong friends, and one day join an enormous network of 19,000 welcoming alumni. Our graduate program is designed around the excellence, diversity, and curiosity of our students.

This document provides current and prospective students a summary of recent research publications and related information about tenure and tenure-track faculty in Electrical and Computer Engineering (ECE) at the University of Michigan.

Michigan ECE faculty specialize in the areas listed below, while continually reaching into new areas and collaborating across disciplines with faculty throughout the University of Michigan, the country, and the world. The University of Michigan has about 100 graduate programs ranked in the top 10 by U.S News & World Report, including ECE.

Get ready to change the world by sharpening your expertise in any of the following areas:

Applied Electromagnetics & RF Circuits
Computer Vision
Control Systems
Embedded Systems
Integrated Circuits & VLSI
MEMS & Microsystems
Network, Communication, and Information Systems
Optics & Photonics
Power & Energy
Robotics
Signal & Image Processing and Machine Learning
Solid State & Nanotechnology

Table of Contents

Afshari, Ehsan

Website: http://unic.eecs.umich.edu/

Research Interests: High frequency circuits and systems for imaging, bio-sensing, and high data rate communication.

Recent Publications

- A High-Resolution 220-GHz Ultra-Wideband Fully Integrated ISAR Imaging System, Mostajeran A., Naghavi S., Emadi M., Samala S., Ginsburg B., Aseeri M., Afshari E., IEEE Transactions on Microwave Theory and Techniques, 01/01/2019
- A 308-317GHz source with 4.6mW peak radiated power and on-chip frequency-stabilization feedback in 0.13mm BiCMOS, Jiang C., Aseeri M., Cathelin A., Afshari E., Digest of Papers - IEEE Radio Frequency Integrated Circuits Symposium, 08/07/2018
- A Single-Stage Soft-Switching High-Frequency AC-Link PV Inverter: Design, Analysis, and Evaluation of Si-based and SiC-based Prototypes, Khodabandeh M., Afshari E., Amirabadi M., IEEE Transactions on Power Electronics, 06/12/2018
- H8 Inverter to Reduce Leakage Current in Transformerless Three-Phase Grid-Connected Photovoltaic systems, Rahimi R., Farhangi S., Farhangi B., Moradi G., Afshari E., Blaabjerg F., IEEE Journal of Emerging and Selected Topics in Power Electronics, 06/01/2018
- A Single-Stage Capacitive AC-Link AC-AC Power Converter, Afshari E., Khodabandeh M., Amirabadi M., IEEE Transactions on Power Electronics, 05/26/2018
- A series-AC-link ISOP AC-AC converter with two power cells, Afshari E., Amirabadi M., Conference Proceedings - IEEE Applied Power Electronics Conference and Exposition - APEC, 04/18/2018
- A 301.7-to-331.8GHz source with entirely on-chip feedback loop for frequency stabilization in 0.mm BiCMOS, Jiang C., Aseeri M., Cathelin A., Afshari E., Digest of Technical Papers - IEEE International Solid-State Circuits Conference, 03/08/2018
- A 173 GHz Amplifier with a 18.5 dB Power Gain in a 130 nm SiGe Process: A Systematic Design of High-Gain Amplifiers above $f_{max}/2$, Khatibi H., Khiyabani S., Afshari E., IEEE Transactions on Microwave Theory and Techniques, 01/01/2018
- A 0.92-THz SiGe Power Radiator Based on a Nonlinear Theory for Harmonic Generation, Aghasi H., Cathelin A., Afshari E., IEEE Journal of Solid-State Circuits, 2/1/2017
- A 170-GHz Fully Integrated Single-Chip FMCW Imaging Radar with 3-D Imaging Capability, Mostajeran A., Cathelin A., Afshari E., IEEE Journal of Solid-State Circuits, 10/1/2017

- A 173 GHz Amplifier with a 18.5 dB Power Gain in a 130 nm SiGe Process: A Systematic Design of High-Gain Amplifiers above f max /2, Khatibi H., Khiyabani S., Afshari E., IEEE Transactions on Microwave Theory and Techniques, 1/1/2018
- A 195 GHz single-transistor fundamental VCO with 15.3% DC-to-RF efficiency, 4.5 mW output power, phase noise FoM of -197 dBc/Hz and 1.1% tuning range in a 55 nm SiGe process, Khatibi H., Khiyabani S., Cathelin A., Afshari E., Digest of Papers - IEEE Radio Frequency Integrated Circuits Symposium, 7/5/2017
- A compact ultra-wide-band frequency divider with a locking range of 12-61 GHz with 0dBm of input power, Mostajeran A., Emadi M., Cathelin A., Afshari E., IEEE MTT-S International Microwave Symposium Digest, 10/4/2017
- A High-Speed Efficient 220-GHz Spatial-Orthogonal ASK Transmitter in 130-nm SiGe BiCMOS, Jiang C., Cathelin A., Afshari E., IEEE Journal of Solid-State Circuits, 9/1/2017
- An Efficient High-Power Fundamental Oscillator above f max /2 : A Systematic Design, Khatibi H., Khiyabani S., Afshari E., IEEE Transactions on Microwave Theory and Techniques, 11/1/2017
- An ultra-wideband harmonic radiator with a tuning range of 62GHz (28.3%) at 220GHz, Mostajeran A., Afshari E., Digest of Papers - IEEE Radio Frequency Integrated Circuits Symposium, 7/5/2017
- On Probability of Support Recovery for Orthogonal Matching Pursuit Using Mutual Coherence, Miandji E., Emadi M., Unger J., Afshari E., IEEE Signal Processing Letters, 11/1/2017
- On-chip terahertz electronics: From device-electromagnetic integration to energy-efficient, large-scale microsystems, Han R., Holloway J., Jiang C., Mostajeran A., Afshari E., Cathelin A., Zhang Y., Boglione L., Hancock T., Wang C., Hu Z., Zhang G., Technical Digest - International Electron Devices Meeting, IEDM, 1/31/2017
- Power-efficient terahertz communication circuits, Aghasi H., Afshari E., Proceedings of the 4th ACM International Conference on Nanoscale Computing and Communication, NanoCom 2017, 9/27/2017
- Towards efficient high power mm-wave and terahertz sources in silicon: One decade of progress, Khatibi H., Afshari E., SiRF 2017 - 2017 IEEE 17th Topical Meeting on Silicon Monolithic Integrated Circuits in RF Systems, 3/8/2017

Students Advised

- Lili Chen, ECE PHD (admitted 2018)
- Bahareh Hadidian, ECE PHD (admitted 2018)
- Zainulabideen Khalifa, ECE PHD (admitted 2017)
- Farzad Khoeini, ECE PHD (admitted 2017)
- Seyyedmohammadhossein Naghavi, ECE PHD (admitted 2018)
- Morteza Tavakoli Taba, ECE PHD (admitted 2018)

Ahmadi, Elaheh

Research Interests: Epitaxial growth and characterization of III-N and Oxide semiconductor materials for electronic and optoelectronics devices, sensing and MEMs applications as well as electron transport modeling.

Recent Publications

- Donors and deep acceptors in b-Ga_2O_3, Neal A., Mou S., Rafique S., Zhao H., Ahmadi E., Speck J., Stevens K., Blevins J., Thomson D., Moser N., Chabak K., Jessen G., Applied Physics Letters, 08/06/2018
- Deep level defects in Ge-doped (010) b-Ga_2O_3 layers grown by plasma-assisted molecular beam epitaxy, Farzana E., Ahmadi E., Speck J., Arehart A., Ringel S., Journal of Applied Physics, 04/28/2018
- N-type dopants in (001) b-Ga_2O_3 grown on (001) b-Ga_2O_3 substrates by plasma-assisted molecular beam epitaxy, Han S., Mauze A., Ahmadi E., Mates T., Oshima Y., Speck J., Semiconductor Science and Technology, 03/01/2018
- Analysis of MOCVD SiN_x Passivated N-Polar GaN MIS-HEMTs on Sapphire with High fmax VDS,Q, Zheng X., Li H., Guidry M., Romanczyk B., Ahmadi E., Hestroffer K., Wienecke S., Keller S., Mishra U., IEEE Electron Device Letters, 03/01/2018
- Enhanced mobility in vertically scaled N-polar high-electron-mobility transistors using GaN/InGaN composite channels, Li H., Wienecke S., Romanczyk B., Ahmadi E., Guidry M., Zheng X., Keller S., Mishra U., Applied Physics Letters, 02/12/2018
- Establishment of design space for high current gain in III-N hot electron transistors, Gupta G., Ahmadi E., Suntrup D., Mishra U., Semiconductor Science and Technology, 01/01/2018
- Growth and etching characteristics of (001) b-Ga_2O_3 by plasma-assisted molecular beam epitaxy, Oshima Y., Ahmadi E., Kaun S., Wu F., Speck J., Semiconductor Science and Technology, 01/01/2018
- Demonstration of constant 8 W/mm power density at 10, 30, and 94 GHz in state-of-the-art millimeter-wave N-polar GaN MISHEMTs, Romanczyk B., Wienecke S., Guidry M., Li H., Ahmadi E., Zheng X., Keller S., Mishra U., IEEE Transactions on Electron Devices, 01/01/2018

Students Advised

- Zhe Jian, ECE PHD (admitted 2018)
- Kamruzzaman Khan, MSE PHD (admitted 2018)
- Subhajit Mohanty, ECE PHD (admitted 2018)
- Sandra Diez Pinzon, Applied Physics PhD (admitted 2018)

Anastasopoulos, Achilleas

Website: https://anastasopoulos.engin.umich.edu/

Research Interests: Resource allocation on networked systems with emphasis on analysis of dynamic games and mechanism design; Information theory with emphasis on fundamental QoS limits in multiuser environments; Communication theory with emphasis on design of capacity-achieving transmission schemes for noisy channels.

Recent Publications

- A systematic process for evaluating structured perfect Bayesian equilibria in dynamic games with asymmetric information, Vasal D., Sinha A., Anastasopoulos A., IEEE Transactions on Automatic Control, 01/2019
- Mechanism design for resource allocation in networks with intergroup competition and intragroup sharing, Sinha A., Anastasopoulos A., IEEE Transactions on Control of Network Systems, 09/2018
- On the reliability function of discrete memoryless multiple-access channel with feedback, M. Heidari, A. Anastasopoulos, and S. Sandeep Pradhan, IEEE Information Theory Workshop (ITW), 11/2018
- Characterizing Non-Myopic Information Cascades in Bayesian learning, I. Bistritz and A. Anastasopoulos, IEEE Conference on Decision and Control (CDC), 12/2018
- Distributed mechanism design for multicast transmission, N. Heydaribeni and A. Anastasopoulos, IEEE Conference on Decision and Control (CDC), 12/2018
- Distributed Mechanism Design for Unicast Transmission, N. Heydaribeni and A. Anastasopoulos, Information Theory and Applications (ITA), 2/2018
- A distributed mechanism for public goods allocation with dynamic learning guarantees, Sinha A., Anastasopoulos A., Proceedings of NetEcon 2017 the 12th Workshop on the Economics of Networks, Systems and Computation - In Conjunction with ACM EC 2017 the 18th ACM Conference on Economics and Computation, 6/2017
- Incentive mechanisms for fairness among strategic agents, Sinha A., Anastasopoulos A., IEEE Journal on Selected Areas in Communications, 11/2017
- Distributed mechanism design with learning guarantees, A. Sinha and A. Anastasopoulos, IEEE Conf. on Decision and Control (CDC), 12/2017
- Linear quadratic games with costly measurements, D. Maity, A. Anastasopoulos, and J. Baras, IEEE Conf. on Decision and Control (CDC), 12/2017

- Variable-length codes for channels with memory and feedback: Error-exponent lower bounds, Anastasopoulos A., Wu J., IEEE International Symposium on Information Theory (ISIT), 6/2017

Students Advised

- Nasimeh Heydaribeni, ECE PHD (admitted 2017)

Avestruz, Al-Thaddeus

Website: https://avestruz.engin.umich.edu/

Research Interests: High Performance Power Electronics, Wireless Power Transfer. Complementary Interests in Circuits and Systems for Sensing, Electromagnetic Systems, Feedback and Controls, Renewable Energy, Automotive, Biomedical, and Consumer.

Recent Publications

- Switching-Synchronized Sampled-State Space Modeling and Digital Controller for a Constant-Off Time, Current-Mode Boost Converter, Cui X., Avestruz A., 2019 American Control Conference, 7/10/2019.
- Performance Comparisons of Synchronous and Uncontrolled Rectifiers for 27.12 MHz Wireless Power Transfer Using CMCD Converters, Zan X., Avestruz A., 2018 IEEE Energy Conversion Congress and Exposition, ECCE 2018, 12/03/2018
- A New Framework for Cycle-by-Cycle Digital Control of Megahertz-Range Variable Frequency Buck Converters, Cui X., Avestruz A., 2018 IEEE 19th Workshop on Control and Modeling for Power Electronics, COMPEL 2018, 09/10/2018
- 27.12 MHz Bi-Directional Wireless Power Transfer Using Current-Mode Class D Converters with Phase-Shift Power Modulation, Zan X., Avestruz A., 2018 IEEE PELS Workshop on Emerging Technologies: Wireless Power Transfer, Wow 2018, 08/29/2018
- Scaling Wireless Power Transfer Through Code Division Multiple Access, Sarin A., Avestruz A., 2018 IEEE PELS Workshop on Emerging Technologies: Wireless Power Transfer, Wow 2018, 08/29/2018
- Accurate Transfer-Power Measurement for Wireless Charging of Electric Vehicles under Misalignment, Chu S., Cui X., Avestruz A., 2018 IEEE PELS Workshop on Emerging Technologies: Wireless Power Transfer, Wow 2018, 08/29/2018
- Comparison of switched receivers for direct-sequence spread-spectrum wireless power transfer, Sarin A., Cui X., Avestruz A., 2017 IEEE 18th Workshop on Control and Modeling for Power Electronics, COMPEL 2017, 8/18/2017
- Transfer-power measurement: A non-contact method for fair and accurate metering of wireless power transfer in electric vehicles, Chu S., Avestruz A., 2017 IEEE 18th Workshop on Control and Modeling for Power Electronics, COMPEL 2017, 8/18/2017
- Wireless power transfer for implantable medical devices using piecewise resonance to achieve high peak-To-Average power ratio, Zan X., Avestruz A., 2017 IEEE 18th Workshop on Control and Modeling for Power Electronics, COMPEL 2017, 8/18/2017

Patents Issued

- Method and apparatus for producing an asymmetric magnetic field, Al-Thaddeus Avestruz, Arijit Banerjee, Arthur Hsu Chen Chang, Shahriar R. Khushrushahi, Steven B. Leeb. Patent #: 9786423

Students Advised

- Sung Yul Chu, ECE PHD (admitted 2016)
- Xiaofan Cui, ECE PHD (admitted 2016)
- Alireza Ramyar, ECE PHD (admitted 2018)
- Akshay Sarin, ECE PHD (admitted 2016)
- Xin Zan, ECE PHD (admitted 2016)

Balzano, Laura

Website: http://web.eecs.umich.edu/~girasole/

Research Interests: Statistical signal processing, machine learning, and optimization theory and methods for dealing with large complex data.

Recent Publications

- Disaggregating Load by Type from Distribution System Measurements in Real-Time, G.S. Ledva, Z. Du, L. Balzano, and J. Mathieu, in the book, Energy Markets and Responsive Grids: Modeling, Control, and Optimization, Sean Meyn, Tariq Samad, Sonja Glavaski, Ian Hiskens, and Jakob Stoustrup, editors. pp. 413-437. Springer, New York, NY, 2018.
- Improving K-Subspaces via Coherence Pursuit, Gitlin A., Tao B., Balzano L., Lipor J., IEEE Journal on Selected Topics in Signal Processing, 12/01/2018
- Learning dictionary-based unions of subspaces for image denoising, Hong D., Malinas R., Fessler J., Balzano L., European Signal Processing Conference, 11/29/2018
- Exploring Connections between a Multiple Model Kalman Filter and Dynamic Fixed Share with Applications to Demand Response, Ledva G., Balzano L., Mathieu J., 2018 IEEE Conference on Control Technology and Applications, CCTA 2018, 10/26/2018
- The Landscape of Non-Convex Quadratic Feasibility, Bower A., Jain L., Balzano L., ICASSP, IEEE International Conference on Acoustics, Speech and Signal Processing - Proceedings, 09/10/2018
- Asymptotic performance of PCA for high-dimensional heteroscedastic data, Hong D., Balzano L., Fessler J., Journal of Multivariate Analysis, 09/01/2018
- Real-Time Energy Disaggregation of a Distribution Feeder's Demand Using Online Learning, Ledva G., Balzano L., Mathieu J., IEEE Transactions on Power Systems, 09/01/2018
- Simultaneous Sparsity and Parameter Tying for Deep Learning Using Ordered Weighted L1 Regularization, Zhang D., Katz-Samuels J., Figueiredo M., Balzano L., 2018 IEEE Statistical Signal Processing Workshop, SSP 2018, 08/29/2018
- Online Estimation of Coherent Subspaces with Adaptive Sampling, Ongie G., Hong D., Zhang D., Balzano L., 2018 IEEE Statistical Signal Processing Workshop, SSP 2018, 08/29/2018
- Streaming PCA and Subspace Tracking: The Missing Data Case, Balzano L., Chi Y., Lu Y., Proceedings of the IEEE, 08/01/2018

- Enhanced online subspace estimation via adaptive sensing, Ongie G., Hong D., Zhang D., Balzano L., Conference Record of 51st Asilomar Conference on Signals, Systems and Computers, ACSSC 2017, 04/10/2018
- Online dynamic MRI reconstruction via robust subspace tracking, Ongie G., Dewangan S., Fessier J., Balzano L., 2017 IEEE Global Conference on Signal and Information Processing, GlobalSIP 2017 - Proceedings, 03/07/2018
- Low algebraic dimension matrix completion, Pimentel-Alarcon D., Ongie G., Balzano L., Willett R., Nowak R., 55th Annual Allerton Conference on Communication, Control, and Computing, Allerton 2017, 01/17/2018
- A Robust Algorithm for Online Switched System Identification*, Du Z., Balzano L., Ozay N., IFAC-PapersOnLine, 01/01/2018
- Distance-Penalized Active Learning Using Quantile Search, Lipor J., Wong B., Scavia D., Kerkez B., Balzano L., IEEE Transactions on Signal Processing, 10/15/2017
- Matched subspace detection using compressively sampled data, Zhang D., Balzano L., ICASSP, IEEE International Conference on Acoustics, Speech and Signal Processing - Proceedings, 6/16/2017
- Mixture regression as subspace clustering, Pimentel-Alarcon D., Balzano L., Marcia R., Nowak R., Willett R., 2017 12th International Conference on Sampling Theory and Applications, SampTA 2017, 9/1/2017
- On learning high dimensional structured single index models, Ganti R., Rao N., Balzano L., Willett R., Nowak R., 31st AAAI Conference on Artificial Intelligence, AAAI 2017, 1/1/2017
- What to Expect When You Are Expecting on the Grassmannian, Eftekhari A., Balzano L., Wakin M., IEEE Signal Processing Letters, 6/1/2017

Students Advised

- Amanda Bower, Applied & Interdisciplinary Mathematics PHD (co-advised)
- Tyler Doiron, ECE Master's (co-advised)
- Zhe Du, ECE PHD (co-advised) (admitted 2017)
- Kyle Gilman, ECE PHD (admitted 2017)
- David Hong, ECE PHD (co-advised) (admitted 2013)
- Alexander Ritchie, ECE PHD (co-advised) (admitted 2017)
- Yutong Wang, ECE PHD (co-advised) (admitted 2016)
- Dejiao Zhang, ECE PHD (admitted 2013)

Berenson, Dmitry

Website: http://web.eecs.umich.edu/~dmitryb/

Research Interests: Motion planning and machine learning for robotic manipulation.

Recent Publications

- Asymptotically Near-Optimal Methods for Kinodynamic Planning with Initial State Uncertainty, Kaiwen Liu, Yang Zhang, Andrew Dobson, and Dmitry Berenson IEEE Robotics and Automation Letters (RA-L), in press.
- Estimating Model Utility for Deformable Object Manipulation Using Multi-Armed Bandit Methods, Dale McConachie and Dmitry Berenson, IEEE Transactions on Automation Science and Engineering (T-ASE), Vol. 15, No. 3, pp. 967-979, July 2018.
- Simultaneous learning of hierarchy and primitives for complex robot tasks, Anahita Mohseni-Kabir, Changshuo Li, Victoria Wu, Daniel Miller, Benjamin Hylak, Sonia Chernova, Dmitry Berenson, Candace Sidner, Charles Rich, Autonomous Robots (AuRo), online May 2018.
- Unsupervised Early Prediction of Human Reaching for Human-robot Collaboration in Shared Workspaces, Ruikun Luo, Rafi Hayne, and Dmitry Berenson, Autonomous Robots (AuRo), Vol. 42, No. 3, pp 631–648, March 2018.
- Learning Constraints from Demonstrations, Glen Chou, Dmitry Berenson, Necmiye Ozay, Workshop on the Algorithmic Foundations of Robotics (WAFR), December, 2018.
- Motion Planning for Manipulators in Unknown Environments with Contact Sensing Uncertainty, Brad Saund and Dmitry Berenson, International Symposium on Experimental Robotics (ISER), November 2018.
- Accounting for Directional Rigidity and Constraints in Control for Manipulation of Deformable Objects without Physical Simulation, Mengyao Ruan, Dale McConachie, and Dmitry Berenson, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), October, 2018.
- Humanoid Navigation Planning in Large Unstructured Environments Using Traversability-Based Segmentation, Yu-Chi Lin and Dmitry Berenson, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), October, 2018
- Incremental Segmentation of ARX Models, Chou G., Ozay N., Berenson D., IFAC-PapersOnLine, 01/01/2018
- What happened at the DARPA robotics challenge finals, Atkeson C., Benzun P., Banerjee N., Berenson D., Bove C., Cui X., DeDonato M., Du R., Feng S., Franklin P., Gennert M.,

Graff J., He P., Jaeger A., Kim J., Knoedler K., Li L., Liu C., Long X., Padir T., Polido F., Tighe G., Xinjilefu X., Springer Tracts in Advanced Robotics, 01/01/2018

- Achieving reliable humanoid robot operations in the DARPA robotics challenge: Team WPI-CMU's approach, Atkeson C., Benzun P., Banerjee N., Berenson D., Bove C., Cui X., DeDonato M., Du R., Feng S., Franklin P., Gennert M., Graff J., He P., Jaeger A., Kim J., Knoedler K., Li L., Liu C., Long X., Polido F., Xinjilefu X., Padir T., Springer Tracts in Advanced Robotics, 01/01/2018
- A framework for robot-assisted doffing of personal protective equipment, Umali A., Berenson D., Proceedings - IEEE International Conference on Robotics and Automation, 7/21/2017
- SLHAP: Simultaneous learning of hierarchy and primitives, Mohseni-Kabir A., Li C., Wu V., Miller D., Hylak B., Chernova S., Berenson D., Sidner C., Rich C., ACM/IEEE International Conference on Human-Robot Interaction, 3/6/2017
- Team WPI-CMU: Achieving Reliable Humanoid Behavior in the DARPA Robotics Challenge, DeDonato M., Polido F., Knoedler K., Babu B., Banerjee N., Bove C., Cui X., Du R., Franklin P., Graff J., He P., Jaeger A., Li L., Berenson D., Gennert M., Feng S., Liu C., Xinjilefu X., Kim J., Atkeson C., Long X., Padir T., Journal of Field Robotics, 3/1/2017
- Unsupervised early prediction of human reaching for human-robot collaboration in shared workspaces, Luo R., Hayne R., Berenson D., Autonomous Robots, 7/8/2017

Students Advised

- Glen Chou, ECE PHD (co-advised) (admitted 2017)
- Yu-Chi Lin, ROB PHD
- Peter Mitrano, ROB PHD
- Dale McConachie, ROB PHD
- Tom Power, ROB PHD
- Bradley Saund, ROB PHD
- Johnson Zhong, ROB PHD

Bhattacharya, Pallab

Website: https://bhattacharya.engin.umich.edu/

Research Interests: Molecular beam epitaxy, low-dimensional quantum confined systems, quantum dot lasers and detectors, optoelectronic integrated circuits, spintronic devices.

Recent Publications

- A dominant electron trap in molecular beam epitaxial InAlN lattice-matched to GaN, Pandey A., Bhattacharya A., Cheng S., Botton G., Mi Z., Bhattacharya P., Journal of Physics D: Applied Physics, 03/12/2018
- Spin-injection-induced gain anisotropy in a polariton diode laser, Bhattacharya A., Bhattacharya P., Physical Review B, 02/14/2018
- Shape Evolution of Highly Lattice-Mismatched InN/InGaN Nanowire Heterostructures, Yan L., Hazari A., Bhattacharya P., Millunchick J., Journal of Electronic Materials, 02/01/2018
- Shape Evolution of Highly Lattice-Mismatched InN/InGaN Nanowire Heterostructures, Yan L., Hazari A., Bhattacharya P., Millunchick J., Journal of Electronic Materials, 2/1/2018
- III-Nitride Electrically Pumped Visible and Near-Infrared Nanowire Lasers on (001) Silicon, Bhattacharya P., Hazari A., Jahangir S., Guo W., Frost T., Semiconductors and Semimetals, 12/1/2017
- Red and Near-Infrared III-Nitride Quantum Dot Lasers, Frost T., Su G., Hazari A., Dallesasse J., Bhattacharya P., IEEE Journal of Selected Topics in Quantum Electronics, 11/1/2017
- Infrared Absorption at 300 K in InGaN/GaN Disk-in-Nanowire Arrays Grown on (001) Silicon, Hazari A., Soibel A., Gunapala S., Bhattacharya P., IEEE Photonics Technology Letters, 10/15/2017
- Room-Temperature Spin Polariton Diode Laser, Bhattacharya A., Baten M., Iorsh I., Frost T., Kavokin A., Bhattacharya P., Physical Review Letters, 8/10/2017
- 1.3 mm Optical Interconnect on Silicon: A Monolithic III-Nitride Nanowire Photonic Integrated Circuit, Hazari A., Hsiao F., Yan L., Heo J., Millunchick J., Dallesasse J., Bhattacharya P., IEEE Journal of Quantum Electronics, 8/1/2017

- High-resolution nonlinear optical spectroscopy of InGaN quantum dots in GaN nanowires, Nelson C., Deshpande S., Liu A., Jahangir S., Bhattacharya P., Journal of the Optical Society of America B: Optical Physics, 6/1/2017
- Room temperature GaN-based edge-emitting spin-polarized light emitting diode, Bhattacharya A., Baten Z., Frost T., Bhattacharya P., IEEE Photonics Technology Letters, 2/1/2017
- III-nitride nanowire array based 1.3mm monolithic photonic integrated circuit on (001) silicon substrate, Hazari A., Heo J., Bhattacharya P., Optics InfoBase Conference Papers, 1/1/2017
- InGaN/GaN Quantum Dot Visible Lasers, T. Frost, G-L. Su, J. Dallesasse, and P. Bhattacharya, Handbook of GaN Semiconductor Materials and Devices, 1/1/2017
- III-Nitride Nanowires and their Laser, LED, and Photovoltaic Applications, W. Guo, P. Bhattacharya and J.S. Hey, Compound Semiconductor Nanowires: Materials, Devices, and Applications, 1/1/2017
- Room Temperature GaN-Based Edge-Emitting Spin-Polarized Light Emitting Diode, A. Bhattacharya, Md. Z. Baten, T. Frost, and P. Bhattacharya, IEEE Photonics Technology Letters, 1/1/2017
- Spin-Injection Induced Gain Anisotropy in a Polarity Diode Laser, A. Bhattacharya and P. Bhattacharya, Physical Review B, 1/1/2018

Students Advised

- Anthony Aiello, ECE PHD (admitted 2016)
- Ayush Pandey, ECE PHD (co-advised) (admitted 2017)

Blaauw, David

Website: https://blaauw.engin.umich.edu/

Research Interests: Low power and high performance VLSI design; Low power wireless sensors and embedded systems.

Recent Publications

- A 1920 x 1080 25FPS, 2.4TOPS/W Unified Optical Flow and Depth 6D Vision Processor for Energy-Efficient, Low Power Autonomous Navigation, Li Z., Wang J., Sylvester D., Blaauw D., Kim H., IEEE Symposium on VLSI Circuits, Digest of Technical Papers, 10/22/2018
- A 179-Lux Energy-Autonomous Fully-Encapsulated 17-mm^3 Sensor Node with Initial Charge Delay Circuit for Battery Protection, Lee I., Kim G., Moon E., Jeong S., Kim D., Phillips J., Blaauw D., IEEE Symposium on VLSI Circuits, Digest of Technical Papers, 10/22/2018
- A 224 PW 260 PPM/degC Gate-Leakage-Based Timer for Ultra-Low Power Sensor Nodes with Second-Order Temperature Dependency Cancellation, Lim J., Jang T., Saligane M., Yasuda M., Miyoshi S., Kawaminami M., Blaauw D., Sylvester D., IEEE Symposium on VLSI Circuits, Digest of Technical Papers, 10/22/2018
- A 2.2 NEF Neural-Recording Amplifier Using Discrete-Time Parametric Amplification, Jang T., Lim J., Choo K., Nason S., Lee J., Oh S., Jeong S., Chestek C., Sylvester D., Blaauw D., IEEE Symposium on VLSI Circuits, Digest of Technical Papers, 10/22/2018
- A 28NM Integrated True Random Number Generator Harvesting Entropy from MRAM, Yang K., Dong Q., Wang Z., Shih Y., Chih Y., Chang J., Blaauw D., Svlvester D., IEEE Symposium on VLSI Circuits, Digest of Technical Papers, 10/22/2018
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- Electrostatic discharge clamp circuit for ultra-low power applications, Patent #: 9716381
- Floating-gate transistor array for performing weighted sum computation, Patent #: 9760533
- Ultra Low Power Temperature Insensitive Current Source with Line and Load Regulation, Patent #: 9639107
- Protocol for an electronic device to receive a data packet from an external device, Patent #: 9635147
- Measurement circuitry and method for measuring a clock node to output node delay of a flip-flop, Patent #: 9638752
- Ultra low power temperature insensitive current source with line and load regulation, D. Blaauw, D. Sylvester, M. Choi, I. Lee, and T. Jang Patent #: 9639107

Students Advised

- Ashwin Bhat, ECE PHD (admitted 2018)
- Li-Xuan Chuo, ECE PHD (admitted 2014)
- Zhen Feng, ECE PHD (admitted 2017)
- Ziyun Li, ECE PHD (admitted 2014)
- Rohit Rothe, ECE PHD (admitted 2017)
- Jihwan Seol, ECE PHD (co-advised) (admitted 2017)
- Zhehong Wang, ECE PHD (admitted 2016)
- Xiao Wu, ECE PHD (admitted 2016)

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Research Interests: Computer vision, robotics, artificial intelligence.

Recent Publications

- Grounded Video Description, Zhou, L., Kalantidis, Y., Chen, X, Corso, J., Rohrbach, M., IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2019), 6/2019.
- BubbleNets: Learning to Select the Guidance Frame in Video Object Segmentation by Deep Sorting Frames, Griffin, B., Corso, J., IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2019), 6/2019.
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- Editorial for special section of video analytics with deep learning, Mei T., Corso J., Luo J., Pattern Recognition, 8/1/2017

Students Advised

- Shurjo Banerjee, ECE PHD (admitted 2015)
- Vikas Dhiman, ECE PHD (admitted 2014)
- Mohamed Elbanani, CSE PHD
- Victoria Florence, ROB PHD
- Eric Hofesmann, CSE PHD
- Parker Koch, ECE PHD (admitted 2015)

- Stephan Lemmer, ROB PHD
- Nathan Louis, ECE PHD (admitted 2017)
- Byungsu Min, ECE PHD (admitted 2018)
- Sajan Patel, ROB PHD
- Madan Ravi Ganesh, ECE PHD (admitted 2016)
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Research Interests: Research includes light-matter interaction in nanoscale systems and the development of low energy photonic and excitonic devices for applications in data communication and life sciences.

Recent Publications

- Exciton transport in strained monolayer WSe_2, Cordovilla Leon D., Li Z., Jang S., Cheng C., Deotare P., Applied Physics Letters, 113, no. 25 (2018): 252101
- Efficient Energy Transfer across Organic-2D Inorganic Heterointerfaces, Cheng C., Li Z., Hambarde A., Deotare P., ACS Applied Materials and Interfaces, 10 (45), 2018, pp 39336–39342
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- Highly efficient energy transfer between TMDCs and organic materials, Cheng C., Li Z., Deotare P., 2018 Conference on Lasers and Electro-Optics, CLEO 2018
- Exciton Transport in MoS_2/WSe_2 Heterostructure, Li Z., Cheng C., Deotare P. B. MRS Spring 2018

Students Advised

- Che-Hsuan Cheng, Material's Science and Eng PHD
- Kanak Datta, ECE PHD (admitted 2016)
- Zidong Li, ECE PHD (admitted 2017)

Dick, Robert

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Research Interests: Embedded systems.

Recent Publications

- Machine foveation: an application-aware compressive sensing framework, Ekdeep L. Singh, V. Aggarwal, and R. P. Dick, Proc. Data Compression Conf., Mar. 2019, accepted.
- Digital Foveation: an Energy-Aware Machine Vision Framework, Ekdeep L. Singh and R. P. Dick, IEEE Trans. Computer-Aided Design of Integrated Circuits and Systems, pp. 2371–2380, Nov. 2018.
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Students Advised

- Leonard Blado, ECE PHD (admitted 2017)
- Benjamin Simpson, ECE PHD (admitted 2017)
- Tony Zhang, ECE PHD (admitted 2017)

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Research Interests: Statistical signal and image processing; Tomographic imaging; Parameter estimation; machine-learning methods for inverse problems.

Recent Publications

- Learning dictionary-based unions of subspaces for image denoising, Hong D., Malinas R., Fessler J., Balzano L., European Signal Processing Conference, 11/29/2018
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- Design of spectral-spatial phase prewinding pulses and their use in small-tip fast recovery steady-state imaging, Williams S., Nielsen J., Fessler J., Noll D., Magnetic Resonance in Medicine, 03/01/2018
- Fast Spatial Resolution Analysis of Quadratic Penalized Least-Squares Image Reconstruction with Separate Real and Imaginary Roughness Penalty: Application to fMRI, Olafsson V., Noll D., Fessler J., IEEE Transactions on Medical Imaging, 02/01/2018
- Accelerated dual gradient-based methods for total variation image denoising/deblurring problems, Kim D., Fessler J., ICASSP, IEEE International Conference on Acoustics, Speech and Signal Processing - Proceedings, 6/16/2017
- Dictionary-free MRI parameter estimation via kernel ridge regression, Nataraj G., Nielsen J., Fessler J., Proceedings - International Symposium on Biomedical Imaging, 6/15/2017
- Efficient learning of dictionaries with low-rank atoms, Ravishankar S., Moore B., Nadakuditi R., Fessler J., 2016 IEEE Global Conference on Signal and Information Processing, GlobalSIP 2016 - Proceedings, 4/19/2017
- Low-Rank and Adaptive Sparse Signal (LASSI) Models for Highly Accelerated Dynamic Imaging, Ravishankar S., Moore B., Nadakuditi R., Fessler J., IEEE Transactions on Medical Imaging, 5/1/2017

- On the Convergence Analysis of the Optimized Gradient Method, Kim D., Fessler J., Journal of Optimization Theory and Applications, 1/1/2017
- Optimizing MR scan design for model-based T 1 ,T 2 estimation from steady-state sequences, Nataraj G., Nielsen J., Fessler J., IEEE Transactions on Medical Imaging, 2/1/2017
- Sum of outer products dictionary learning for inverse problems, Ravishankar S., Nadakuditi R., Fessler J., 2016 IEEE Global Conference on Signal and Information Processing, GlobalSIP 2016 - Proceedings, 4/19/2017

Patents Issued

- Systems and methods for parallel processing of imaging information, Evgeny Drapkin, Jean-Baptiste Thibault, Debashish Pal, Somesh Srivastava Ryan Thome, Madison McGaffin, J A Fessler, Donghwan Kim Patent #: 9721361

Students Advised

- Cameron Blocker, ECE PHD; Comput Discovery & Engin Cert. (admitted 2016)
- Caroline Crockett, ECE PHD; EER Cert. (co-advised) (admitted 2017)
- Mingjie Gao, ECE PHD (admitted 2018)
- Shouchang Guo, ECE PHD (admitted 2018)
- David Hong, ECE PHD (co-advised)
- Michelle Karker, BIO PHD
- Anish Lahiri, ECE PHD (admitted 2017)
- Hongki Lim, ECE PHD (admitted 2017)
- Naveen Murthy, ECE PHD (admitted 2017)
- Steven Whitaker, ECE PHD (admitted 2017)

Finelli, Cynthia

Website: https://finelli.engin.umich.edu/

Research Interests: Engineering education research: active learning, evidence-based teaching, student learning, classroom spaces, institutional change, with current projects studying: Motivators and barriers to adoption of active learning; Student resistance to active learning; The impact of classroom space on teaching and learning; Use of technology to increase learning and engagement; The role of background characteristics and socialization experiences in college on co-curricular participation.

Recent Publications

- Influencing changes in teaching: Addressing motivations and barriers to the adoption of evidence-based teaching practices in engineering, DeMonbrun, R. M., Cañas, J. C., & Finelli, C. J. *Journal of Excellence in College Teaching,* (in press).
- Improving student learning in undergraduate engineering education by improving teaching and assessment, Finelli, C. J., & Froyd, J. E., *Advances of Engineering Education*, (in press).
- How a flexible classroom affords active learning in electrical engineering, Johnson, A.W., Blackburn, M. W., Su, M. P., & Finelli, C. J., *IEEE Transactions on Education*, (in press).
- Integrating quantitative and qualitative research methods to examine student resistance to active learning, Shekhar, P., Prince, M. J., Finelli, C. J., DeMonbrun, R. M., & Waters, C. K. *European Journal of Engineering Education, 44*(1), 6-18, 2019
- The long-term impact of a faculty development program on student evaluations of teaching, DeMonbrun, R. M., Kerst, J., Pfershy, H., & Finelli, C. J., *International Journal of Engineering Education, 34*(4), 1325-1334, 2018.
- Reducing student resistance to active learning: Strategies for instructors, Finelli, C. J., Nguyen, K. A., DeMonbrun, R. M., Borrego, M., Prince, M. J., Husman, J., Henderson, C., Shekhar, P., & Waters, C. K., *Journal of College Science Teaching, 47*(5), 80-91, 2018.
- Strategies to mitigate student resistance to active learning, Tharayil, S. A., Borrego, M., Prince, M., Nguyen, K. A., Shekhar, P., Finelli, C. J., & Waters, C. K., *International Journal of STEM Education, 5*(7), 1-16, 2018.
- Creating an instrument to measure student response to instructional practices, DeMonbrun, R. M., Finelli, C. J., Prince, M. J., Borrego, M., Shekhar, P., Henderson, C., & Waters, C. K., *Journal of Engineering Education, 106*(2), 273-298, 2017.
- Students' expectations, types of instruction, and instructor strategies predicting student response to active learning, Nguyen, K. A., Husman, J., Borrego, M., Shekhar, P., Prince, M. J., DeMonbrun, R. M., Finelli, C. J., Henderson, C., & Waters, C. K., *International Journal of Engineering Education, 33*(1A), 2-18, 2017.

- Development of a taxonomy of keywords for engineering education research, Finelli, C. J., Borrego, M., & Rasoulifar, G., Joint publication appearing simultaneously in five journals:
    - *Journal of Engineering Education, 104*(4), 365-387.
    - *IEEE Transactions on Education, 58*(4), 219-241.
    - *International Journal of Engineering Education, 32*(1A), 2-18.
    - *Australasian Journal of Engineering Education, 21*(1), 1-16.
    - *European Journal of Engineering Education, 41*(3), 231-215.
- Development of an observation protocol to study undergraduate engineering student resistance to active learning, Shekhar, P., DeMonbrun, R. M., Borrego, M., Finelli, C. J., Prince, M. J., Henderson, C., & Waters, C. K., *International Journal of Engineering Education, 31*(2), 597-609.

Students Advised

- Emma Brennan-Wydra, School of Information MS (admitted 2017)
- Laura Carroll, Engineering Education Research PHD (admitted 2018)
- Caroline Crockett, ECE PHD (co-advised) (admitted 2017)
- Trevion Henderson, Education PHD (admitted 2017)
- Rachel Vitali, Mechanical Engineering PHD (co-advised) (admitted 2015)

Flynn, Michael P.

Website: https://www.mpflynngroup.com/

Research Interests: Analog circuits, analog-to-digital conversion, RF and wireless circuits. high-speed serial transceivers.

Recent Publications

- A Mismatch-Immune 12-Bit SAR ADC with Completely Reconfigurable Capacitor DAC, Collins N., Tamez A., Jie L., Pernillo J., Flynn M., IEEE Transactions on Circuits and Systems II: Express Briefs, 11/01/2018
- A Maximum-Likelihood Sequence Detection Powered ADC-Based Serial Link, Song S., Choo K., Chen T., Jang S., Flynn M., Zhang Z., IEEE Transactions on Circuits and Systems I: Regular Papers, 07/01/2018
- Digital Fractional-N PLLs Based on a Continuous-Time Third-Order Noise-Shaping Time-to-Digital Converter for a 240-GHz FMCW Radar System, Dayanik M., Flynn M., IEEE Journal of Solid-State Circuits, 06/01/2018
- A 1.5-GHz 6.144T Correlations/s 64 x 64 Cross-Correlator with 128 Integrated ADCs for Real-Time Synthetic Aperture Imaging, Bell J., Knag P., Sun S., Lim Y., Chen T., Fredenburg J., Chen C., Zhai C., Rocca A., Collins N., Tamez A., Pernillo J., Correll J., Tanner A., Zhang Z., Flynn M., IEEE Journal of Solid-State Circuits, 5/1/2017
- A 16-element 4-beam 1GHz-IF 100MHz-bandwidth Interleaved Bit-Stream digital beamformer in 40nm CMOS, Jang S., Jeong J., Lu R., Flynn M., Digest of Papers - IEEE Radio Frequency Integrated Circuits Symposium, 7/5/2017
- A 3.43TOPS/W 48.9pJ/pixel 50.1nJ/classification 512 analog neuron sparse coding neural network with on-chip learning and classification in 40nm CMOS, Buhler F., Brown P., Li J., Chen T., Zhang Z., Flynn M., IEEE Symposium on VLSI Circuits, Digest of Technical Papers, 8/10/2017
- A 48-MHz Differential Crystal Oscillator with 168-fs Jitter in 28-nm CMOS, Rajavi Y., Ghahramani M., Khalili A., Kavousian A., Kim B., Flynn M., IEEE Journal of Solid-State Circuits, 10/1/2017
- A 5GS/s 156MHz BW 70dB DR continuous-time sigma-delta modulator with time-interleaved reference data-weighted averaging, Dayanik M., Weyer D., Flynn M., IEEE Symposium on VLSI Circuits, Digest of Technical Papers, 8/10/2017

- A calibration-free 2.3 mW 73.2 dB SNDR 15b 100 MS/s four-stage fully differential ring amplifier based SAR-assisted pipeline ADC, Lim Y., Flynn M., IEEE Symposium on VLSI Circuits, Digest of Technical Papers, 8/10/2017
- A Maximum-Likelihood Sequence Detection Powered ADC-Based Serial Link, Song S., Choo K., Chen T., Jang S., Flynn M., Zhang Z., IEEE Transactions on Circuits and Systems I: Regular Papers, 12/7/2017
- A Mismatch-Immune 12-bit SAR ADC With Completely Reconfigurable Capacitor DAC, Collins N., Tamez A., Jie L., Pernillo J., Flynn M., IEEE Transactions on Circuits and Systems II: Express Briefs, 11/18/2017
- New Associate Editors, Flynn M., IEEE Journal of Solid-State Circuits, 1/1/2017

Patents Issued

- Closed-loop neural stimulation. Flynn, Michael P., Parag G. Patil, Hyo Gyuem Rhew, and Jaehun Jeong. U.S. Patent 8,892,208.

Students Advised

- John Bell, ECE PHD (admitted 2016)
- Peter Brown, ECE PHD (admitted 2015)
- Fred Buhler, ECE PHD (admitted 2014)
- Justin Correll, ECE PHD (admitted 2016)
- Linda Gong, ECE PHD (admitted 2018)
- Lu Jie, ECE PHD (admitted 2017)
- Taewook Kang, ECE PHD (admitted 2016)
- Seungjong Lee, ECE PHD (admitted 2017)
- Rundao Lu, ECE PHD (admitted 2016)
- Christine Weston, ECE PHD (co-advised) (admitted 2017)
- Boyi Zheng, ECE PHD (admitted 2016)

Forrest, Stephen R.

Website: http://www.umich.edu/~ocm/

Research Interests: Organic Electronics, Photonic Integrated Circuits, Photonic Materials.

Recent Publications

- Thin Films for Enhanced Photon Recycle in Thermophotovoltaics, Burger T., Fan D., Lee K., Forrest S., Lenert A., 2018 IEEE 7th World Conference on Photovoltaic Energy Conversion, WCPEC 2018 - A Joint Conference of 45th IEEE PVSC, 28th PVSEC and 34th EU PVSEC, 11/26/2018
- Near-Infrared Ternary Tandem Solar Cells, Li Y., Lin J.D., Liu X., Qu Y., Wu F.P., Liu F., Jiang Z.Q., Forrest S.R., Advanced Materials, 30 (45) 1804416, 10/01/2018
- Surface Passivation of InP Using an Organic Thin Film, Lee B., Liu X., Lee K., Jung B.J., Forrest, S., Journal of Crystal Growth, 503, 09/14/2018
- Continuous Roll-to-Roll Fabrication of Organic Photovoltaic Cells via Interconnected High-Vacuum and Low-Pressure Organic Vapor Phase Deposition Systems, Qu B., Forrest S.R., Applied Physics Letters, 113 (5) 053302, 07/30/2018
- Donor-Acceptor-Acceptor's Molecules for Vacuum-Deposited Organic Photovoltaics with Efficiency Exceeding 9%, Che X., Chung C., Hsu C., Liu F., Wong K., Forrest S., Advanced Energy Materials, 07/05/2018
- Efficient Outcoupling of Organic Light-Emitting Devices Using a Light-Scattering Dielectric Layer, Kim J., Qu Y., Coburn C., Forrest S.R., ACS Photonics 5 (8), 3315-21, 07/02/2018
- Thin-Film Architectures with High Spectral Selectivity for Thermophotovoltaic Cells, Burger T., Fan D., Lee K., Forrest S.R., Lenert A., ACS Photonics, 5, 2748-54, 06/27/2018
- High Fabrication Yield Organic Tandem Photovoltaics Combining Vacuum- and Solution-Processed Subcells with 15% Efficiency, Che X., Li Y., Qu Y., Forrest S., Nature Energy, 05/01/2018
- High Fabrication Yield Organic Tandem Photovoltaics Combining Vacuum- and Solution-Processed Subcells with 15% Efficiency, Che X., Li Y., Qu Y., Forrest S.R., Nat. Energy, 3, 422-7, 04/23/2018
- Charge Transfer and Collection in Dilute Organic Donor-Acceptor Heterojunction Blends, Ding K., Liu X., Forrest S.R., Nano Letters, 18, 3180-4, 04/23/2018

- Efficient, Nonintrusive Outcoupling in Organic Light Emitting Devices Using Embedded Microlens Arrays, Qu Y., Kim J., Coburn C., Forrest S.R., ACS Photonics, 5 (6) 2453-8, 04/17/2018
- Donor-Acceptor-Acceptor' Molecules for Vacuum-Deposited Organic Photovoltaics with Efficiency Exceeding 9%, Che X., Chung C.-L., Hsu C.-C., Liu F., Wong K.-T., Forrest S.R., Adv. Energy Mater., 8, 1703603, 03/15/2018
- Reliable, All-Phosphorescent Stacked White Organic Light Emitting Devices with a High Color Rendering Index, Coburn C., Jeong C., Forrest S., ACS Photonics, 02/21/2018
- Centimetre-scale electron diffusion in photoactive organic heterostructures, Burlingame Q., Coburn C., Che X., Panda A., Qu Y., Forrest S., Nature, 554, 77, 02/01/2018
- Engineering Temperature-Dependent Carrier Concentration in Bulk Composite Materials via Temperature-Dependent Fermi Level Offset, Hui S., Gao W., Lu X., Panda A., Bailey T., Page A., Forrest S., Morelli D., Pan X., Pipe K., Uher C., Advanced Energy Materials, 01/25/2018
- Dipole-Aligned Energy Transfer between Excitons in Two-Dimensional Transition Metal Dichalcogenide and Organic Semiconductor, Gu J., Liu X., Lin E., Lee Y., Forrest S., Menon V., ACS Photonics, 01/17/2018
- Quantum Confinement of Hybrid Charge Transfer Excitons in GaN/InGaN/Organic Semiconductor Quantum Wells, Panda A., Forrest S., Nano Letters, 17, 7853, 12/13/2017
- High Efficiency Near-Infrared and Semitransparent Non-Fullerene Acceptor Organic Photovoltaic Cells, Li Y., Lin J., Che X., Qu Y., Liu F., Liao L., Forrest S., Journal of the American Chemical Society, 11/29/2017
- Reliable, all-phosphorescent stacked white organic light emitting devices with a high color rendering index, Coburn C., Jeong C., Forrest S., ACS Photonics, 10/13/2017
- Isomeric Effects of Solution Processed Ladder-Type Non-Fullerene Electron Acceptors, Li Y., Zhong L., Lin J.-D., Wu F.-P., Bin H.-J., Zhang Z., Xu L., Jiang Z.-Q., Zhang Z.-G., Liu F., Russell T.P., Li Y., Liao L.-S., Forrest S.R., Solar RRL, 1, 09/11/2017
- Hot excited state management for long-lived blue phosphorescent organic light-emitting diodes, Lee J., Jeong C., Batagoda T., Coburn C., Thompson M., Forrest S., Nature Communications, 8, 05/31/2017
- Photoresponse of an Organic Semiconductor/Two-Dimensional Transition Metal Dichalcogenide Heterojunction, Liu X., Gu J., Ding K., Fan D., Hu X., Tseng Y., Lee Y., Menon V., Forrest S., Nano Letters, 05/10/2017
- Effects of Charge Balance and Exciton Confinement on the Operational Lifetime of Blue Phosphorescent Organic Light-Emitting Diodes, Coburn C., Forrest S., Physical Review Applied, 7, 41002, 04/24/2017
- Elimination of Plasmon Losses and Enhanced Light Extraction of Top-Emitting Organic Light-Emitting Devices Using a Reflective Subelectrode Grid, Qu Y., Coburn C., Fan D., Forrest S., ACS Photonics, 4 (2) 363-8, 02/15/2017

- Bilayer Interdiffused Heterojunction Organic Photodiodes Fabricated, Double Transfer Stamping, Kim H., Song B., Lee K., Forrest S., Kanicki J., Advanced Optical Materials, 5, 3, 02/02/2017
- Outdoor operation of small-molecule organic photovoltaics, Burlingame Q., Zanotti G., Ciammaruchi L., Katz E., Forrest S., Organic Electronics: physics, materials, applications, 41, 274-9, 02/01/2017

Patents Issued

- Thermal Surface Treatment for Reuse of Wafers after Epitaxial Lift Off, Patent #9,548,218
- Optoelectronic device formed with controlled vapor flow, Patent #9,653,709
- Growth of ordered crystalline organic films, Patent #9,666,816
- Extended OLED Operational Lifetime Through Phosphorescent Dopant Profile Management, Patent #9,666,822
- Organic Vapor Jet Print Head with Solder Joint, Patent #9,700,901
- Enhancing light extraction of organic light emitting diodes via nanoscale texturing of electrode surfaces, Patent #9,761,842
- Enhanced bulk heterojunction devices prepared by thermal and solvent vapor annealing processes, Patent #9,768,402
- Patterning by stamped metal resist, Patent #9,793,481
- Nozzle geometry for organic vapor jet printing, Patent #9,797,039
- Use of inverse quasi-epitaxy to modify order during post-deposition processing of organic photovoltaics, Patent #9,847,487
- Electrophosphorescent organic light emitting concentrator, Patent #9,853,247
- Microfluidic device and method using double anodic bonding, Patent #9,873,939
- Excited state management, Patent #9,929,365
- Photovoltaic cells with a graded active region achieved using stamp transfer printing, Patent #9,978,968
- Stacked white OLED having separate red, green and blue sub-elements, Patent #10,014,485
- Devices combining thin film inorganic LEDs with organic LEDs and fabrication thereof, Patent #10,062,738
- Fabrication of photodiode array on spherical platform for 4-Pi detection awareness, Patent #10,032,812
- Thick-ETL OLEDs with sub-ITO grids with improved outcoupling, Patent #10,038,167
- Integration of epitaxial lift-off solar cells with mini-parabolic concentrator arrays via printing method, Patent #10,069,033
- Organic photosensitive devices with exciton-blocking charge carrier filters, Patent #10,069,095
- Organic electroluminescent devices, Patent #10,074,815

- Excitonic energy transfer to increase inorganic solar cell efficiency, Patent #10,074,820
- Epitaxial lift-off processed GaAs thin-film solar cells integrated with non-tracking mini-compound parabolic concentrators, Patent #10,141,465
- Hybrid planar-graded heterojunction for organic photovoltaics, Patent #10,141,531
- Thin film lift-off via combination of epitaxial lift-off and spalling, Patent #10,186,629

Students Advised

- Claire Arneson, Physics PHD (admitted 2018)
- Clarence Chan, ECE PHD (admitted 2017)
- Caleb Coburn, Physics PHD (admitted 2013)
- Kan Ding, Physics PHD (admitted 2014)
- Dejiu Fan, ECE PHD (admitted 2013)
- Jeffrey Horowitz, ECE PHD (admitted 2018)
- Xiaheng Huang, ECE PHD (admitted 2018)
- Xinjing Huang, Applied Physics PHD (admitted 2017)
- Jong Chan Kim, ECE PHD (admitted 2016)
- Byungjun Lee, ECE PHD (admitted 2016)
- Boning Qu, MSE PHD (admitted 2016)
- Yue Qu, ECE PHD (admitted 2014)
- Hafiz Sheriff, Applied Physics PHD (admitted 2017)
- Chan Ho Soh, ECE PHD (admitted 2018)

Freudenberg, James S.

Website: https://freudenberg.engin.umich.edu/

Research Interests: Fundamental design limitations in feedback control systems, embedded control systems.

Recent Publications

- Stochastic Feedback Combustion Control at High Dilution Limit, Maldonado B., Freudenberg J., Stefanopoulou A., Proceedings of the American Control Conference, 08/09/2018

Galvanauskas, Almantas

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Research Interests: High power ultrafast fiber lasers for nonlinear optics, high intensity laser-matter interactions, laser driven secondary-radiation such as gamma and x-ray sources, and laser acceleration of charged particles. Main emphasis of current research efforts is on developing a new generation of laser-plasma accelerator drivers that could enable high energy and brightness particle accelerators for future fundamental science experiments as well as for new applications in biology, medicine and material science.

Recent Publications

- Cavity Phase Measurement via Modulated Impulse Response for Coherent Temporal Pulse Stacking, Yang Y., Dawson J., Doolittle L., Du Q., Galvanauskas A., Huang G., Zhou T., Wilcox R., Leemans W., 2018 Conference on Lasers and Electro-Optics, CLEO 2018 - Proceedings, 08/06/2018
- FPGA-Based Optical Cavity Phase Stabilization for Coherent Pulse Stacking, Xu Y., Wilcox R., Byrd J., Doolittle L., Du Q., Huang G., Yang Y., Zhou T., Leemans W., Galvanauskas A., Ruppe J., Tang C., Huang W., IEEE Journal of Quantum Electronics, 02/01/2018
- Mode-locked oscillator phase stabilization using a Gires-Tournois interferometer, Cui Y., Pei H., Nees J., Galvanauskas A., Optics InfoBase Conference Papers, 01/01/2018
- Narrowband transverse-modal-instability (TMI)-free Yb-doped fiber amplifiers for directed energy applications, Kanskar M., Zhang J., Koponen J., Kimmelma O., Aallos V., Hu I., Galvanauskas A., Proceedings of SPIE - The International Society for Optical Engineering, 01/01/2018
- High energy ultrafast fiber lasers based on coherent pulse stacking amplification, Pei H., Whittlesey M., Ruppe J., Sheikhsofla M., Chen S., Nees J., Du Q., Wilcox R., Leemans W., Galvanauskas A., Optics InfoBase Conference Papers, 01/01/2018
- Cavity phase measurement via modulated impulse response for coherent temporal pulse stacking, Yang Y., Dawson J., Doolittle L., Du Q., Galvanauskas A., Huang G., Zhou T., Wilcox R., Leemans W., Optics InfoBase Conference Papers, 01/01/2018
- 10mJ energy extraction from Yb-doped 85mm core CCC fiber using coherent pulse stacking amplification of fs pulses, Pei H., Ruppe J., Chen S., Sheikhsofla M., Nees J., Yang Y., Wilcox R., Leemans W., Galvanauskas A., Optics InfoBase Conference Papers, 1/1/2017
- Coherent pulse stacking amplification - extending chirped pulse amplification by orders of magnitude, Ruppe J., Pei H., Sheikhsofla M., Chen S., Wilcox R., Leemans W., Nees J., Galvanauskas A., Optics InfoBase Conference Papers, 1/1/2017

- Focus issue introduction: Advanced Solid- State Lasers (ASSL) 2016, Jeong Y., Krankel C., Galvanauskas A., Schepler K., Taira T., Jiang S., Optics Express/Optical Materials Express, 4/1/2017
- FPGA-Based Optical Cavity Phase Stabilization for Coherent Pulse Stacking, Xu Y., Wilcox R., Byrd J., Doolittle L., Du Q., Huang G., Yang Y., Zhou T., Leemans W., Galvanauskas A., Ruppe J., Tang C., Huang W., IEEE Journal of Quantum Electronics, 11/18/2017
- High repetition rate fs pulse burst generation using the Vernier effect, Flory T., Andriukaitis G., Barkauskas M., Kaksis E., Astrauskas I., PugzVlys A., BaltusVka A., Danielius R., Galvanauskas A., Balciunas T., Optics InfoBase Conference Papers, 1/1/2017
- High-energy pulse stacking via regenerative pulse-burst amplification, Astrauskas I., Kaksis E., Flory T., Andriukaitis G., Pugzlys A., Baltuska A., Ruppe J., Chen S., Galvanauskas A., Balciunas T., Optics Letters, 6/1/2017
- Interferometer design and controls for pulse stacking in high power fiber lasers, Wilcox R., Yang Y., Dahlen D., Xu Y., Huang G., Qiang D., Doolittle L., Byrd J., Leemans W., Ruppe J., Zhou T., Sheikhsofla M., Nees J., Galvanauskas A., Dawson J., Chen D., Pax P., AIP Conference Proceedings, 3/6/2017
- Multi-mJ ultrashort pulse coherent pulse stacking amplification in a Yb-doped 85mm CCC fiber based system, Pei H., Ruppe J., Chen S., Sheikhsofla M., Nees J., Galvanauskas A., Optics InfoBase Conference Papers, 1/1/2017
- Summary report of working group 8: Advanced beam and laser facilities and technology, Galvanauskas A., Granados E., AIP Conference Proceedings, 3/6/2017

Patents Issued

- Coherent Combining of Pulse Bursts in Time Domain, Almantas Galvanauskas, Patent #: 9865986
- N2 Times Pulse Energy Enhancement Using Coherent Addition of N Orthogonally Phase Modulated Periodic Signals, Almantas Galvanauskas, Patent #: 9503196

Students Advised

- Siyun Chen, ECE PHD (admitted 2016)
- Yifan Cui, ECE PHD (admitted 2017)
- Weizhi Du, ECE PHD; Comput Discovery & Engin Cert. (admitted 2017)
- Hanzhang Pei, ECE PHD (admitted 2015)
- Alexander Rainville, ECE PHD (admitted 2017)
- Theodore Whittlesey, ECE PHD (admitted 2017)

Gianchandani, Yogesh B.

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Research Interests: Design and fabrication of microsensors, microactuators, and micro-electro-mechanical systems (MEMS) for a variety of applications such as environmental sensing, micro gas chromatographs, gas phase micropumps, microfluidics, microoptics, and biomedical instrumentation; Development of manufacturing processes using combinations of traditional and novel materials and techniques, for example, micro-electro-discharge machining and microplasmas; Design of interface circuits for MEMS and development of co-fabrication techniques for circuits and MEMS.

Recent Publications

- Analysis of Extracellular Vesicles Using Coffee Ring, Jeong H., Han C., Cho S., Gianchandani Y., Park J., ACS Applied Materials and Interfaces, 07/11/2018
- A Microdischarge-Based Pressure Sensor Fabricated Using Through-Wafer Isolated Bulk-Silicon Lead Transfer, Luo X., Gianchandani Y., Journal of Microelectromechanical Systems, 04/01/2018
- Encapsulation Approaches for In-Stent Wireless Magnetoelastic Sensors, Jiang J., Nambisan R., Green S., Gianchandani Y., IEEE Transactions on Biomedical Engineering, 01/01/2018
- A bidirectional Knudsen pump with superior thermal management for micro-gas chromatography applications, Cheng Q., Qin Y., Gianchandani Y., Proceedings of the IEEE International Conference on Micro Electro Mechanical Systems (MEMS), 2/23/2017
- Autonomous microsystems for downhole applications: Design challenges, current state, and initial test results, Choi M., Sui Y., Lee I., Meredith R., Ma Y., Kim G., Blaauw D., Gianchandani Y., Li T., Sensors (Switzerland), 10/1/2017
- Facile batch mode process for high capacity rechargeable nickel-zinc microbatteries, Vellaluru N., Gianchandani Y., Li T., TRANSDUCERS 2017 - 19th International Conference on Solid-State Sensors, Actuators and Microsystems, 7/26/2017
- In situ acoustomagnetic interrogation of a glaucoma valve with integrated wireless microactuator, Nambisan R., Green S., Stein J., Gianchandani Y., TRANSDUCERS 2017 - 19th International Conference on Solid-State Sensors, Actuators and Microsystems, 7/26/2017
- Miniaturized magnet-less RF electron trap. I. Modeling and analysis, Markosyan A., Green S., Deng S., Gianchandani Y., Kushner M., Journal of Vacuum Science and Technology B: Nanotechnology and Microelectronics, 7/1/2017

- Miniaturized magnet-less RF electron trap. II. Experimental verification, Deng S., Green S., Markosyan A., Kushner M., Gianchandani Y., Journal of Vacuum Science and Technology B: Nanotechnology and Microelectronics, 7/1/2017
- Wireless magnetoelastic transducers for biomedical applications, Green S., Gianchandani Y., Proceedings of SPIE - The International Society for Optical Engineering, 1/1/2017

Patents Issued

- Passive Wireless Strain Sensor, Y. Gianchandani, V. Pepakayala, S. Green Patent #: 9726557
- Packaged Microsystems, Y.B. Gianchandani, T. Li, and Y. Ma Patent #: 9950922

Students Advised

- Alexander Benken, ECE PHD (admitted 2014)
- Tsenguun Byambadorj, ECE PHD (admitted 2017)
- Qisen Cheng, ME PHD
- Partha Dutta, ECE PHD (admitted 2017)
- Johnathan Lewis, ECE PHD (admitted 2017)
- Weilin Liao, ECE PHD (admitted 2017)
- Hsueh-Tsung Lu, ME PHD
- Ramprasad Mohanan Nambisan, ECE PHD (admitted 2015)
- Andrew Trickey-Glassman, ECE PHD (admitted 2014)
- Neeharika Vellaluru, ECE PHD (admitted 2017)
- Xiangyu Zhao, ECE PHD (admitted 2018)

Gilchrist, Brian E.

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Research Interests: Plasma electrodynamics and diagnostics; Wireless Technology; Space Systems & Technology.

Recent Publications

- Spacecraft-Charging Mitigation of a High-Power Electron Beam Emitted by a Magnetospheric Spacecraft: Simple Theoretical Model for the Transient of the Spacecraft Potential, Lucco Castello F., Delzanno G., Borovsky J., Miars G., Leon O., Gilchrist B., Journal of Geophysical Research: Space Physics, 08/01/2018
- Experimental Investigation of Electron Collection by Rectangular Cuboid Probes in a High-Speed Plasma, Bell I., Leon O., Miars G., Gilchrist B., IEEE Transactions on Plasma Science, 7/1/2017
- Investigating miniaturized electrodynamic tethers for picosatellites and femtosatellites, Bell I., Gilchrist B., McTernan J., Bilen S., Journal of Spacecraft and Rockets, 1/1/2017
- Tethers in Space, Johnson L., Bilen S., Gilchrist B., Krause L., Acta Astronautica, 9/1/2017
- Vertically integrated projects (VIP) programs: Multidisciplinary projects with homes in any discipline, Aazhang B., Abler R., Allebach J., Bost L., Cavallaro J., Chong E., Coyle E., Cullers J., Dennis S., Dong Y., Enjeti P., Filippas A., Froyd J., Garmire D., George J., Gilchrist B., Hohner G., Hughes W., Johnson A., Kim C., Kim H., Klenke R., Lagoudas, ASEE Annual Conference and Exposition, Conference Proceedings, 6/24/2017

Students Advised

- Grant Miars, ECE PHD, Plasma Science & Engin Cert (admitted 2014)

Grbic, Anthony

Website: https://grbic.engin.umich.edu/

Research Interests: Engineered electromagnetic structures (metamaterials, metasurfaces, electromagnetic band-gap materials, frequency selective surfaces), antennas, near-field radiation and localized waves, microwave circuits, plasmonics, optics, wireless power transmission systems, and analytical modeling in electromagnetics/optics.

Recent Publications

- Compound metaoptics for amplitude and phase control of wavefronts, B. O. Raeker and A. Grbic, Physical Review Letters, accepted for publication, arXiv preprint arXiv:1807.05461, 2019.
- Tunable metasurfaces: a polarization rotator design, Z. Wu, Y. Ra'di, A. Grbic, *Physical Review X*, accepted Jan. 1, 2019.
- Designing Anisotropic, Inhomogeneous Metamaterial Devices Through Optimization, B. B. Tierney and A. Grbic, *IEEE Trans. on Antennas and Propagation*, vol. 67, no.2, pp. 998 – 1009, Feb. 2019.
- Synchrotron radiation from an accelerating light pulse, M. Henstridge, C. Pfeiffer, D. Wang, A. Boltasseva, V. M. Shalaev, A. Grbic, and R. Merlin, *Science*, vol. 362, no. 6413, pp. 439-442, Oct. 2018.
- A planar, broadband, metamaterial-based beamformer, B. B. Tierney and A. Grbic, *IEEE Trans. on Antennas and Propagation*, vol. 66, no. 9, pp. 4844 – 4853, Sept. 2018.
- A Reflective Polarization Converting Metasurface at X-band Frequencies, J. Loncar, A. Grbic, S. Hrabar, *IEEE Trans. on Antennas and Propagation* 66, 6, pp. 3213-3218, Jun. 2018.
- Accelerating light with metasurfaces, M. Henstridge, C. Pfeiffer, D. Wang, A. Boltasseva, V. M. Shalaev, A. Grbic, and R. Merlin, *Optica* 5, no. 6 pp. 678-681, May 2018
- Controlling leaky waves with 1-D cascaded metasurfaces, B. B. Tierney and A. Grbic, *IEEE Trans. on Antennas and Propagation*, 66,4, pp. 2143-2146, Apr. 2018.
- Experimental demonstration of highly localized pulses (X waves) at microwave frequencies, N. Chiotellis, V. Mendez, S. M. Rudolph, and A. Grbic, *Physical Review B*, 97, 085136, Feb. 2018.
- Modelling cascaded cylindrical metasurfaces using sheet impedances and a transmission matrix formulation, Z. Sipus, M. Bosiljevac A. Grbic, IET Microwaves, Antennas & Propagation. Vol. 12, no. 7, pp. 1041-1047, Jan. 2018.
- Radiative wireless power transfer system using wideband, wide-angle slot arrays, M. Ettorre, W. A. Alomar, A. Grbic, *IEEE Trans. on Antennas and Propagation*, vol. 65, no. 6, pp. 2975-2982, March 2017.

- Circuit and system design of ultra-low power sensor nodes with application to a miniaturized GNSS logger for position tracking: Part I - Analog Circuit Techniques, T. Jang, B. Kimpke, M. Henry, N. Chiotellis, D. Kim, G. Kim, Z. Foo, A. Grbic, D. Sylvester, H.-S. Kim, D. Wentzloff and D. Blaauw, IEEE Transactions on Circuits and Systems I," *IEEE Trans. on Circuits and Systems I*, 64, 9, pp. 2237 - 2249 September 2017.
- Analysis and synthesis of cascaded metasurfaces using wave matrices, A. Ranjbar and A. Grbic, *Physical Review B*, vol. 95, 205114, May 2017.

Patents Issued

- Wireless Power Transfer Using Multiple Near-Field Plates, Anthony Grbic and Steve Young, Patent #: US9793720B2
- Multi-coil transcranial magnetic stimulation, Luis Hernandez-Garcia, Anthony Grbic, Eric Michielssen, Luis Gomez Patent #: US9744373B2

Students Advised

- Faris Alsolamy, ECE PHD (admitted 2015)
- Brian Raeker, ECE PHD (admitted 2016)
- Mohammadamin Ranjbaraskari, ECE PHD (admitted 2014)
- Francis Salas, ECE PHD (admitted 2016)
- Cody Scarborough, ECE PHD (admitted 2017)
- Luke Szymanski, ECE PHD (admitted 2016)
- Zhanni Wu, ECE PHD (admitted 2015)

Grizzle, Jessy W.

Website: http://web.eecs.umich.edu/faculty/grizzle/

Research Interests: Analysis and feedback control of nonlinear systems; Control of bipedal robot locomotion.

Recent Publications

- Feedback Control of an Exoskeleton for Paraplegics: Toward Robustly Stable, Hands-Free Dynamic Walking, Harib O., Hereid A., Agrawal A., Gurriet T., Finet S., Boeris G., Duburcq A., Mungai M., Masselin M., Ames A., Sreenath K., Grizzle J., IEEE Control Systems, 12/01/2018
- Correctness Guarantees for the Composition of Lane Keeping and Adaptive Cruise Control, Xu X., Grizzle J., Tabuada P., Ames A., IEEE Transactions on Automation Science and Engineering, 07/01/2018
- Self-synchronization and self-stabilization of 3D bipedal walking gaits, Chevallereau C., Razavi H., Six D., Aoustin Y., Grizzle J., Robotics and Autonomous Systems, 02/01/2018
- Hybrid electric powertrain design methodology with planetary gear sets for performance and fuel economy, Dagci O., Peng H., Grizzle J., IEEE Access, 01/23/2018
- Validating Noncooperative Control Designs Through a Lyapunov Approach, Chen Y., Peng H., Grizzle J., IEEE Transactions on Control Systems Technology, 01/05/2018
- Obstacle Avoidance for Low-Speed Autonomous Vehicles With Barrier Function, Chen Y., Peng H., Grizzle J., IEEE Transactions on Control Systems Technology, 01/01/2018
- Closed-form controlled invariant sets for pedestrian avoidance, Shoukry Y., Tabuada P., Tsuei S., Milam M., Grizzle J., Ames A., Proceedings of the American Control Conference, 6/29/2017
- Control Barrier Function Based Quadratic Programs for Safety Critical Systems, Ames A., Xu X., Grizzle J., Tabuada P., IEEE Transactions on Automatic Control, 8/1/2017
- Correct by construction design of autonomous vehicles through a barrier function method, Chen Y., Peng H., Grizzle J., Proceedings of the American Control Conference, 6/29/2017
- Correctness Guarantees for the Composition of Lane Keeping and Adaptive Cruise Control, Xu X., Grizzle J., Tabuada P., Ames A., IEEE Transactions on Automation Science and Engineering, 11/16/2017
- Decentralized chassis control with guaranteed performance: A lyapunov approach, Chen Y., Peng H., Grizzle J., Proceedings of the American Control Conference, 6/29/2017

- Fast Trajectory Planning and Robust Trajectory Tracking for Pedestrian Avoidance, Chen Y., Peng H., Grizzle J., IEEE Access, 1/1/2017
- First steps toward formal controller synthesis for bipedal robots with experimental implementation, Ames A., Tabuada P., Jones A., Ma W., Rungger M., Schurmann B., Kolathaya S., Grizzle J., Nonlinear Analysis: Hybrid Systems, 8/1/2017
- First Steps Towards Translating HZD Control of Bipedal Robots to Decentralized Control of Exoskeletons, Agrawal A., Harib O., Hereid A., Finet S., Masselin M., Praly L., Ames A., Sreenath K., Grizzle J., IEEE Access, 1/1/2017
- Nonholonomic virtual constraints and gait optimization for robust walking control, Griffin B., Grizzle J., International Journal of Robotics Research, 7/1/2017
- Obstacle Avoidance for Low-Speed Autonomous Vehicles With Barrier Function, Chen Y., Peng H., Grizzle J., IEEE Transactions on Control Systems Technology, 1/1/2018
- Reduced-order framework for exponential stabilization of periodic orbits on parameterized hybrid zero dynamics manifolds: Application to bipedal locomotion, Akbari Hamed K., Grizzle J., Nonlinear Analysis: Hybrid Systems, 8/1/2017
- Supervised learning for stabilizing underactuated bipedal robot locomotion, with outdoor experiments on the wave field, Da X., Hartley R., Grizzle J., Proceedings - IEEE International Conference on Robotics and Automation, 7/21/2017
- Symmetry in legged locomotion: a new method for designing stable periodic gaits, Razavi H., Bloch A., Chevallereau C., Grizzle J., Autonomous Robots, 6/1/2017

Students Advised

- Grant Gibson, ROB PHD
- Yukai Gong, ROB PHD
- Omar Harib, ECE PHD; ME Master's (admitted 2016)
- Matthew Hartley, ROB PHD
- Bruce Huang, ROB PHD
- Margaret Eva Mungai, ME PHD

Guo, L. Jay

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Research Interests: Polymer-based photonic sensors and photoacoustics, organic and hybrid photovoltaics, flexible transparent conductors, plasmonic nanophotonics & structural colors, nanomanufacturing technologies and applications.

Recent Publications

- Efficient Photoacoustic Conversion in Optical Nanomaterials and Composites, Lee T., Baac H., Li Q., Guo L., Advanced Optical Materials, 12/17/2018
- Planar Metasurfaces Enable High-Efficiency Colored Perovskite Solar Cells, Liu D., Wang L., Cui Q., Guo L., Advanced Science, 10/01/2018
- Robust Extraction of Hyperbolic Metamaterial Permittivity Using Total Internal Reflection Ellipsometry, Zhang C., Hong N., Ji C., Zhu W., Chen X., Agrawal A., Zhang Z., Tiwald T., Schoeche S., Hilfiker J., Guo L., Lezec H., ACS Photonics, 06/20/2018
- Visualizing Mie Resonances in Low-Index Dielectric Nanoparticles, Zhou J., Panday A., Xu Y., Chen X., Chen L., Ji C., Guo L., Physical Review Letters, 06/18/2018
- Modulation of the effective density and refractive index of carbon nanotube forests via nanoimprint lithography, Park S., Ok J., Park H., Lee K., Lee J., Kim J., Cho E., Baac H., Kang S., Guo L., Hart A., Carbon, 04/01/2018
- Demonstration of versatile whispering-gallery micro-lasers for remote refractive index sensing, Wan L., Chandrahalim H., Zhou J., Li Z., Chen C., Cho S., Zhang H., Mei T., Tian H., Oki Y., Nishimura N., Fan X., Jay Guo L., Optics Express, 03/05/2018
- Effects of edge inclination angles on whispering-gallery modes in printable wedge microdisk lasers, Chen C., Wan L., Chandrahalim H., Zhou J., Zhang H., Cho S., Mei T., Yoshioka H., Tian H., Nishimura N., Fan X., Jay Guo L., Oki Y., Optics Express, 01/08/2018
- Achieving pattern uniformity in plasmonic lithography by spatial frequency selection, Liang G., Chen X., Zhao Q., Guo L., Nanophotonics, 01/01/2018
- RGB tunable color filters using germanium telluride, Jafari M., Guo L., Rais-Zadeh M., Proceedings of SPIE - The International Society for Optical Engineering, 01/01/2018
- A Reconfigurable Color Reflector by Selective Phase Change of GeTe in a Multilayer Structure, Jafari M., Guo L., Rais-Zadeh M., Advanced Optical Materials, 01/01/2018
- Decorative near-infrared transmission filters featuring high-efficiency and angular-insensitivity employing 1D photonic crystals, Ji C., Yang C., Shen W., Lee K., Zhang Y., Liu X., Guo L., Nano Research, 01/01/2018

- Controlled synthesis of brightly fluorescent $CH_3NH_3PbBr_3$ perovskite nanocrystals employing $Pb(C_{17}H_{33}COO)_2$ as the sole lead source, Fu X., Peng Z., Zhang C., Xia Y., Zhang J., Luo W., Guo L., Li H., Wang Y., Zhang D., RSC Advances, 01/01/2018
- A metasurface-inspired focusing collector for concentrated solar power applications, Ding Q., Barna S., Jacobs K., Choubal A., Mensing G., Zhang Z., Yamada K., Tirawat R., Kincaid N., Zhu G., Wendelin T., Guo L., Ferreira P., Toussaint K., Optics InfoBase Conference Papers, 01/01/2018
- Sustainable p-type copper selenide solar material with ultra-large absorption coefficient, Chen E., Williams L., Olvera A., Zhang C., Zhang M., Shi G., Heron J., Qi L., Guo L., Kioupakis E., Poudeu P., Chemical Science, 01/01/2018
- 5-nm LiF as an Efficient Cathode Buffer Layer in Polymer Solar Cells Through Simply Introducing a C 60 Interlayer, Liu X., Guo L., Zheng Y., Nanoscale Research Letters, 1/1/2017
- Abnormal Multiple Charge Memory States in Exfoliated Few-Layer WSe 2 Transistors, Chen M., Wang Y., Shepherd N., Huard C., Zhou J., Guo L., Lu W., Liang X., ACS Nano, 1/24/2017
- Achieving pattern uniformity in plasmonic lithography by spatial frequency selection, Liang G., Chen X., Zhao Q., Guo L., Nanophotonics, 1/1/2018
- Air-coupled ultrasound detection using capillary-based optical ring resonators, Kim K., Luo W., Zhang C., Tian C., Jay Guo L., Wang X., Fan X., Scientific Reports, 1/1/2017
- An ultra-fast optical shutter exploiting total light absorption in a phase change material, Jafari M., Guo L., Rais-Zadeh M., Proceedings of SPIE - The International Society for Optical Engineering, 1/1/2017
- Effect of Interfacial Molecular Orientation on Power Conversion Efficiency of Perovskite Solar Cells, Xiao M., Joglekar S., Zhang X., Jasensky J., Ma J., Cui Q., Guo L., Chen Z., Journal of the American Chemical Society, 3/8/2017
- Effect of the charge balance on high-efficiency inverted polymer light-emitting diodes, Huang Q., Zhao S., Guo L., Xu Z., Wang P., Qin Z., Organic Electronics: physics, materials, applications, 10/1/2017
- Engineering Light at the Nanoscale: Structural Color Filters and Broadband Perfect Absorbers, Ji C., Lee K., Xu T., Zhou J., Park H., Guo L., Advanced Optical Materials, 10/16/2017
- Fabrication of contact lens containing high-performance wire grid polarizer, Shin Y., Shin M., Guo L., Shin J., Polymer International, 9/1/2017
- Half-mode hexagonal substrate integrated waveguide (HMHSIW) structure and its application, Jang T., Payne K., Guo L., Choi J., IEEE MTT-S International Microwave Symposium Digest, 10/4/2017
- Highly Efficient Photoacoustic Conversion by Facilitated Heat Transfer in Ultrathin Metal Film Sandwiched by Polymer Layers, Lee T., Guo L., Advanced Optical Materials, 1/18/2017

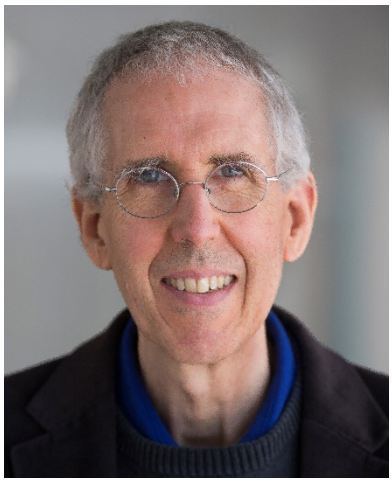
- High-Performance Doped Silver Films: Overcoming Fundamental Material Limits for Nanophotonic Applications, Zhang C., Kinsey N., Chen L., Ji C., Xu M., Ferrera M., Pan X., Shalaev V., Boltasseva A., Guo L., Advanced Materials, 5/17/2017
- Improving the Radiative Efficiency of InGaN Quantum Dots via an Open Top Cavity, Demory B., Katcher A., Hill T., Teng C., Zhang C., Guo L., Deng H., Ku P., ACS Photonics, 4/19/2017
- Laser-generated focused ultrasound for micro-cavitation and its application to high-precision cavitation treatment, Lee T., Luo W., Li Q., Dernirci H., Guo L., IEEE International Ultrasonics Symposium, IUS, 10/31/2017
- Laser-Induced Focused Ultrasound for Cavitation Treatment: Toward High-Precision Invisible Sonic Scalpel, Lee T., Luo W., Li Q., Demirci H., Guo L., Small, 10/11/2017
- Modulation of the effective density and refractive index of carbon nanotube forests via nanoimprint lithography, Park S., Ok J., Park H., Lee K., Lee J., Kim J., Cho E., Baac H., Kang S., Guo L., Hart A., Carbon, 4/1/2018
- Nanofluidic/nanoelectronic study on solvent-processed nanoscale organic transistors, Li D., Ryu B., Cui Q., Chen M., Jay Guo L., Ma B., Liang X., Journal of Vacuum Science and Technology B: Nanotechnology and Microelectronics, 11/1/2017
- On-chip, high-sensitivity temperature sensors based on dye-doped solid-state polymer microring lasers, Wan L., Chandrahalim H., Chen C., Chen Q., Mei T., Oki Y., Nishimura N., Guo L., Fan X., Applied Physics Letters, 8/7/2017
- Performance analyses of plasmonic lithography, Chen X., Liang G., Guo L., Proceedings of SPIE - The International Society for Optical Engineering, 1/1/2017
- Plasmonic Lithography Utilizing Epsilon Near Zero Hyperbolic Metamaterial, Chen X., Zhang C., Yang F., Liang G., Li Q., Guo L., ACS Nano, 10/24/2017
- Printed large-area flat optical component: Metasurfaces for cylindrical vector beam generation, Zhang C., Li Q., Jin L., Chen X., Jay Guo L., Optics InfoBase Conference Papers, 1/1/2017
- Scalable solution-processed fabrication strategy for high-performance, flexible, transparent electrodes with embedded metal mesh, Khan A., Lee S., Jang T., Xiong Z., Zhang C., Tang J., Jay Guo L., Guo L., Li W., Journal of Visualized Experiments, 6/23/2017
- Selective Photomechanical Detachment and Retrieval of Divided Sister Cells from Enclosed Microfluidics for Downstream Analyses, Chen Y., Baac H., Lee K., Fouladdel S., Teichert K., Ok J., Cheng Y., Ingram P., Hart A., Azizi E., Guo L., Wicha M., Yoon E., ACS Nano, 5/23/2017
- Semitransparent and flexible mechanically reconfigurable electrically small antennas based on tortuous metallic micromesh, Jang T., Zhang C., Youn H., Zhou J., Guo L., IEEE Transactions on Antennas and Propagation, 1/1/2017
- Wavelength scale terahertz spectrometer based on extraordinary transmission, Henstridge M., Zhou J., Jay Guo L., Merlin R., Applied Physics Letters, 8/7/2017

Patents Issued

- Real time detection and imaging of THz pulse radiation by using photoacoustic conversions, L. J. Guo Patent #: 9795689
- Dye and pigment-free structural colors and angle-insensitive spectrum filters, L. J. Guo, A. E. Hollowell, Y.-K. Wu Patent #: 9547107
- Methods for Making Micro- and Nano-Scale Conductive Grids for Transparent Electrodes and Polarizers by Roll to Roll Optical Lithography, L. J. Guo, Patent #: 9720330
- Methods and Devices For Generating High-Amplitude And High-Frequency Focused Ultrasound With Light Absorbing Materials, L. J. Guo, H. W. Baac Patent #: 9601103

Students Advised

- Qingyu Cui, ECE PHD (admitted 2014)
- Weijie Feng, MACRO PHD (admitted 2018)
- Mohsen Jafari, ECE PHD (admitted 2014, co-advisor)
- Changyeong Jeong, ECE PHD (admitted 2015)
- Suneel Joglekar, ECE PHD (admitted 2015)
- Sang Hyun Lee, ECE PHD (admitted 2018)
- Maxwell Li, ECE PHD (admitted 2015, co-advisor)
- Jihun Lim, ECE PHD (admitted 2017)
- Sunghyun Nam, MACRO PHD (admitted 2015)
- Yongbum Park, ECE PHD (admitted 2015)
- Kaito Yamada, Applied Physics PHD (admitted 2016)
- Yichun Zhang, MACRO PHD (admitted 2018)



Hero, Alfred O.

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Research Interests: Theory and algorithms underlying data science and machine learning. Theory includes applied probability, statistical modeling, and optimization. Applications include complex networks, spatio-temporal processes, computational biology, personalized health, and security.

Recent Publications

- Anomaly detection for partially observed traffic networks, E. Hou, Y. Yilmaz, A. Hero, IEEE Trans. on Signal Processing, vol. 67, no. 6, pp 1461-1476, March 2019.
- Identifying Influential Links for Event Propagation on Twitter: A Network of Networks Approach, P.-Y. Chen, C.-C, Tu, P.-S. Ting, Y.-Y. Lo, D. Koutra and A.O. Hero, IEEE Trans on Signal and Information Processing over Networks, vol. 5, no. 1, pp. 139-151, Mar. 2019.
- Identification of mixed sources with an organic scintillator-based radiation portal monitor, M. Paff, A. Di Fulvio, Y. Altmann, S. D. Clarke, S. A. Pozzi, A. Hero, Journal of Nuclear Materials Management, vol. 46, no. 4, 2019.
- Latent Laplacian Maximum Entropy Discrimination for Detection of High-Utility Anomalies, Hou E., Sricharan K., Hero A., IEEE Transactions on Information Forensics and Security, 06/01/2018
- Quantum-inspired computational imaging, Y. Altmann, S. McLaughlin, M.J. Padgett, V.K. Goyal, A.O. Hero, and D. Faccio, Science, Vol. 361, Issue 6403, 17 Aug 2018.
- Joint camera blur and pose estimation from aliased data, Leblanc J., Thelen B., Hero A., Journal of the Optical Society of America A: Optics and Image Science, and Vision, 04/01/2018
- Accelerated Distributed Dual Averaging over Evolving Networks of Growing Connectivity, Liu S., Chen P., Hero A., IEEE Transactions on Signal Processing, 04/01/2018
- Semiblind subgraph reconstruction in Gaussian graphical models, Xie T., Liu S., Hero A., 2017 IEEE Global Conference on Signal and Information Processing, GlobalSIP 2017 - Proceedings, 03/07/2018
- Multimodal Event Detection in Twitter Hashtag Networks, Yilmaz Y., Hero A., Journal of Signal Processing Systems, 02/01/2018
- Unequal error protection querying policies for the noisy 20 questions problem, Chung H., Sadler B., Zheng L., Hero A., IEEE Transactions on Information Theory, 02/01/2018
- Direct estimation of density functionals using a polynomial basis, Wisler A., Berisha V., Spanias A., Hero A., IEEE Transactions on Signal Processing, 02/01/2018

- AMOS: An automated model order selection algorithm for spectral graph clustering, Chen P., Gensollen T., Hero A., ICASSP, IEEE International Conference on Acoustics, Speech and Signal Processing - Proceedings, 6/16/2017
- Analysis of a privacy-preserving PCA algorithm using random matrix theory, Wei L., Sarwate A., Corander J., Hero A., Tarokh V., 2016 IEEE Global Conference on Signal and Information Processing, GlobalSIP 2016 - Proceedings, 4/19/2017
- Binary Hypothesis Testing via Measure Transformed Quasi-Likelihood Ratio Test, Halay N., Todros K., Hero A., IEEE Transactions on Signal Processing, 12/15/2017
- Bounds on variance for unimodal distributions, Chung H., Sadler B., Hero A., IEEE Transactions on Information Theory, 11/1/2017
- Complex input convolutional neural networks for wide angle SAR ATR, Wilmanski M., Kreucher C., Hero A., 2016 IEEE Global Conference on Signal and Information Processing, GlobalSIP 2016 - Proceedings, 4/19/2017
- Direct estimation of density functionals using a polynomial basis, Wisler A., Berisha V., Spanias A., Hero A., IEEE Transactions on Signal Processing, 11/25/2017
- Direct estimation of information divergence using nearest neighbor ratios, Noshad M., Moon K., Sekeh S., Hero A., IEEE International Symposium on Information Theory - Proceedings, 8/9/2017
- Distributed optimization for evolving networks of growing connectivity, Liu S., Chen P., Hero A., ICASSP, IEEE International Conference on Acoustics, Speech and Signal Processing - Proceedings, 6/16/2017
- Distributed sensor selection for field estimation, Liu S., Chepuri S., Leus G., Hero A., ICASSP, IEEE International Conference on Acoustics, Speech and Signal Processing - Proceedings, 6/16/2017
- Dynamic reconstruction of influence graphs with adaptive directed information, Oselio B., Hero A., ICASSP, IEEE International Conference on Acoustics, Speech and Signal Processing - Proceedings, 6/16/2017
- Ensemble estimation of mutual information, Moon K., Sricharan K., Hero A., IEEE International Symposium on Information Theory - Proceedings, 8/9/2017
- Information theoretic structure learning with confidence, Moon K., Noshad M., Sekeh S., Hero A., ICASSP, IEEE International Conference on Acoustics, Speech and Signal Processing - Proceedings, 6/16/2017
- Learning sparse graphs under smoothness prior, Chepuri S., Liu S., Leus G., Hero A., ICASSP, IEEE International Conference on Acoustics, Speech and Signal Processing - Proceedings, 6/16/2017
- Measure-Transformed Quasi-Maximum Likelihood Estimation, Todros K., Hero A., IEEE Transactions on Signal Processing, 2/1/2017
- Nasopharyngeal Protein Biomarkers of Acute Respiratory Virus Infection, Burke T., Henao R., Soderblom E., Tsalik E., Thompson J., McClain M., Nichols M., Nicholson B.,

Veldman T., Lucas J., Moseley M., Turner R., Lambkin-Williams R., Hero A., Woods C., Ginsburg G., EBioMedicine, 3/1/2017

- Part-level fully convolutional networks for pedestrian detection, Wang X., Jung C., Hero A., ICASSP, IEEE International Conference on Acoustics, Speech and Signal Processing - Proceedings, 6/16/2017
- Quickest hub discovery in correlation graphs, Banerjee T., Hero A., Conference Record - Asilomar Conference on Signals, Systems and Computers, 3/1/2017
- Similarity function tracking using pairwise comparisons, Greenewald K., Kelley S., Oselio B., Hero A., IEEE Transactions on Signal Processing, 11/1/2017
- The three-terminal interactive lossy source coding problem, Vega L., Piantanida P., Hero A., IEEE Transactions on Information Theory, 1/1/2017
- Two-stage sampling, prediction and adaptive regression via correlation screening, Firouzi H., Hero A., Rajaratnam B., IEEE Transactions on Information Theory, 1/1/2017
- Unequal Error Protection Querying Policies for the Noisy 20 Questions Problem, Chung H., Sadler B., Zheng L., Hero A., IEEE Transactions on Information Theory, 10/5/2017

Recent patents Issued

- Methods of identifying infectious disease and assays for identifying infectious disease, G. Ginsberg, J. Lucas, C. Woods, L. Carin, A. Zaas, and A. Hero, US Patent 8,821,876. Sept 2 2014.
- Method and apparatus for clustering and visualization of multicolor cytometry data, A. Hero, K. Carter, R. Raich, and W. Finn, US Patent 7,853,432. Dec 14 2010.
- Method for determining alignment of images in high dimensional feature space, A. Hero, H. Neemuchwala, P. Carson, US Patent 7,653,264. Jan 26 2010.

Students Currently Advised

- Neophytos Charalambides, ECE PHD (admitted 2017)
- Elizabeth Hou, ECE PHD (admitted 2017)
- Joel Leblanc, ECE PHD (admitted 2007)
- Robert Malinas, ECE PHD (admitted 2018)
- Mortaza Noushad Iranzad, CSE PHD
- Brandon Oselio, ECE PHD, Statistics Master's (admitted 2012)
- Haonan Zhu, ECE PHD (admitted 2018)
- Yaya Zhai, Bioinformatics PHD (admitted 2014)
- Yun Wei, Applied Math PHD (admitted 2013)
- Byoung Jan, Statistics PHD (admitted 2015)

Hiskens, Ian A.

Website: https://web.eecs.umich.edu/~hiskens/

Research Interests: Power system analysis, Analysis and control of nonlinear non-smooth dynamical systems. Areas of specialty: Power system dynamics and control, Wind power, Grid controllability, Inverse problems.

Recent Publications

- Energy Markets and Responsive Grids: Modeling, Control, and Optimization, Sean Meyn, Tariq Samad, Sonja Glavaski, Ian Hiskens, and Jakob Stoustrup, editors. Springer, New York, NY, 2018
- Consensus-based coordination of electric vehicle charging considering transformer hierarchy, Zou S., Hiskens I., Ma Z., Control Engineering Practice, 11/01/2018
- Numerical computation of critical parameter values for fault recovery in power systems, Fisher M., Hiskens I., 20th Power Systems Computation Conference, PSCC 2018, 08/20/2018
- Topological graph metrics for detecting grid anomalies and improving algorithms, Kersulis J., Hiskens I., Coffrin C., Molzahn D., 20th Power Systems Computation Conference, PSCC 2018, 08/20/2018
- A Dynamical Systems Approach to Modeling and Analysis of Transactive Energy Coordination, Nazir M., Hiskens I., IEEE Transactions on Power Systems, 05/10/2018
- Jump Conditions for Second-Order Trajectory Sensitivities at Events, Geng S., Hiskens I., Proceedings - IEEE International Symposium on Circuits and Systems, 04/26/2018
- Load synchronization and sustained oscillations induced by transactive control, Nazir M., Hiskens I., IEEE Power and Energy Society General Meeting, 01/29/2018
- Optimal control policies for reserve deployment with probabilistic performance guarantees, Vrakopoulou M., Hiskens I., 2017 IEEE 56th Annual Conference on Decision and Control, CDC 2017, 01/18/2018
- Parametric dependence of large disturbance response and relationship to stability boundary, Fisher M., Hiskens I., 2017 IEEE 56th Annual Conference on Decision and Control, CDC 2017, 01/18/2018
- A Laplacian-Based Approach for Finding Near Globally Optimal Solutions to OPF Problems, Molzahn D., Josz C., Hiskens I., Panciatici P., IEEE Transactions on Power Systems, 1/1/2017
- A nonlinear optimization model for transient stable line switching, Mak T., Van Hentenryck P., Hiskens I., Proceedings of the American Control Conference, 6/29/2017

- An Efficient Game for Coordinating Electric Vehicle Charging, Zou S., Ma Z., Liu X., Hiskens I., IEEE Transactions on Automatic Control, 5/1/2017
- Consensus-Based Coordination of Electric Vehicle Charging, Zou S., Hiskens I., Ma Z., Liu X., IFAC-PapersOnLine, 7/1/2017
- Corrective Model-Predictive Control in Large Electric Power Systems, Martin J., Hiskens I., IEEE Transactions on Power Systems, 3/1/2017
- Decentralized Coordination of Controlled Loads and Transformers in a hierarchical structure, Zou S., Hiskens I., Ma Z., IFAC-PapersOnLine, 7/1/2017
- Generalized Line Loss Relaxation in Polar Voltage Coordinates, Martin J., Hiskens I., IEEE Transactions on Power Systems, 5/1/2017
- Moment relaxations of optimal power flow problems: Beyond the convex hull, Molzahn D., Josz C., Hiskens I., 2016 IEEE Global Conference on Signal and Information Processing, GlobalSIP 2016 - Proceedings, 4/19/2017
- Noise and Parameter Heterogeneity in Aggregate Models of Thermostatically Controlled Loads, Nazir M., Hiskens I., IFAC-PapersOnLine, 7/1/2017
- Optimal policy-based control of generation and HVDC lines in power systems under uncertainty, Vrakopoulou M., Hiskens I., 2017 IEEE Manchester PowerTech, Powertech 2017, 7/13/2017
- Performance Limits of Thermostatically Controlled Loads under Probabilistic Switching, Nazir M., Ross S., Mathieu J., Hiskens I., IFAC-PapersOnLine, 7/1/2017
- Solving Multiperiod OPF Problems Using an AC-QP Algorithm Initialized with an SOCP Relaxation, Marley J., Molzahn D., Hiskens I., IEEE Transactions on Power Systems, 9/1/2017

Students Advised

- Michael Fisher, ECE PHD (admitted 2014)
- Sijia Geng, ECE PHD (admitted 2016)
- Jonas Kersulis, ECE PHD (admitted 2013)
- Md Nazir, ECE PHD (admitted 2015)

Hofmann, Heath

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Research Interests: Power electronics and systems.

Recent Publications

- Parameter identification of lithium-ion battery pack for different applications based on Cramer-Rao bound analysis and experimental study, Song Z., Hofmann H., Lin X., Han X., Hou J., Applied Energy, 12/01/2018
- Implementation and evaluation of real-time model predictive control for load fluctuations mitigation in all-electric ship propulsion systems, Hou J., Song Z., Park H., Hofmann H., Sun J., Applied Energy, 11/15/2018
- Simultaneous Identification and Torque Control of Surface-Mount Permanent Magnet Synchronous Machines with Inverter Current and Voltage Constraints, Delgado F., Reed D., Hofmann H., Sun J., 2018 IEEE Conference on Control Technology and Applications, CCTA 2018, 10/26/2018
- Performance of plug-in hybrid electric vehicle under low temperature condition and economy analysis of battery pre-heating, Wang T., Wu X., Xu S., Hofmann H., Du J., Li J., Ouyang M., Song Z., Journal of Power Sources, 10/15/2018
- Robust, Accurate Systems-based Power Electronic Circuit Models in Simulink, Song H., Hofmann H., 2018 IEEE 19th Workshop on Control and Modeling for Power Electronics, COMPEL 2018, 09/10/2018
- Parameter Identification and Maximum Power Estimation of Battery/Supercapacitor Hybrid Energy Storage System based on Cramer-Rao Bound Analysis, Song Z., Hou J., Hofmann H., Lin X., Sun J., IEEE Transactions on Power Electronics, 07/23/2018
- A Dual-Coupled LCC-Compensated IPT System with a Compact Magnetic Coupler, Lu F., Zhang H., Hofmann H., Su W., Mi C., IEEE Transactions on Power Electronics, 07/01/2018
- The battery-supercapacitor hybrid energy storage system in electric vehicle applications: A case study, Song Z., Li J., Hou J., Hofmann H., Ouyang M., Du J., Energy, 07/01/2018
- Adaptive model predictive control with propulsion load estimation and prediction for all-electric ship energy management, Hou J., Sun J., Hofmann H., Energy, 05/01/2018
- Control development and performance evaluation for battery/flywheel hybrid energy storage solutions to mitigate load fluctuations in all-electric ship propulsion systems, Hou J., Sun J., Hofmann H., Applied Energy, 02/15/2018

- A Double-Sided LC-Compensation Circuit for Loosely Coupled Capacitive Power Transfer, Lu F., Zhang H., Hofmann H., Mi C., IEEE Transactions on Power Electronics, 02/01/2018
- Component sizing optimization of plug-in hybrid electric vehicles with the hybrid energy storage system, Song Z., Zhang X., Li J., Hofmann H., Ouyang M., Du J., Energy, 02/01/2018
- Rotor Resistance Estimation for Induction Machines Using Carrier Signal Injection with Minimized Torque Ripple, Hasanzadeh A., Reed D., Hofmann H., IEEE Transactions on Energy Conversion, 01/01/2018
- Mitigating Power Fluctuations in Electric Ship Propulsion with Hybrid Energy Storage System: Design and Analysis, Hou J., Sun J., Hofmann H., IEEE Journal of Oceanic Engineering, 01/01/2018
- Six-Plate Capacitive Coupler to Reduce Electric Field Emission in Large Air-Gap Capacitive Power Transfer, Zhang H., Lu F., Hofmann H., Liu W., Mi C., IEEE Transactions on Power Electronics, 01/01/2018
- Current Profile Optimization for Combined State of Charge and State of Health Estimation of Lithium Ion Battery based on Cramer-Rao Bound Analysis, Song Z., Wu X., Li X., Sun J., Hofmann H., Hou J., IEEE Transactions on Power Electronics, 01/01/2018
- A dual-coupled LCC-compensated IPT system to improve misalignment performance, Lu F., Zhang H., Hofmann H., Mi C., 2017 IEEE PELS Workshop on Emerging Technologies: Wireless Power Transfer, WoW 2017, 6/26/2017
- A Dual-Coupled LCC-Compensated IPT System with a Compact Magnetic Coupler, Lu F., Zhang H., Hofmann H., Su W., Mi C., IEEE Transactions on Power Electronics, 8/31/2017
- A high efficiency and compact inductive power transfer system compatible with both 3.3kW and 7.7kW receivers, Lu F., Zhang H., Kan T., Hofmann H., Mei Y., Cai L., Mi C., Conference Proceedings - IEEE Applied Power Electronics Conference and Exposition - APEC, 5/17/2017
- An Inductive and Capacitive Integrated Coupler and Its LCL Compensation Circuit Design for Wireless Power Transfer, Lu F., Zhang H., Hofmann H., Mi C., IEEE Transactions on Industry Applications, 9/1/2017
- An LC-Compensated Electric Field Repeater for Long-Distance Capacitive Power Transfer, Zhang H., Lu F., Hofmann H., Liu W., Mi C., IEEE Transactions on Industry Applications, 9/1/2017
- Autonomous Wideband Piezoelectric Energy Harvesting Utilizing a Resonant Inverter, Stein A., Hofmann H., IEEE Transactions on Power Electronics, 8/1/2017
- Battery/flywheel Hybrid Energy Storage to mitigate load fluctuations in electric ship propulsion systems, Hou J., Sun J., Hofmann H., Proceedings of the American Control Conference, 6/29/2017
- Computationally-Efficient Heat Convection Model for Electric Machines, Wang Y., Hofmann H., Rizzo D., Shurin S., SAE Technical Papers, 3/28/2017

- Mitigating Power Fluctuations in Electric Ship Propulsion With Hybrid Energy Storage System: Design and Analysis, Hou J., Sun J., Hofmann H., IEEE Journal of Oceanic Engineering, 3/27/2017
- Simultaneous Identification and Adaptive Torque Control of Permanent Magnet Synchronous Machines, Reed D., Sun J., Hofmann H., IEEE Transactions on Control Systems Technology, 7/1/2017
- Sliding-mode and Lyapunov function-based control for battery/supercapacitor hybrid energy storage system used in electric vehicles, Song Z., Hou J., Hofmann H., Li J., Ouyang M., Energy, 1/1/2017

Patents Issued

- Electromechanical Flywheels, C.M. Kalev, H.F. Hofmann, Patent #: US9673680B2
- Homopolar motor-generators, C. Kalev and H. Hofmann, Patent #: 9548645
- Hybrid Power and Energy for Robots, K.M. Reichard, C.M. Rogan, E.M. Hughes, N.J. Hobbs, H.F. Hofmann, Patent #: US9688152B2

Students Advised

- Jake Chung, ECE PHD (admitted 2017)
- Daniel Dahl, ECE PHD (admitted 2018)
- Fanny Pinto Delgado, ECE PHD (admitted 2017)
- Yuanying Wang, ECE PHD (admitted 2016)

Islam, Mohammed N.

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Research Interests: Mid- and near-infrared laser sources and their applications in defense and healthcare. On the defense side, applications include infrared countermeasures, explosives detection, and active remote sensing. On the healthcare side, his research relates to using fiber lasers in cardiology, dentistry, non-invasive glucose monitoring and blood analyte measurements, and selective ablation of visceral fat for diabetes treatment.

Recent Publications

- Mid-infrared supercontinuum generation from 1.6 to > 11µm using concatenated step-index fluoride and chalcogenide fibers, Ramon A. Martinez, Genevieve Plant, Kaiwen Guo, Brian Janiszewski, Michael J. Freeman, Robert L. Maynard, Mohammed N. Islam, Fred L. Terry, Oseas Alvarez, Francois Chenard, Robert Bedford, Ricky Gibson, and Agustin I. Ifarraguerri, Optics Letters, Vol. 43, No. 2, pp. 296-299 (January 15, 2018).
- Generation of near diffraction limited, high power supercontinuum from 1.57 to 12µm with cascaded fluoride and chalcogenide fibers, Kaiwen Guo, Ramon A. Martinez, Genevieve Plant, Lukasz Maksymiuk, Brian Janiszewski, Michael J. Freeman, Robert L. Maynard, Mohammed N. Islam, Fred L. Terry, Robert Bedford, Ricky Gibson, Francois Chenard, Stephane Chatigny, and Agustin I. Ifarraguerri, Applied Optics, Vol. 57, no. 10, pp. 2519-2533, 2018.
- High-power, all-fiber-integrated super-continuum source from 1.57 to 12 microns, Mohammed N. Islam, Carl DeWilde, Lukasz Maksymiuk, Michael J. Freeman, Kaiwen Guo, Ramon A. Martinez, Robert Maynard, Shawn Z. Meah, Brandon Demory, Tianqu Zhai, and Fred L. Terry, (Invited Paper), Proc. SPIE 10897-27 (2019).
- Stand-off FTIR spectroscopy utilizing a long-wave infrared supercontinuum source, Ramon A. Martinez, Kaiwen Guo, Tianqu Zhai, Fred L. Terry, Mohammed N. Islam, Lukasz Maksymiuk, Robert L. Maynard, Michael J. Freeman, Carl A. DeWilde and Agustin I. Ifarraguerri, Proc. SPIE 10897-60 (2019).
- Non-destructive detection of acrylamide in potato fries with high-power supercontinuum lasers, Kaiwen Guo, Brandon Demory, Shawn Z. Meah, Tianqu Zhai, Ramon Martinez, Mohammed N. Islam, Lukasz Maksymiuk, Fred L. Terry, Carl A. DeWilde, Michael J. Freeman, Luju Ren and Luis Rodriguez-Saona, Proc. SPIE 10897-62 (2019).

Patents Issued

- Short-Wave Infrared Super-Continuum Lasers for Detecting Counterfeit or Illicit Drugs and Pharmaceutical Process Control, M.N. Islam [OMNI-0105-PUSP1], U.S. Patent # 9,651,533
- Broadband or Mid-Infrared Fiber Light Sources, M.N. Islam [OMNI-0109-PUSP7], U.S. Patent # 9,476,769
- System and Method for Voice Control of Medical Devices, M.N. Islam [OMNI-0110-PUSP11], U.S. Patent # 9,456,751
- Broadband or Mid-Infrared Fiber Light Sources, M.N. Islam [OMNI-109-PCA], Canadian Patent # 2,623,380
- Near-infrared lasers for non-invasive monitoring of glucose, ketones, HbA1c, and other blood constituents, M.N. Islam [OMNI-101-PUSA1], U.S. Patent # 9,885,698
- Broadband or Mid-Infrared Fiber Light Sources, M.N. Islam [OMNI-0109-PUSP8], U.S. Patent # 9,726,539
- System and Method for Voice Control of Medical Devices, M.N. Islam [OMNI-0110-PUSP12], U.S. Patent # 9,770,174
- Short-wave infrared super-continuum lasers for early detection of dental caries, M.N. Islam [OMNI-102-PUSA1], U.S. Patent # 9,757,040
- Short-wave infrared super-continuum lasers for natural gas leak detection, exploration, and other active remote sensing applications, M.N. Islam [OMNI-104-PUSA1], U.S. Patent # 9,797,876
- Short-wave infrared super-continuum lasers for early detection of dental caries, M.N. Islam [OMNI-102-PUSA2], U.S. Patent # 9,861,286
- Short-wave infrared super-continuum lasers for natural gas leak detection, exploration, and other active remote sensing applications, M.N. Islam [OMNI-104-PUSA2], U.S. Patent # 9,897,584
- System configured for measuring physiological parameters, M.N. Islam [OMNI-105-PUSP2], U.S. Patent # 10,188,299
- Mid-infrared super-continuum laser, M.N. Islam [OMNI-0109-PUSP9], U.S. Patent # 10,041,832
- Measurement apparatus for physiological parameters, M.N. Islam [OMNI-0110-PUSP13], U.S. Patent # 10,004,402
- Broadband or Mid-Infrared Fiber Light Sources, M.N. Islam [OMNI-109-PCA1], Canadian Patent # 2,838,355
- Fiber Lasers and Mid-Infrared Light Sources in Methods and Systems for Selective Biological Tissue Processing and Spectroscopy, M.N. Islam [OMNI-108-PEP], European Patent # 2,521,505
- Broadband or mid-infrared fiber light sources, M.N. Islam [OMNI-109-PEP], European Patent # EP 1,949,151

- Light-based spectroscopy with improved signal-to-noise ratio, M.N. Islam [OMNI-105-PUSP3], U.S. Patent # 10,172,523
- Short-wave infrared super-continuum lasers for natural gas leak detection, exploration, and other active remote sensing applications, M.N. Islam [OMNI-104-PUSA3], U.S. Patent # 9,995,722
- Near-infrared time-of-flight imaging, M.N. Islam [OMNI-104-PUSA4], U.S. Patent # 10,126,283
- Short-wave infrared super-continuum lasers and similar light sources for imaging applications, M.N. Islam [OMNI-101-PUSA2], U.S. Patent # 10,136,819
- Near-infrared laser diodes used in imaging applications, M.N. Islam [OMNI-101-PUSA3], U.S. Patent # 10,201,283
- Wearable devices using near-infrared light sources, M.N. Islam [OMNI-102-PUSA3], U.S. Patent # 10,098,546
- Physiological measurement devices using light emitting diodes, M.N. Islam [OMNI-102-PUSA4], U.S. Patent # 10,213,113

Students Advised

- Charles Filipiak
- Kaiwen Guo, ECE PHD (admitted 2015)
- Ramon Martinez, Applied Physics PHD
- Tianqu Zhai, ECE PHD (admitted 2018)

Kanicki, Jerzy

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Research Interests: Metal oxide semiconductors thin-film devices and circuits; Transmissive, reflective and emissive flat panel displays; Electrochromic devices; Detectors and active pixel sensors for digital breast tomosynthesis; Biodegradable hydrogels for various applications.

Recent Publications

- Cascaded systems analysis of a-Se/a-Si and a-InGaZnO TFT passive and active pixel sensors for tomosynthesis, Sengupta A., Zhao C., Konstantinidis A., Kanicki J., Physics in Medicine and Biology, 01/10/2019
- Novel Top-Anode OLED/a-IGZO TFTs Pixel Circuit for 8K4K AM-OLEDs, Lai P., Lin C., Kanicki J., IEEE Transactions on Electron Devices, 01/01/2019
- Study of ionically conducting nanocomposites for reflective electrochromic devices, F. Sentanin, R.C. Sabadini, S.C. Barros, W.R. Caliman, C.C.S. Cavalheiro, J. Kanicki, J.P. Donoso, C.J. Magon, I.D.A. Silva, M.M. Silva, Agnieszka Pawlicka, Electrochimica Acta, 01/25/2019
- High-performance PBT7-Th:PC70BM polymer photodiode with transferred charge blocking layers, Kim H., Song B., Lee K., Kim J., Kanicki J., Organic Electronics: physics, materials, applications, 11/01/2018
- Photoluminescence Study of Amorphous InGaZnO Thin-Film Transistors, Yu E., Lai P., Kanicki J., IEEE Transactions on Electron Devices, 03/01/2018
- Gellan gum-O,O'-bis(2-aminopropyl)-polyethylene glycol hydrogel for controlled fertilizer release, Sabadini R., Silva M., Pawlicka A., Kanicki J., Journal of Applied Polymer Science, 01/10/2018
- 3D Printed Masks and Transfer Stamping Process to Enable the Fabrication of the Hemispherical Organic Photodiodes, Kim H., Moon J., Lee K., Kanicki J., Advanced Materials Technologies, 1/1/2017
- Bilayer Interdiffused Heterojunction Organic Photodiodes Fabricated by Double Transfer Stamping, Kim H., Song B., Lee K., Forrest S., Kanicki J., Advanced Optical Materials, 2/2/2017
- DNA-DODA-based polymer electrolytes for dye sensitized solar cells, Jimenez D., Nogueira A., Kajzar F., Kanicki J., Pawlicka A., Molecular Crystals and Liquid Crystals, 9/22/2017

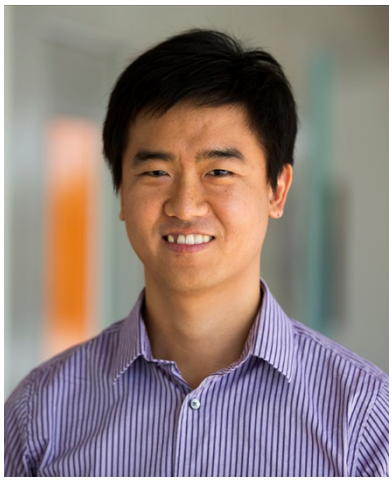
- Influence of molybdenum trioxide thin film thickness on its electrochemical properties, Lemos R., Alcazar J., Carreno N., Andrade J., Pawlicka A., Kanicki J., Gundel A., Azevedo C., Avellaneda C., Molecular Crystals and Liquid Crystals, 9/22/2017
- Study of current-mode active pixel sensor circuits using amorphous InSnZnO thin-film transistor for 50-mm pixel-pitch indirect X-ray imagers, Cheng M., Zhao C., Kanicki J., Solid-State Electronics, 5/1/2017
- Task-Based Modeling of a 5k Ultra-High-Resolution Medical Imaging System for Digital Breast Tomosynthesis, Zhao C., Kanicki J., IEEE Transactions on Medical Imaging, 9/1/2017
- Three-dimensional cascaded system analysis of a 50 mm pixel pitch wafer-scale CMOS active pixel sensor x-ray detector for digital breast tomosynthesis, Zhao C., Vassiljev N., Konstantinidis A., Speller R., Kanicki J., Physics in Medicine and Biology, 2/13/2017

Patents

- Sensor Circuits for X-ray Imagers, J. Kanicki, M.-H. Cheng, C. Zhaoand A. Sengupta, filed on October 19, 2018 and assigned U.S. Serial No. 16/165,816

Students Advised

- Aunnasha Sengupta, ECE PHD (admitted 2016)



Kim, Hun-Seok

Website: https://kim.engin.umich.edu/

Research Interests: Digital communication algorithm and systems; Ultra low power / ultra high performance VLSI SoC architecture; Computer vision and multimedia signal processing.

Recent Publications

- Analysis of Circuit Noise and Non-Ideal Filtering Impact on Energy Detection Based Ultra-Low-Power Radios Performance, Alghaihab A., Kim H., Wentzloff D., IEEE Transactions on Circuits and Systems II: Express Briefs, 12/01/2018
- A 1920 x 1080 25FPS, 2.4TOPS/W Unified Optical Flow and Depth 6D Vision Processor for Energy-Efficient, Low Power Autonomous Navigation, Li Z., Wang J., Sylvester D., Blaauw D., Kim H., IEEE Symposium on VLSI Circuits, Digest of Technical Papers, 10/22/2018
- A 470mW-92.5dBm OOK/FSK Receiver for IEEE 802.11 WiFi LP-WUR, Im J., Kim H., Wentzloff D., ESSCIRC 2018 - IEEE 44th European Solid State Circuits Conference, 10/16/2018
- Artificial neural network algorithms for pulse shape discrimination and recovery of piled-up pulses in organic scintillators, Fu C., Di Fulvio A., Clarke S., Wentzloff D., Pozzi S., Kim H., Annals of Nuclear Energy, 10/01/2018
- A 217mW -82dBm IEEE 802.11 Wi-Fi LP-WUR using a 3rd-harmonic passive mixer, Im J., Kim H., Wentzloff D., Digest of Papers - IEEE Radio Frequency Integrated Circuits Symposium, 08/07/2018
- A 150 mw -57.5 dBm-sensitivity bluetooth low-energy back-channel receiver with LO frequency hopping, Alzhaihab A., Breiholz J., Kim H., Calhoun B., Wentzloff D., Digest of Papers - IEEE Radio Frequency Integrated Circuits Symposium, 08/07/2018
- A 486 mw all-digital bluetooth low energy transmitter with ring oscillator based ADPLL for IoT applications, Chen X., Breiholz J., Yahya F., Lukas C., Kim H., Calhoun B., Wentzloff D., Digest of Papers - IEEE Radio Frequency Integrated Circuits Symposium, 08/07/2018
- HDM: Hyper-dimensional modulation for robust low-power communications, Kim H., IEEE International Conference on Communications, 07/27/2018
- Low Complexity, Hardware-Efficient Neighbor-Guided SGM Optical Flow for Low Power Mobile Vision Applications, Li Z., Xiang J., Gong L., Blaauw D., Chakrabarti C., Kim H., IEEE Transactions on Circuits and Systems for Video Technology, 07/08/2018

- A receiver/antenna co-design for a 1.5mJ per fix fully-integrated 10x10x6mm^3 GPS logger, Kim H., Chiotellis N., Ansari E., Faisal M., Jang T., Grbic A., Blaauw D., Wentzloff D., 2018 IEEE Custom Integrated Circuits Conference, CICC 2018, 05/09/2018
- A Fixed-Point Neural Network Architecture for Speech Applications on Resource Constrained Hardware, Shah M., Arunachalam S., Wang J., Blaauw D., Sylvester D., Kim H., Seo J., Chakrabarti C., Journal of Signal Processing Systems, 05/01/2018
- OuterSPACE: An Outer Product Based Sparse Matrix Multiplication Accelerator, Pal S., Beaumont J., Park D., Amarnath A., Feng S., Chakrabarti C., Kim H., Blaauw D., Mudge T., Dreslinski R., Proceedings - International Symposium on High-Performance Computer Architecture, 03/27/2018
- Always-On 12-nW Acoustic Sensing and Object Recognition Microsystem for Unattended Ground Sensor Nodes, Jeong S., Chen Y., Jang T., Tsai J., Blaauw D., Kim H., Sylvester D., IEEE Journal of Solid-State Circuits, 01/01/2018
- A 1920 x 1080 30-frames/s 2.3 TOPS/W Stereo-Depth Processor for Energy-Efficient Autonomous Navigation of Micro Aerial Vehicles, Li Z., Dong Q., Saligane M., Kempke B., Gong L., Zhang Z., Dreslinski R., Sylvester D., Blaauw D., Kim H., IEEE Journal of Solid-State Circuits, 01/01/2018
- A 12nW always-on acoustic sensing and object recognition microsystem using frequency-domain feature extraction and SVM classification, Jeong S., Chen Y., Jang T., Tsai J., Blaauw D., Kim H., Sylvester D., Digest of Technical Papers - IEEE International Solid-State Circuits Conference, 3/2/2017
- A 1920 x 1080 30-frames/s 2.3 TOPS/W Stereo-Depth Processor for Energy-Efficient Autonomous Navigation of Micro Aerial Vehicles, Li Z., Dong Q., Saligane M., Kempke B., Gong L., Zhang Z., Dreslinski R., Sylvester D., Blaauw D., Kim H., IEEE Journal of Solid-State Circuits, 1/1/2018
- A 1920x1080 30fps 2.3TOPS/W stereo-depth processor for robust autonomous navigation, Li Z., Dong Q., Saligane M., Kempke B., Yang S., Zhang Z., Dreslinski R., Sylvester D., Blaauw D., Kim H., Digest of Technical Papers - IEEE International Solid-State Circuits Conference, 3/2/2017
- A 288uW programmable deep-learning processor with 270KB on-chip weight storage using non-uniform memory hierarchy for mobile intelligence, Bang S., Wang J., Li Z., Gao C., Kim Y., Dong Q., Chen Y., Fick L., Sun X., Dreslinski R., Mudge T., Kim H., Blaauw D., Sylvester D., Digest of Technical Papers - IEEE International Solid-State Circuits Conference, 3/2/2017
- A 335mW -72dBm receiver for FSK back-channel embedded in 5.8GHz Wi-Fi OFDM packets, Im J., Kim H., Wentzloff D., Digest of Papers - IEEE Radio Frequency Integrated Circuits Symposium, 7/5/2017
- A 915MHz asymmetric radio using Q-enhanced amplifier for a fully integrated 3x3x3mm 3 wireless sensor node with 20m non-line-of-sight communication, Chuo L., Shi Y., Luo Z., Chiotellis N., Foo Z., Kim G., Kim Y., Grbic A., Wentzloff D., Kim H., Blaauw D., Digest of Technical Papers - IEEE International Solid-State Circuits Conference, 3/2/2017

- A programmable galois field processor for the internet of things, Chen Y., Lu S., Fu C., Blaauw D., Dreslinski R., Mudge T., Kim H., Proceedings - International Symposium on Computer Architecture, 6/24/2017
- Always-On 12-nW Acoustic Sensing and Object Recognition Microsystem for Unattended Ground Sensor Nodes, Jeong S., Chen Y., Jang T., Tsai J., Blaauw D., Kim H., Sylvester D., IEEE Journal of Solid-State Circuits, 1/1/2018
- An analysis of phase noise requirements for ultra-low-power FSK radios, Chen X., Kim H., Wentzloff D., IEEE Radio Frequency Integrated Circuits Symposium, 7/5/2017
- Circuit and System Designs of Ultra-Low Power Sensor Nodes With Illustration in a Miniaturized GNSS Logger for Position Tracking: Part I - Analog Circuit Techniques, Jang T., Kim G., Kempke B., Henry M., Chiotellis N., Pfeiffer C., Kim D., Kim Y., Foo Z., Kim H., Grbic A., Sylvester D., Wentzloff D., Blaauw D., IEEE Transactions on Circuits and Systems I: Regular Papers, 9/1/2017
- Circuit and System Designs of Ultra-Low Power Sensor Nodes With Illustration in a Miniaturized GNSS Logger for Position Tracking: Part II - Data Communication, Energy Harvesting, Power Management, and Digital Circuits, Jang T., Kim G., Kempke B., Henry M., Chiotellis N., Pfeiffer C., Kim D., Kim Y., Foo Z., Kim H., Grbic A., Sylvester D., Wentzloff D., Blaauw D., IEEE Transactions on Circuits and Systems I, 9/1/2017
- RF-Echo: A non-line-of-sight indoor localization system using a low-power active rf reflector ASIC tag, Chuo L., Luo Z., Sylvester D., Blaauw D., Kim H., Proceedings of the Annual International Conference on Mobile Computing and Networking, MOBICOM, 10/4/2017

Patents Issued

- Low Power Wireless Communication Utilizing OFDM Backchannels, U.S. Patent #419838

Students Advised

- Ang Cao, ECE Master's
- Yu Chen, ECE PHD (admitted 2017)
- Yao-Shan Hsiao, ECE PHD (admitted 2018)
- Chin-Wei Hsu, ECE PHD (admitted 2017)
- Sung Kim, ECE PHD (admitted 2018)
- Bowen Liu, ECE PHD (admitted 2018)
- Lu Liu, ECE Master's
- Wenhao Peng, ECE PHD (admitted 2018)
- Siddharth Venkatesan, ECE Master’s
- Mingyu Yang, ECE Master’s
- Li-Xuan Chuo, ECE PHD (admitted 2014, co-advised with Blaauw)
- Ziyun Li, ECE PHD (admitted 2014, co-advised with Blaauw)
- Minchang Cho, ECE PHD (admitted 2015, co-advised with Blaauw)

Kira, Mackillo

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Research Interests: Quantum optoelectronics, semiconductor quantum optics, quantum optics, condensed-matter theory, terahertz spectroscopy, many-body interactions, photon correlations, coherent and ultrafast phenomena, and cluster-expansion approach.

Recent Publications

- Exciton ionization by THz pulses in germanium, Stein M., Lammers C., Steiner J.T., Richter P.-H., Koch S.W., Koch M., and Kira M., Journal of Physics B, 07/09/2018
- Lightwave valleytronics in a monolayer of tungsten diselenide, Langer F., Schmid C.P., Schlauderer S., Gmitra M., Fabian J., Nagler P., Schüller C., Korn T., Hawkins P.G., Steiner J.T., Huttner U., Koch S.W., Kira M., and Huber R, Nature 557, 05/02/2018
- Dynamics of charge-transfer excitons in type-II semiconductor heterostructures, Stein M., Lammers C., Richter P., Fuchs C., Stolz W., Koch M., Vanska O., Weseloh M., Kira M., Koch S., Physical Review B, 03/26/2018
- Density-dependent exciton dynamics and L -valley anisotropy in germanium, Stein M., Lammers C., Springer P., Richter P., Koch S., Koch M., Kira M., Physical Review B, 04/26/2017
- Symmetry-controlled temporal structure of high-harmonic carrier fields from a bulk crystal, Langer F., Hohenleutner M., Huttner U., Koch S., Kira M., Huber R., Nature Photonics, 04/01/2017
- Charge-transfer states and optical transitions at the pentacene-TiO 2 interface, Ljungberg M., Vänskä O., Koval P., Koch S., Kira M., Sanchez-Portal D., New Journal of Physics, 03/13/2017
- Ultrahigh Off-Resonant Field Effects in Semiconductors, Huttner U., Kira M., Koch S., Laser and Photonics Reviews, 07/01/2017
- Lightwave-driven quasiparticle collisions on a sub-cycle timescale, Langer F., Hohenleutner M., Schmid C., Poellmann C., Nagler P., Korn T., Schüller C., Sherwin M.S., Huttner U., Steiner J.T., Koch S.W., Kira M., Huber R., Nature 05/12/2016
- Coherent cyclotron motion beyond Kohn's theorem, Maag T., Bayer A., Baierl S., Hohenleutner M., Korn T., Schüller C., Schuh D., Bougeard D., Lange C., Huber R., Mootz M., Sipe J.E., Koch S.W., Kira M., , Nature Physics 01/02/2016

Students Advised

- Chihyo Ahn, ECE PHD (co-advised, admitted 2018)
- Markus Borsch, ECE PHD (admitted 2017)
- Benjamin Girodias, Physics PHD (admitted 2016)
- Aaditya Hambarde, ECE PHD (admitted 2018)
- Weiwei Jiang, ECE PHD (admitted 2017)
- Woncheol Lee, ECE PHD (co-advised, admitted 2017)
- Haiyi Liu, ECE PHD (admitted 2018)
- Cody Patterson, Applied Physics (admitted 2017)
- Qiannan Wen, Applied Physics (admitted 2017)

Ku, Pei-Cheng

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Research Interests: Optoelectronic devices and materials with current focus on integrated photonics, semiconductor light sources (both classical and quantum) and their applications.

Recent Publications

- Integrated parabolic nanolenses on MicroLED color pixels, Demory B., Chung K., Katcher A., Sui J., Deng H., Ku P., Nanotechnology, 02/27/2018
- Strain effects in gallium nitride adsorption on defective and doped graphene: First-principles calculations, Yan H., Ku P., Gan Z., Liu S., Li P., Crystals, 02/01/2018
- Reducing inhomogeneity in the dynamic properties of quantum dots via self-aligned plasmonic cavities, Demory B., Hill T., Teng C., Deng H., Ku P., Nanotechnology, 01/05/2018
- A variable transmission thin film for visible light, Roberts B., Ghosh M., Ku P., Optics InfoBase Conference Papers, 1/1/2017
- Chip-scale integration of RGB LED pixels for microdisplay, lighting and biophotonics applications, Ku P., Optics InfoBase Conference Papers, 1/1/2017
- Color mixing from monolithically integrated InGaN-based light-emitting diodes by local strain engineering, Chung K., Sui J., Demory B., Ku P., Applied Physics Letters, 7/24/2017
- Gallium nitride based tactile sensors, Sui J., Ku P., Optics InfoBase Conference Papers, 1/1/2017
- Impact of carrier localization on recombination in InGaN quantum wells and the efficiency of nitride light-emitting diodes: Insights from theory and numerical simulations, Jones C., Teng C., Yan Q., Ku P., Kioupakis E., Applied Physics Letters, 9/11/2017
- Improving the Radiative Efficiency of InGaN Quantum Dots via an Open Top Cavity, Demory B., Katcher A., Hill T., Teng C., Zhang C., Guo L., Deng H., Ku P., ACS Photonics, 4/19/2017
- Individually addressable micron-sized LED color pixels with integrated condenser lenses, Demory B., Chung K., Sui J., Ku P., Optics InfoBase Conference Papers, 1/1/2017
- LED Lights with Hidden Intensity-Modulated Blue Channels Aiming for Enhanced Subconscious Visual Responses, Vartanian G., Wong K., Ku P., IEEE Photonics Journal, 6/1/2017

- Monolithic integration of individually addressable light-emitting diode color pixels, Chung K., Sui J., Demory B., Teng C., Ku P., Applied Physics Letters, 3/13/2017
- Wavelength tunable InGaN/GaN nano-ring LEDs via nano-sphere lithography, Wang S., Hong K., Tsai Y., Teng C., Tzou A., Chu Y., Lee P., Ku P., Lin C., Kuo H., Scientific Reports, 3/3/2017

Students Advised

- Juhyeon Kim, ECE PHD (admitted 2019)
- Tuba Sarwar, ECE PHD (admitted 2018)

Kushner, Mark J.

Website: http://uigelz.eecs.umich.edu/

Research Interests: Computational plasma science and engineering with applications to materials processing, microelectronics, photonics and lasers, biotechnology and medicine, and environment.

Recent Publications

- Propagation of negative electrical discharges through 2-dimensional packed bed reactors, J. Kruszelnicki, K. W. Engeling, J. E. Foster, Z. Xiong, and M. J. Kushner, J. Phys. D: Appl. Phys. **50**, 025203 (2017).
- Controlling VUV Photon Fluxes in Pulsed Inductively Coupled Ar/Cl_2 Plasmas and Potential Applications in Plasma Etching, P. Tian and M. J. Kushner, Plasma Sources Sci. Technol. **26**, 024005 (2017).
- Atomic Layer Etching of 3D Structures in Silicon: Self-limiting and Non-ideal Reactions, C. M. Huard, Y. Zhang, S. Sriraman, A. Paterson, K. Kanarik and M. J. Kushner, J. Vac. Sci. Technol. A. **35**, 031306 (2017).
- The 2017 Plasma Roadmap: Low Temperature Plasma Science and Technology, Adamovich, et al, J. Phys. D: Appl. Phys. **50**, 323001 (2017).
- Arrays of Microplasmas for Controlling Properties of Electromagnetic Waves, C. Qu, P. Tian, A. Semnani and M. J. Kushner, Plasma Sources Sci. Technol. **26**, 105006 (2017).
- Downstream Etching of Silicon Nitride Using Continuous-Wave and Pulsed Remote Plasma Sources Sustained in Ar/NF3/O2 Mixtures, S. Huang, V. Volynets, J. R. Hamilton, S. K. Nam, I-C. Song, S. Lu, J. Tennyso) and M. J. Kushner, J. Vac. Sci. Technol. A **36**, 021305 (2018)
- Electrode Configurations in Atmospheric Pressure Plasma Jets: Production of Reactive Species, M. Lietz and M. J. Kushner, Plasma Sources Sci. Technology **27**, 105020 (2018).
- Transient Behavior in Quasi-Atomic Layer Etching of Silicon Dioxide and Silicon Nitride in Fluorocarbon Plasmas, M. Huard, S. Sriraman, A. Paterson and M. J. Kushner, J. Vac. Sci. Technol. A **36**, 06b101 (2018).
- Atmospheric Pressure Plasma Jets onto a Reactive Water Layer over Tissue: Pulse Repetition Rate as a Control Mechanism, S. A. Norberg, G. M. Parsey, A. M. Lietz, E. Johnsen, and M. J. Kushner, J. Phys. D.: Appl. Phys. **52**, 015201 (2019).

Patents Issued

- Microdischarge Based Transducer, Y. Gianchandani, E. Eun, X. Luo, M. J. Kushner, Z. Xiong and J-C. Wang, US Patent Number 10,006,823, issued 2018.

Students Advised

- Shuo Huang, ECE PHD (admitted 2014)
- Juliusz Kruszelnicki, NERS PHD
- Steven Lanham, CHEM PHD
- Amanda Lietz, NERS PHD
- Jordyn Polito, CHEM PHD
- Chenhui Qu, ECE PHD (admitted 2016)

Lafortune, Stéphane

Website:
https://wiki.eecs.umich.edu/stephane/index.php/Main_Page

Research Interests: System and control theory; Discrete event systems; Application to computer and communication systems.

Recent Publications

- Synthesis of Maximally Permissive Nonblocking Supervisors for the Lower Bound Containment Problem, Yin X., Lafortune S., IEEE Transactions on Automatic Control, 12/01/2018
- Minimization of Sensor Activation in Decentralized Discrete-Event Systems, Yin X., Lafortune S., IEEE Transactions on Automatic Control, 11/01/2018
- Detection and mitigation of classes of attacks in supervisory control systems, Carvalho L., Wu Y., Kwong R., Lafortune S., Automatica, 11/01/2018
- Thirty Years of the Ramadge-Wonham Theory of Supervisory Control: A Retrospective and Future Perspectives [Conference Reports], Lafortune S., Rudie K., Tripakis S., IEEE Control Systems, 08/01/2018
- Enforcement of opacity by public and private insertion functions, Ji Y., Wu Y., Lafortune S., Automatica, 07/01/2018
- Supervisory Control of Labeled Transition Systems Subject to Multiple Reachability Requirements via Symbolic Model Checking, Rawlings B., Lafortune S., Ydstie B., IEEE Transactions on Control Systems Technology, 01/01/2018
- On the history of diagnosability and opacity in discrete event systems, Lafortune S., Lin F., Hadjicostis C., Annual Reviews in Control, 01/01/2018
- Synthesis of Obfuscation Policies to Ensure Privacy and Utility, Wu Y., Raman V., Rawlings B., Lafortune S., Seshia S., Journal of Automated Reasoning, 01/01/2018
- A new approach for the verification of infinite-step and K-step opacity using two-way observers, Yin X., Lafortune S., Automatica, 6/1/2017
- From Diagnosability to Opacity: A Brief History of Diagnosability or Lack Thereof, Lafortune S., Lin F., IFAC-PapersOnLine, 7/1/2017
- Minimization of Sensor Activation in Decentralized Discrete Event Systems, Yin X., Lafortune S., IEEE Transactions on Automatic Control, 12/12/2017
- On the Decidability and Complexity of Diagnosability for Labeled Petri Nets, Yin X., Lafortune S., IEEE Transactions on Automatic Control, 11/1/2017

- Scaling the formal synthesis of supervisory control software for multiple robot systems, Hill R., Lafortune S., Proceedings of the American Control Conference, 6/29/2017
- Supervisory control and reactive synthesis: a comparative introduction, Ehlers R., Lafortune S., Tripakis S., Vardi M., Discrete Event Dynamic Systems: Theory and Applications, 6/1/2017
- Supervisory control for collision avoidance in vehicular networks using discrete event abstractions, Dallal E., Colombo A., Del Vecchio D., Lafortune S., Discrete Event Dynamic Systems: Theory and Applications, 3/1/2017
- Synthesis of Maximally-Permissive Supervisors for the Range Control Problem, Yin X., Lafortune S., IEEE Transactions on Automatic Control, 8/1/2017
- Verification complexity of a class of observational properties for modular discrete events systems, Yin X., Lafortune S., Automatica, 9/1/2017

Students Advised

- Yiding Ji, ECE PHD (admitted 2016)
- Romulo Meira Goes, ECE PHD (admitted 2015)
- Andrew Wintenberg, ECE PHD (co-advised) (admitted 2018)

Lee, Somin Eunice

Website: http://bioplasmonics.org/

Research Interests: Use of nanoscale-dependent properties to enable unique spatial and temporal capabilities needed for quantification in bioscience and medicine; Areas of expertise include plasmonics, nanophotonics, bionanotechnologies.

Recent Publications

- High spatial precision nano-imaging of polarization-sensitive plasmonic particles, Liu Y., Wang Y., Lee S., Progress in Biomedical Optics and Imaging - Proceedings of SPIE, 01/01/2018
- High-speed nano-polarimetry for real-time plasmonic bio-imaging, Wang Y., Liu Y., Zhao X., Lee S., Progress in Biomedical Optics and Imaging - Proceedings of SPIE, 01/01/2018
- Mechano-optical plasmonic nanoantenna, Lee, S.E., SPIE Photonics West Bios, 2/2/2017
- High-speed nano-polarimetry for real-time plasmonic bio-imaging, Wang, Y., Liu, Y., Zhao, X., Lee, S.E., Proceedings of SPIE, 2/23/18
- High spatial precision nano-imaging of polarization-sensitive plasmonic particles, Liu, Y., Wang, Y., Lee, S.E., Proceedings of SPIE, 2/20/18

Patents Issued

- Nanoscale temperature sensor, Liu, Y., Lee, S.E, Patent #: Application # 15/632,307

Students Advised

- Gary Cui, ECE MS (admitted 2018)
- Sam Carano, ECE MS (admitted 2018)
- Longshun Li, BME MS (admitted 2018)
- Christina Liao, ECE PHD (admitted 2017)
- Wei-Kuan Lin, ECE PHD (admitted 2017)
- Yunbo Liu, ECE PHD (admitted 2014)
- Xintao Zhao, ECE PHD (admitted 2017)

Liu, Mingyan

Website: https://liu.engin.umich.edu/

Research Interests: Resource allocation, performance modeling, sequential decision and learning theory, game theory and incentive mechanisms, with applications to large-scale networked systems, cybersecurity and cyber risk quantification.

Recent Publications

- Designing Cyber Insurance Policies: The Role of Pre-Screening and Security Interdependence, Khalili M., Naghizadeh P., Liu M., IEEE Transactions on Information Forensics and Security (TISF), 13(9), pp. 2226-2239, September 2018.
- Provision of Public Goods on Networks: On Existence, Uniqueness, and Centralities, Naghizadeh P., Liu M., IEEE Transactions on Network Science and Engineering (TNSE), 5(3), pp. 225-236, July 2018.
- Recycled ADMM: Improve Privacy and Accuracy with Less Computation in Distributed Algorithms, Zhang X., Khalili M., Liu M., Annual Allerton Conference on Control, Communication, and Computing (Allerton), October 2018, Allerton, IL.
- Characterizing the Internet Host Population Using Deep Learning: A Universal and Lightweight Numerical Embedding, Sarabi A., Liu M., Proceedings of the ACM SIGCOMM Internet Measurement Conference (IMC), October 2018, Boston, MA.
- Characterize Adversarial Examples Based on Spatial Consistency Information for Semantic Segmentation, Xiao C., Deng R., Li B., Yu F., Liu M., Song D., The European Conference on Computer Visions (ECCV), pp. 220-237, September 2018, Munich, Germany.
- From Patching Delays to Infection Symptoms: Using Risk Profiles for an Early Discovery of Vulnerabilities Exploited in the Wild, Xiao C., Sarabi A., Liu Y., Li B., Liu M., Tumitras T., The Annual USENIX Security Symposium (USENIX), pp. 903-918, August 2018, Baltimore, MD.
- Improving the Privacy and Accuracy of ADMM-Based Distributed Algorithms, Zhang X., Khalili M., Liu, M., International Conference on Machine Learning (ICML), pp. 5791-5800, July 2018, Stockholm, Sweden.
- Generating Adversarial Examples with Adversarial Networks, Xiao C., Li, B., Zhu, J.-Y., He, W., Liu M., Song, D., The 27th International Joint Conference on Artificial Intelligence (IJCAI), pp. 3905-3911, July 2018, Stockholm, Sweden.
- Embracing and Controlling Risk Dependency in Cyber Insurance Policy Underwriting, Khalili M., Liu M., Romanosky S., The Annual Workshop on the Economics of Information Security (WEIS), June 2018, Innsbruck, Austria.

- Spatially Transformed Adversarial Examples, Xiao C., Zhu J.-Y., Li B., He W., Liu M., Song D., International Conference on Learning Representations (ICLR), May 2018, Vancouver, Canada.
- Sequential Learning and Decision-Making in Dynamic Channel Access and Transmission Scheduling, Liu Y., Liu M., Chapter in "Handbook of Cognitive Radio," Springer, May 2017, doi:10.1007/978- 981-10-1389-8 25-1.
- An Online Learning Approach to Improving the Quality of Crowd-Sourcing, Liu Y., Liu M., IEEE/ACM Transactions on Networking (ToN), 25(4), pp. 2166 - 2179, August 2017.
- Mitigating Large Errors in WiFi-based Indoor Localization for Smartphones, Wu C., Zhou Z., Liu Y., Liu M., IEEE Transactions on Vehicular Technology (TVT), 66(7), pp. 6246-6257, July 2017.
- Design and Optimization of a Distributive Model-Based Sensor Fault Detection Method for Automated In-Network Execution in a Wireless Sensor Network, Lo C., Lynch J., Liu, M., International Journal of Sustainable Materials and Structural Systems, 3(1), pp. 33–52, 2017.
- On the Uniqueness and Stability of Equilibria of Network Games, Naghizadeh P., Liu M., 55th Annual Allerton Conference on Communication, Control, and Computing (Allerton) 2017, Allerton, IL.
- Embracing Risk Dependency in Designing Cyber-Insurance Contracts, Khalili M., Naghizadeh P., Liu M., 55th Annual Allerton Conference on Communication, Control, and Computing (Allerton), October 2017, Allerton, IL.
- Designing Cyber Insurance Policies in the Presence of Security Interdependence, Khalili M., Naghizadeh P., Liu M., Proceedings of the 12th Workshop on the Economics of Networks, Systems and Computation (NetEcon) - In Conjunction with the 18th ACM Conference on Economics and Computation (EC), June 2017, Boston, MA.
- Crowd Learning: Improving Online Decision Making Using Crowdsourced Data, Liu Y., Liu M., International Joint Conference on Artificial Intelligence (IJCAI), August 2017, Melbourne, Australia.
- Designing Cyber Insurance Policies: Mitigating Moral Hazard Through Security Pre-Screening, Khalili M., Naghizadeh P., Liu M., International Conference on Game Theory for Networks (GameNets), May 2017, Knoxville, TN.
- A Reputation-Based Contract for Repeated Crowdsensing with Costly Verification, Dobakhshari D., Naghizadeh P., Liu M., Gupta V., Proceedings of the American Control Conference (ACC), May 2017, Seattle, WA.
- Distributed Belief Averaging Using Sequential Observations, Liu Y., Liu J., Basar T., Liu M., Proceedings of the American Control Conference (ACC), May 2017, Seattle, WA.
- Patch Me If You Can: A Study on the Effects of Individual User Behavior on the End-Host Vulnerability State, Sarabi A., Zhu Z., Xiao C., Liu M., Dumitras T., Passive and Active Measurement Conference (PAM), March 2017, Sydney, Australia.

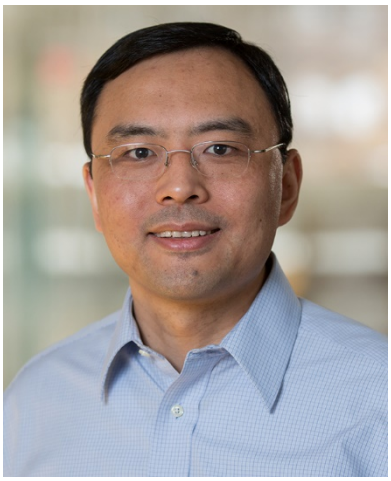
- Inter-Temporal Incentives in Security Information Sharing Agreements, Naghizadeh P., Liu M., Information Theory and Applications Workshop (ITA), February 2016, San Diego, CA. [Invited paper and talk]

Patents Issued

- Rating Network Security Posture And Comparing Network Maliciousness, Patent No. US 10,038,703 B2, issued July 2018.
- Network Maliciousness Susceptibility Analysis and Rating, Patent No. US 9,729,558 B2, issued April 2017.

Students Advised

- Kun Jin, ECE PHD (admitted 2017)
- Mohammadmahdi Khaliligarekani, ECE PHD (admitted 2015)
- Mehrdad Moharrami, ECE PHD (co-advised with V. Subramanian, admitted 2014)
- Chenlan Wang, ECE PHD (admitted 2018)
- Chaowei Xiao, CSE PHD (admitted 2015)
- Xueru Zhang, ECE PHD (admitted 2017)



Lu, Wei

Website: https://liu.engin.umich.edu/

Research Interests: New memory devices such as resistive-random access memory (RRAM), memristor-based logic circuits, neuromorphic computing systems, aggressively scaled transistor devices, electrical transport in low-dimensional systems.

Recent Publications

- Ionic modulation and ionic coupling effects in MoS_2 devices for neuromorphic computing, Xiaojian Zhu, Da Li, Xiaogan Liang, & Wei D. Lu, *Nature Materials*, **18**, 141–148 (2019)
- Self-Limited and Forming-Free CBRAM Device with Double Al_2O_3 ALD Layers, Jong Hoon Shin, Qiwen Wang, Wei D Lu, *IEEE Electron Device Letters*, **39**, 1512-1515 (2018)
- Neuromorphic Computing Using Memristor Crossbar Networks: A Focus on Bio-Inspired Approaches, YeonJoo Jeong, Wei Lu, *IEEE Nanotechnology Magazine*, **12**, 6-18 (2018)
- A general memristor-based partial differential equation solver, Mohammed A. Zidan, YeonJoo Jeong, Jihang Lee, Bing Chen, Shuo Huang, Mark J. Kushner & Wei D. Lu, *Nature Electronics* **1**, 411–420 (2018)
- K-means Data Clustering with Memristor Networks, YeonJoo Jeong, Jihang Lee, John Moon, Jong Hoon Shin, and Wei D. Lu, *Nano Lett.,* **18** (7), 4447–4453 (2018)
- Neuromorphic Computing Using Memristor Crossbar Networks: A Focus on Bio-Inspired Approaches, Y.J. Jeong, W. D. Lu, *IEEE Nanotechnology Magazine*, **12** (3), 6-18 (2018)
- Neuromorphic computing with memristive devices, Wen Ma, Mohammed A Zidan, Wei D Lu, *Science China Information Sciences*, **61** (6), 060422 (2018)
- Parasitic Effect Analysis in Memristor-Array-Based Neuromorphic Systems, Y.J. Jeong, M.A. Zidan, W.D. Lu, *IEEE Transactions on Nanotechnology* **17** (1), 184-193 (2018).
- Optogenetics-Inspired Tunable Synaptic Functions in Memristors, Xiaojian Zhu and Wei D. Lu, *ACS Nano*, **12** (2), pp 1242–1249 (2018)
- The Future of Electronics Based on Memristive Systems, Mohammed A. Zidan, John Paul Strachan & Wei D. Lu, *Nature Electronics*, **1**, 22–29 (2018)
- Reservoir computing using dynamic memristors for temporal information processing, C. Du, F. Cai, M. A Zidan, W. Ma, S.H. Lee, and Wei D. Lu, *Nature Communications* **8**, 2204 (2017) doi:10.1038/s41467-017-02337-y
- On-Demand Reconfiguration of Nanomaterials: When Electronics Meets Ionics, Jihang

Lee, Wei D. Lu, *Advanced Materials*, 30, 1702770 (2018)

- Memristive computing devices and applications, M.A. Zidan, A. Chen, G. Indiveri, W.D. Lu, *Journal of Electroceramics* **39** (1-4), 4-20 (2017)
- Iodine vacancy redistribution in organic–inorganic halide perovskite films and resistive switching effects, X. Zhu, J. Lee, W.D. Lu, *Advanced Materials* **29**, 1700527 (2017)
- Field-Programmable Crossbar Array (FPCA) for Reconfigurable Computing, Mohammed A. Zidan, YeonJoo Jeong, Jong Hoon Shin, Chao Du, Zhengya Zhang, and Wei D. Lu, *IEEE Trans Multi-Scale Comp Sys*, **4**, 698-710 (2017)
- Sparse Coding with Memristor Networks, Patrick M. Sheridan, Fuxi Cai, Chao Du, Wen Ma, Zhengya Zhang & Wei D. Lu, *Nature Nanotechnology*, **12**, 784–789 (2017)
- Temporal Learning Using Second-Order Memristors, M.A. Zidan, Y.J. Jeong, W.D. Lu, *IEEE Transactions on Nanotechnology*, **16** (4), 721-723 (2017)
- Experimental Demonstration of Feature Extraction and Dimensionality Reduction Using Memristor Networks, S. Choi, J. H. Shin, J. Lee, P. Sheridan, and W. D. Lu, *Nano Letters*, **17**, 3113–3118 (2017).
- Electronic and optical properties of oxygen vacancies in amorphous Ta_2O_5 from first principles, Jihang Lee, Wei D. Lu and Emmanouil Kioupakis, *Nanoscale*, **9**, 1120-1127 (2017).
- Ge nanowire photodetector with high photoconductive gain epitaxially integrated on Si substrate, U. Otuonye, H.W. Kim, W.D. Lu, *Applied Physics Letters*, **110** (17), 173104 (2017)
- Emulation of synaptic metaplasticity in memristors, Xiaojian Zhu, Chao Du, YeonJoo Jeong, Wei D. Lu, *Nanoscale*, **9** (1), 45-51 (2017)

Patents Issued

- Sparse Coding with Memristor Networks, Wei Lu, Fuxi, Cai, Patrick, Sheridan, Chao Du, Chao, US Patent #10,171,084

Students Advised

- Fuxi Cai, ECE PHD (admitted 2013)
- Seung Hwan Lee, ECE PHD (admitted 2015)
- Fan-Hsuan Meng, ECE PHD (admitted 2017)
- John Moon, ECE PHD (admitted 2015)
- Jong Hoon Shin, ECE PHD (admitted 2014)
- Qiwen Wang, ECE PHD (admitted 2016)
- Xinxin Wang, ECE PHD (admitted 2018)

Mahdavifar, Hessam

Website: https://mahdavifar.engin.umich.edu/

Research Interests: Coding and information theory with applications to wireless communications, data storage, security, and Internet of Things. I am also interested in game theory with applications to social networks.

Recent Publications

- Global Games with Noisy Information Sharing, Mahdavifar H., Beirami A., Touri B., Shamma J., IEEE Transactions on Signal and Information Processing over Networks, 09/01/2018
- Distributed Multi-User Secret Sharing, Soleymani M., Mahdavifar H., IEEE International Symposium on Information Theory - Proceedings, 08/15/2018
- Algebraic List-Decoding in Projective Space: Decoding with Multiplicities and Rank-Metric Codes, Mahdavifar H., Vardy A., IEEE Transactions on Information Theory, 01/01/2018
- A new approach for constructing and decoding maximum rank distance codes, Mahdavifar H., IEEE International Symposium on Information Theory - Proceedings, 8/9/2017
- Asymptotically optimal sticky-insertion-correcting codes with efficient encoding and decoding, Mahdavifar H., Vardy A., IEEE International Symposium on Information Theory - Proceedings, 8/9/2017
- Fast polarization for non-stationary channels, Mahdavifar H., IEEE International Symposium on Information Theory - Proceedings, 8/9/2017
- Relaxed Polar Codes, El-Khamy M., Mahdavifar H., Feygin G., Lee J., Kang I., IEEE Transactions on Information Theory, 4/1/2017
- Scaling exponent of sparse random linear codes over binary erasure channels, Mahdavifar H., IEEE International Symposium on Information Theory - Proceedings, 8/9/2017

Students Advised

- Nasser Aldaghri, ECE PHD (admitted 2017)
- Mohammad Vahid Jamali, ECE PHD (admitted 2017)
- Chin-Jen Pang, ECE PHD (co-advised) (admitted 2017)
- Mahdi Soleymani, ECE PHD (admitted 2017)

Mathieu, Johanna

Website: https://mathieu.engin.umich.edu/

Research Interests: Modeling, estimation, and control of electric loads and storage; Operational and control strategies that reduce the environmental impact, cost, and inefficiency of the power system.

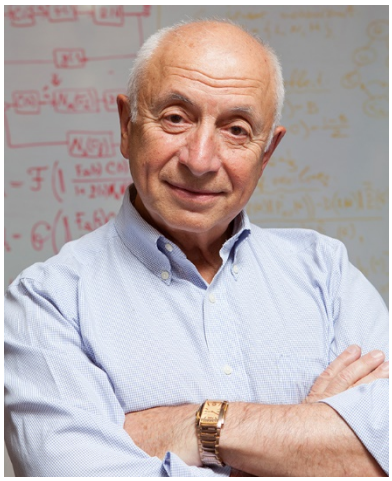
Recent Publications

- Do commercial buildings become less efficient when they provide grid ancillary services?, Keskar, D. Anderson, J. X. Johnson, I. A. Hiskens, and J. L. Mathieu, Energy Efficiency (Accepted).
- Effects of load-based frequency regulation on distribution network operation, S.C. Ross, G. Vuylsteke, and J.L. Mathieu, IEEE Transactions on Power Systems (Accepted).
- Chance constrained reserve scheduling using uncertain controllable loads, Part I: Formulation and scenario-based analysis, M. Vrakopoulou, B. Li, and J.L. Mathieu. IEEE Transactions on Smart Grid (Accepted).
- Chance constrained reserve scheduling using uncertain controllable loads, Part II: Analytical reformulation, Li, M. Vrakopoulou, and J.L. Mathieu. IEEE Transactions on Smart Grid (Accepted).
- Ambiguous risk constraints with moment and unimodality information, Li, R. Jiang, and J.L. Mathieu. Mathematical Programming 173.1-2 (2019), 151-192.
- Use-phase drives lithium ion battery life cycle environmental impacts when used for frequency regulation, N.A. Ryan, Y. Lin, N. Mitchell-Ward, J.L. Mathieu, and J.X. Johnson. Environmental Science & Technology 52.17 (2018), 10163-10174.
- Real-time energy disaggregation of a distribution feeder's demand using online learning, G.S. Ledva, L. Balzano, and J.L. Mathieu. IEEE Transactions on Power Systems 33.5 (2018), 4730-4740.
- Managing communication delays and model error in demand response, G.S. Ledva, E. Vrettos, S. Mastellone, G. Andersson, and J.L. Mathieu. IEEE Transactions on Power Systems 33.2 (2018), 1299-1308.
- Policy and market barriers to energy storage providing multiple services, S. Forrester, A. Zaman, J.L Mathieu, and J.X. Johnson. The Electricity Journal 30.9 (2017), 50-56.
- Modeling and optimal operation of distributed battery storage in low voltage grids, P. Fortenbacher, J.L. Mathieu, and G. Andersson. IEEE Transactions on Power Systems 32.6 (2017), 4340-4350.

- Explaining inefficiencies in commercial buildings providing power system ancillary services, Y. Lin, J.L. Mathieu, J.X. Johnson, I.A. Hiskens, and S. Backhaus. Energy and Buildings 152 (2017), 216-226.
- Hybrid stochastic-deterministic multi-period DC optimal power flow, Mégel, J.L. Mathieu, and G. Andersson. IEEE Transactions on Power Systems 32.5 (2017), 3934-3945.
- Distributionally robust chance-constrained optimal power flow with uncertain renewables and uncertain reserves provided by loads, Y. Zhang, S. Shen, and J.L. Mathieu. IEEE Transactions on Power Systems 32.2 (2017), 1378-1388.
- Ancillary services through demand scheduling and control of commercial buildings, Y. Lin, P. Barooah, and J.L. Mathieu. IEEE Transactions on Power Systems 32.1 (2017), 186-197.
- Price and capacity competition in energy storage markets, Taylor, J.L. Mathieu, D.S. Callaway, and K. Poolla. Energy Systems 8.1 (2017), 169-197.
- Environmental Impacts of Using Energy Storage Aggregations to Provide Multiple Services, Kern, J.X. Johnson, and J.L. Mathieu. Hawaii International Conference on Systems Science. 2019.
- Improving power system voltage stability by using demand response to maximize the distance to the closest saddle-node bifurcation, M. Yao, I.A. Hiskens, and J.L. Mathieu. IEEE Conference on Decision and Control. 2018.
- Exploring connections between a multiple model Kalman filter and dynamic fixed share with applications to demand response, G.S. Ledva, L. Balzano, and J.L. Mathieu. IEEE Conference on Control Technology and Applications. 2018.
- Experimental investigation of the additional energy consumed by building HVAC systems providing grid ancillary services, Keskar, D. Anderson, J.X. Johnson, I.A. Hiskens, and J.L. Mathieu. ACEEE Summer Study on Energy Efficiency in Buildings. 2018.
- Benchmarking of aggregate residential load models used for demand response, G.S. Ledva, S. Peterson, and J.L Mathieu. IEEE PES General Meeting. 2018.
- Distributionally robust chance-constrained optimal power flow assuming log-concave distributions, Li, J.L Mathieu, and R. Jiang. Power Systems Computation Conference. 2018.

Students Advised

- Gregory Ledva, ECE PHD (admitted 2014)
- Bowen Li, ECE PHD (admitted 2013)
- Stephanie Ross, ECE PHD (admitted 2014)
- Anna Stuhlmacher, ECE PHD (admitted 2017)
- Mengqi Yao, ECE PHD (admitted 2016)



Meerkov, Semyon M.

Research Interests: Control of systems with nonlinear sensors and actuators, Resilient monitoring and control under malicious attacks; Smart production systems: theory and industrial applications in the framework of Industry 4.0.

Recent Publications

- Combating curse of dimensionality in resilient monitoring systems: Conditions for lossless decomposition, S. M. Meerkov and M. Ravichandran, IEEE Transactions on Cybernetics, 5/1/2017
- Multi-job production systems: definition, problems, and product-mix performance portrait of serial lines, Alavian P., Denno P., Meerkov S., International Journal of Production Research, 6/28/2017 (best paper award of the year).
- Design for manufacturing and assembly/disassembly: joint design of products and production systems, O. Battaia, A. Dolgui, S.S. Heragu, S.M. Meerkov, and M.K. Tiwari, International Journal of Production Research, Vol. 56, No. 24, 7181–7189, 2018.

Patents Issued

- Programmable manufacturing advisor for smart production systems, P Alavian, S.M. Meerkov and L. Zhang, Provisional application filed on 10/18/2018.

Students Advised

- Kang Liu, ECE PHD (admitted 2018)

Mi, Zetian

Website: https://mi.engin.umich.edu/

Research Interests: III-nitride semiconductors, low dimensional nanostructures, LEDs, lasers, Si photonics, solar fuels.

Recent Publications

- AlGaN Nanowires: Path to Electrically Injected Semiconductor Deep Ultraviolet Lasers, Zhao S., Mi Z., IEEE Journal of Quantum Electronics, 12/01/2018
- Gallium nitride nanowire as a linker of molybdenum sulfides and silicon for photoelectrocatalytic water splitting, Zhou B., Kong X., Vanka S., Chu S., Ghamari P., Wang Y., Pant N., Shih I., Guo H., Mi Z., Nature Communications, 12/01/2018
- A Photochemical Diode Artificial Photosynthesis System for Unassisted High Efficiency Overall Pure Water Splitting, F. A. Chowdhury, M. L. Trudeau, H. Guo and Z. Mi, Nature Communications, vol. 9, 1707, 2018.
- InGaN/GaN Quantum Dots in Nanowires on Silicon (111) for Intermediate Band Solar Cells (WCPEC-7), Cheriton R., Sadaf S., Mi Z., Hinzer K., 2018 IEEE 7th World Conference on Photovoltaic Energy Conversion, WCPEC 2018 - A Joint Conference of 45th IEEE PVSC, 28th PVSEC and 34th EU PVSEC, 11/26/2018
- AlGaN Nanowire Photonic Crystals: Design, Epitaxy, and High Efficiency Deep UV LEDs, Liu X., Le B., Mashooq K., Mi Z., 31st Annual Conference of the IEEE Photonics Society, IPC 2018, 11/06/2018
- Characterizing the electrical breakdown properties of single n-i-n-n^+:GaN nanowires, Qu J., Wang R., Sun Y., Shih I., Mi Z., Liu X., Applied Physics Letters, 11/05/2018
- High Efficiency Si Photocathode Protected by Multifunctional GaN Nanostructures, Vanka S., Arca E., Cheng S., Sun K., Botton G., Teeter G., Mi Z., Nano Letters, 10/10/2018
- Making of an Industry-Friendly Artificial Photosynthesis Device, Guan X., Chowdhury F., Wang Y., Pant N., Vanka S., Trudeau M., Guo L., Vayssieres L., Mi Z., ACS Energy Letters, 09/14/2018
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- Efficient coupling of disorder states to excitons in an InGaN nanostructure, Nelson C., Ra Y., Mi Z., Steel D., Physical Review B, 08/13/2018

- Carrier relaxation dynamics of InGaN/GaN dot-in-nanowires, George H., Ra Y., Mi Z., Norris T., 2018 Conference on Lasers and Electro-Optics, CLEO 2018 - Proceedings, 08/06/2018
- Rolled-up SiO_x/SiN_x microtubes with an enhanced quality factor for sensitive solvent sensing, Song P., Chen C., Qu J., Ou P., Dastjerdi M., Mi Z., Song J., Liu X., Nanotechnology, 08/03/2018
- Charge carrier transport properties of Mg-doped $Al_{0.6}Ga_{0.4}N$ grown by molecular beam epitaxy, Liu X., Pandey A., Laleyan D., Mashooq K., Reid E., Shin W., Mi Z., Semiconductor Science and Technology, 07/11/2018
- Solar Water Oxidation by an InGaN Nanowire Photoanode with a Bandgap of 1.7 eV, Chu S., Vanka S., Wang Y., Gim J., Ra Y., Hovden R., Guo H., Shih I., Mi Z., ACS Energy Letters, 02/09/2018
- Electrical characterization of Si/InN nanowire heterojunctions, Alagha S., Zhao S., Mi Z., Watkins S., Kavanagh K., Semiconductor Science and Technology, 01/01/2018
- Heteroepitaxy of Fin-Shaped InGaN Nanoridge Using Molecular Beam Epitaxy, Park Y., Gim J., Yalisove R., Hovden R., Mi Z., Crystal Growth and Design, 01/01/2018
- Towards enhancing photocatalytic hydrogen generation: Which is more important, alloy synergistic effect or plasmonic effect, Xu Z., Kibria M., AlOtaibi B., Duchesne P., Besteiro L., Gao Y., Zhang Q., Mi Z., Zhang P., Govorov A., Mai L., Chaker M., Ma D., Applied Catalysis B: Environmental, 01/01/2018
- Optically active dilute-antimonide III-nitride nanostructures for optoelectronic devices, Chowdhury F., Sadaf S., Shi Q., Chen Y., Guo H., Mi Z., Applied Physics Letters, 8/7/2017
- A Monolithically Integrated InGaN Nanowire/Si Tandem Photoanode Approaching the Ideal Bandgap Configuration of 1.75/1.13 eV, Fan S., Shih I., Mi Z., Advanced Energy Materials, 1/25/2017
- Al(Ga)N Nanowire Deep Ultraviolet Optoelectronics, Zhao S., Mi Z., Semiconductors and Semimetals, 12/1/2017
- AlGaN nanowire deep ultraviolet optoelectronics, Zhao S., Sadaf S., Liu X., Mi Z., Summer Topicals Meeting Series, SUM 2017, 8/17/2017
- AlN/h-BN Heterostructures for Mg Dopant-Free Deep Ultraviolet Photonics, Laleyan D., Zhao S., Woo S., Tran H., Le H., Szkopek T., Guo H., Botton G., Mi Z., Nano Letters, 6/14/2017
- An AlGaN Core-Shell Tunnel Junction Nanowire Light-Emitting Diode Operating in the Ultraviolet-C Band, Sadaf S., Zhao S., Wu Y., Ra Y., Liu X., Vanka S., Mi Z., Nano Letters, 2/8/2017
- Artificial Photosynthesis on III-Nitride Nanowire Arrays, Chu S., Kong X., Vanka S., Guo H., Mi Z., Semiconductors and Semimetals, 1/1/2017
- Electrical characterization of Si/InN nanowire heterojunctions, Alagha S., Zhao S., Mi Z., Watkins S., Kavanagh K., Semiconductor Science and Technology, 1/1/2018
- Electrically injected AlGaN nanowire deep ultraviolet lasers, Mi Z., Zhao S., Liu X., Woo S., Bugnet M., Botton G., 2016 IEEE Photonics Conference, IPC 2016, 1/23/2017

- InGaN nanowire integrated nanophotonics, Mi Z., Ra Y., Rashid R., Wang R., Shih I., Summer Topicals Meeting Series, SUM 2017, 8/17/2017
- InN Nanowires: Epitaxial Growth, Characterization, and Device Applications, Zhao S., Mi Z., Semiconductors and Semimetals, 12/1/2017
- Molecular beam epitaxial growth and characterization of AlN nanowall deep UV light emitting diodes, Liu X., Zhao S., Le B., Mi Z., Applied Physics Letters, 9/4/2017
- Nitrogen Photofixation over III-Nitride Nanowires Assisted by Ruthenium Clusters of Low Atomicity, Li L., Wang Y., Vanka S., Mu X., Mi Z., Li C., Angewandte Chemie - International Edition, 1/1/2017
- On the mechanism of highly efficient p-type conduction of Mg-doped ultra-wide-bandgap AlN nanostructures, Tran N., Le B., Zhao S., Mi Z., Applied Physics Letters, 1/16/2017
- Photorechargeable High Voltage Redox Battery Enabled by Ta 3 N 5 and GaN/Si Dual-Photoelectrode, Cheng Q., Fan W., He Y., Ma P., Vanka S., Fan S., Mi Z., Wang D., Advanced Materials, 7/12/2017
- Preface, Mi Z., Wang L., Jagadish C., Semiconductors and Semimetals, 1/1/2017
- Recent advances on p-type III-nitride nanowires by molecular beam epitaxy, Zhao S., Mi Z., Crystals, 9/1/2017
- Scalable Nanowire Photonic Crystals: Molding the Light Emission of InGaN, Ra Y., Rashid R., Liu X., Lee J., Mi Z., Advanced Functional Materials, 10/12/2017
- Sub- meV decoherence-induced population pulsation resonances in an InGaN system, Nelson C., Ra Y., Mi Z., Berman P., Steel D., Physical Review B, 9/5/2017
- Welcome to the 2017 IEEE Photonics Society Summer Topicals Meeting Series, Mi Z., Summer Topicals Meeting Series, SUM 2017, 8/17/2017

Students Advised

- Chihyo Ahn, ECE PHD (co-advised) (admitted 2018)
- David Laleyan, ECE PHD (admitted 2016)
- Xiwen Liu, ECE PHD (admitted 2018)
- Kishwar Mashooq, ECE PHD
- Ayush Pandey, ECE PHD (co-advised) (admitted 2017)
- Eric Reid, ECE PHD (admitted 2017)
- Walter Jin Shin, ECE PHD (admitted 2017)
- Yongjie Wang, ECE PHD (admitted 2016)
- Aagnick Pant, Applied Physics PHD (admitted 2018)

Michielssen, Eric

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Research Interests: Computational, applied, and theoretical electromagnetics; antennas; microwave and millimeter wave circuits and packaging.

Recent Publications

- Computational design of composite EMI shields through the control of pore morphology, Bregman A., Taub A., Michielssen E., MRS Communications, 09/01/2018
- Controlled Transmission Through Highly Scattering Media Using Semi-Definite Programming as a Phase Retrieval Computation Method, Nagom M., Estakhri N., Norris T., Michielssen E., Nadakuditi R., 2018 Conference on Lasers and Electro-Optics, CLEO 2018 - Proceedings, 08/06/2018
- Reference-less method for computing the transmission matrix of a multimode fiber, N'Gom M., Norris T., Michielssen E., Nadakuditi R., 2018 Optical Fiber Communications Conference and Exposition, OFC 2018 - Proceedings, 06/13/2018
- A butterfly-based direct solver using hierarchical LU factorization for Poggio-Miller-Chang-Harrington-Wu-Tsai equations, Guo H., Liu Y., Hu J., Michielssen E., Microwave and Optical Technology Letters, 06/01/2018
- A Wavelet-Enhanced PWTD-Accelerated Time-Domain Integral Equation Solver for Analysis of Transient Scattering from Electrically Large Conducting Objects, Liu Y., Yucel A., Bagci H., Gilbert A., Michielssen E., IEEE Transactions on Antennas and Propagation, 05/01/2018
- Internally Combined Volume-Surface Integral Equation for em Analysis of Inhomogeneous Negative Permittivity Plasma Scatterers, Yucel A., Gomez L., Michielssen E., IEEE Transactions on Antennas and Propagation, 04/01/2018
- The ICVSIE: A General Purpose Integral Equation Method for Bio-Electromagnetic Analysis, Gomez L., Yucel A., Michielssen E., IEEE Transactions on Biomedical Engineering, 03/01/2018
- Mode control in a multimode fiber through acquiring its transmission matrix from a reference-less optical system, N'Gom M., Norris T., Michielssen E., Nadakuditi R., Optics Letters, 02/01/2018
- Reference-less method for computing the transmission matrix of a multimode fiber, N'Gom M., Norris T., Michielssen E., Nadakuditi R., Optics InfoBase Conference Papers, 01/01/2018

- Controlled transmission through highly scattering media using semi-definite programming as a phase retrieval computation method, N'Gom M., Estakhri N., Norris T., Michielssen E., Nadakuditi R., Optics InfoBase Conference Papers, 01/01/2018
- Parallel Wideband MLFMA for Analysis of Electrically Large, Non-Uniform, Multiscale Structures, Hughey S., Aktulga H., Vikram M., Lu M., Shanker B., Michielssen E., IEEE Transactions on Antennas and Propagation, 01/01/2018
- Controlling Light Transmission Through Highly Scattering Media Using Semi-Definite Programming as a Phase Retrieval Computation Method, Gom M., Lien M., Estakhri N., Norris T., Michielssen E., Nadakuditi R., Scientific Reports, 12/1/2017
- A butterfly-based direct integral-equation solver using hierarchical LU factorization for analyzing scattering from electrically large conducting objects, Guo H., Liu Y., Hu J., Michielssen E., IEEE Transactions on Antennas and Propagation, 9/1/2017
- Compression of Translation Operator Tensors in FMM-FFT-Accelerated SIE Solvers via Tucker Decomposition, Yucel A., Gomez L., Micielssen E., IEEE Antennas and Wireless Propagation Letters, 8/15/2017
- Non-holographic method to compute the transmission matrix of a multimode fiber for mode control, Gom M., Norris T., Michielssen E., Nadakuditi R., Optics InfoBase Conference Papers, 1/1/2017
- An HSS Matrix-Inspired Butterfly-Based Direct Solver for Analyzing Scattering from Two-Dimensional Objects, Liu Y., Guo H., Michielssen E., IEEE Antennas and Wireless Propagation Letters, 1/1/2017
- Internally Combined Volume-Surface Integral Equation for a 3-D Electromagnetic Scattering Analysis of High-Contrast Media, Gomez L., Yucel A., Michielssen E., IEEE Antennas and Wireless Propagation Letters, 1/1/2017
- Non-Holographic Method to Compute the Transmission Matrix of a Multimode Fiber for Mode Control, N'Gom, M., Norris, T. B., Michielssen, E., & Nadakuditi, R. R., In Frontiers in Optics (pp. FTh4A-1). Optical Society of America, 1/1/2017

Students Advised

- Max Bright, ECE PHD (admitted 2018)

Mortazawi, Amir

Website: https://mortazawi.engin.umich.edu/

Research Interests: RF and microwave circuits including: microwave and millimeter-wave power amplifiers, spatial power combining and thin film ferroelectric based frequency agile circuits.

Recent Publications

- Rectifier Array with Adaptive Power Distribution for Wide Dynamic Range RF-DC Conversion, Wang X., Mortazawi A., IEEE Transactions on Microwave Theory and Techniques, 01/01/2019
- Linearity Measurements of Intrinsically Switchable BST FBAR Filters, Koohi M., Nam S., Mortazawi A., 2018 48th European Microwave Conference, EuMC 2018, 11/20/2018
- Intrinsically Switchable Filter Bank Employing Ferroelectric Barium Strontium Titanate, Koohi M., Mortazawi A., IEEE Transactions on Microwave Theory and Techniques, 09/11/2018
- On the Linearity of BST Thin Film Bulk Acoustic Resonators, Koohi M., Mortazawi A., 2018 IEEE MTT-S International Microwave Workshop Series on Advanced Materials and Processes for RF and THz Applications, IMWS-AMP 2018, 09/06/2018
- A New Integrated K-Band Analog Vector Sum Phase Shifter, Akbar F., Mortazawi A., IEEE MTT-S International Microwave Symposium Digest, 08/17/2018
- A Compact Intrinsically Switchable Filter Bank Employing Multifunctional Ferroelectric BST, Koohi M., Mortazawi A., IEEE MTT-S International Microwave Symposium Digest, 08/17/2018
- Nonlinear Resonant Circuits for Coupling-Insensitive Wireless Power Transfer Circuits, Abdelatty O., Wang X., Mortazawi A., IEEE MTT-S International Microwave Symposium Digest, 08/17/2018
- Compact intrinsically switchable FBAR filters utilizing ferroelectric BST, Zolfagharloo Koohi M., Lee S., Mortazawi A., IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 08/01/2018
- Exciting Workshops and Short Courses during Microwave Week 2018, Chiao J., Shanaa O., Mortazawi A., Ivanov T., Hoorfar A., Hang C., Roblin P., Wang H., IEEE Microwave Magazine, 05/01/2018
- Scalable phased array architectures with a reduced number of tunable phase shifters, F. Akbar and A. Mortazawi, IEEE Trans. Microw. Theory Techn, 9/1/2017

- A frequency tunable 360º analog CMOS phase shifter with an adjustable amplitude, F. Akbar and A. Mortazawi, IEEE Trans. Circuits Syst. II, 12/1/2017

Patents Issued

- Wide Dynamic Range Rectifier Circuits, Patent #: 9768708

Students Advised

- Omar Abdelatty, ECE PHD (co-advised) (admitted 2015)
- Ruiying Chai, ECE PHD (admitted 2018)
- Suhyun Nam, ECE PHD (admitted 2017)
- Milad Zolfagharloo Koohi, ECE PHD (admitted 2014)

Nadakuditi, Rajesh R.

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Research Interests: Statistical signal processing, random matrix theory, random graphs and light transport through opaque random media.

Recent Publications

- Controlled Transmission Through Highly Scattering Media Using Semi-Definite Programming as a Phase Retrieval Computation Method, Nagom M., Estakhri N., Norris T., Michielssen E., Nadakuditi R., 2018 Conference on Lasers and Electro-Optics, CLEO 2018 - Proceedings, 08/06/2018
- Reference-less method for computing the transmission matrix of a multimode fiber, N'Gom M., Norris T., Michielssen E., Nadakuditi R., 2018 Optical Fiber Communications Conference and Exposition, OFC 2018 - Proceedings, 06/13/2018
- Efficient online dictionary adaptation and image reconstruction for dynamic MRI, Ravishankar S., Moore B., Nadakuditi R., Fessier J., Conference Record of 51st Asilomar Conference on Signals, Systems and Computers, ACSSC 2017, 04/10/2018
- Augmented robust PCA for foreground-background separation on noisy, moving camera video, Gao C., Moore B., Nadakuditi R., 2017 IEEE Global Conference on Signal and Information Processing, GlobalSIP 2017 - Proceedings, 03/07/2018
- Robust photometric stereo using learned image and gradient dictionaries, Wagenmaker A., Moore B., Nadakuditi R., Proceedings - International Conference on Image Processing, ICIP, 02/20/2018
- Robust surface reconstruction from gradients via adaptive dictionary regularization, Wagenmaker A., Moore B., Nadakuditi R., Proceedings - International Conference on Image Processing, ICIP, 02/20/2018
- Passive Radar Detection with Noisy Reference Channel Using Principal Subspace Similarity, Gogineni S., Setlur P., Rangaswamy M., Nadakuditi R., IEEE Transactions on Aerospace and Electronic Systems, 02/01/2018
- Mode control in a multimode fiber through acquiring its transmission matrix from a reference-less optical system, N'Gom M., Norris T., Michielssen E., Nadakuditi R., Optics Letters, 02/01/2018
- Reference-less method for computing the transmission matrix of a multimode fiber, N'Gom M., Norris T., Michielssen E., Nadakuditi R., Optics InfoBase Conference Papers, 01/01/2018

- Controlled transmission through highly scattering media using semi-definite programming as a phase retrieval computation method, N'Gom M., Estakhri N., Norris T., Michielssen E., Nadakuditi R., Optics InfoBase Conference Papers, 01/01/2018
- NLP-driven citation analysis for scientometrics, Jha R., Jbara A., Qazvinian V., Radev D., Natural Language Engineering, 1/1/2017
- Controlling Light Transmission Through Highly Scattering Media Using Semi-Definite Programming as a Phase Retrieval Computation Method, Gom M., Lien M., Estakhri N., Norris T., Michielssen E., Nadakuditi R., Scientific Reports, 12/1/2017
- Passive Radar Detection with Noisy Reference Channel Using Principal Subspace Similarity, Gogineni S., Setlur P., Rangaswamy M., Nadakuditi R., IEEE Transactions on Aerospace and Electronic Systems, 7/22/2017
- Improved Detection of Correlated Signals in Low-Rank-Plus-Noise Type Data Sets Using Informative Canonical Correlation Analysis (ICCA), Asendorf N., Nadakuditi R., IEEE Transactions on Information Theory, 6/1/2017
- Low-Rank and Adaptive Sparse Signal (LASSI) Models for Highly Accelerated Dynamic Imaging, Ravishankar S., Moore B., Nadakuditi R., Fessler J., IEEE Transactions on Medical Imaging, 5/1/2017
- Efficient Sum of Outer Products Dictionary Learning (SOUP-DIL) and Its Application to Inverse Problems, S. Ravishankar, R. R. Nadakuditi and J. A. Fessler, IEEE Transactions on Computational Imaging, 1/1/2017
- Improved detection of correlated signals in low-rank-plus-noise type datasets using Informative Canonical Correlation Analysis (ICCA), N. A. Asendorf and R. R. Nadakuditi, IEEE Transactions on Information Theory, 1/1/2017
- Non-holographic method to compute the transmission matrix of a multimode fiber for mode control, M. N'gom, T. B. Norris, E. Michielssen, and R. R. Nadakuditi, Frontiers in Optics, 1/1/2017

Students Advised

- Arvind Prasadan, ECE PHD (admitted 2014)
- Rishi Sonthalia (AIM Math)
- Hao Wu (AIM Math) Applied & Interdisc. Mathematics

Najafi, Khalil

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Research Interests: Solid-state integrated sensors, microactuators, micromechanics, analog and digital integrated circuits.

Recent Publications

- On-chip capacitive sensing and tilting motion estimation of a micro-stage for in situ MEMS gyroscope calibration, Chen Y., Aktakka E., Woo J., Najafi K., Oldham K., Mechatronics, 12/01/2018
- Poster: Frequency scaling in time synchronization for wireless sensor networks, Asgarian F., Najafi K., Proceedings - 14th Annual International Conference on Distributed Computing in Sensor Systems, DCOSS 2018, 10/25/2018
- Ultra Deep Reactive Ion Etching of High Aspect-Ratio and Thick Silicon Using a Ramped-Parameter Process, Tang Y., Sandoughsaz A., Owen K., Najafi K., Journal of Microelectromechanical Systems, 08/01/2018
- Design and fabrication of high-Q birdbath resonator for MEMS gyroscopes, Singh S., Nagourney T., Cho J., Darvishian A., Najafi K., Shiari B., 2018 IEEE/ION Position, Location and Navigation Symposium, PLANS 2018 - Proceedings, 06/05/2018
- High-density wide-range digital accelerometer arrays with high detection resolution, Tang Y., Najafi K., 5th IEEE International Symposium on Inertial Sensors and Systems, INERTIAL 2018 - Proceedings, 05/11/2018
- A micro thermal and stress isolation platform for inertial sensors, Yang D., Najafi K., Lemmerhirt D., Mitchell J., 5th IEEE International Symposium on Inertial Sensors and Systems, INERTIAL 2018 - Proceedings, 05/11/2018
- Simulation-based approach for fabrication of micro-shell resonators with controllable stiffness and mass distribution, Shiari B., Nagourney T., Singh S., Cho J., Najafi K., 5th IEEE International Symposium on Inertial Sensors and Systems, INERTIAL 2018 - Proceedings, 05/11/2018
- Fabrication of hemispherical fused silica micro-resonator with tailored stiffness and mass distribution, Nagourney T., Singh S., Shiari B., Cho J., Najafi K., Proceedings of the IEEE International Conference on Micro Electro Mechanical Systems (MEMS), 04/24/2018
- Thick High Aspect-Ratio Biomimetic Silicon Hair Sensors as Accelerometers, Tang Y., Najafi K., Journal of Microelectromechanical Systems, 01/01/2018

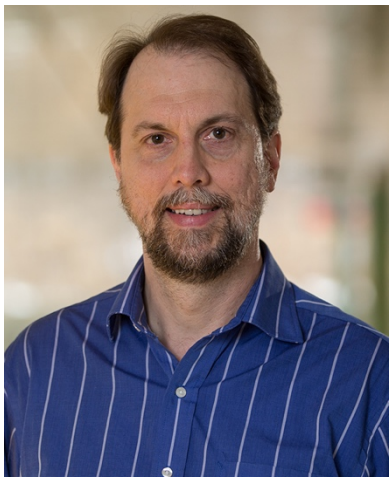
- Thermoelastic Dissipation in Micromachined Birdbath Shell Resonators, Darvishian A., Nagourney T., Cho J., Shiari B., Najafi K., Journal of Microelectromechanical Systems, 8/1/2017
- Simulation of Blowtorch Reflow of Fused Silica Micro-Shell Resonators, Shiari B., Nagourney T, Darvishian A., Cho J., Najafi K., Journal of Microelectromechanical Systems, 8/1/2017
- A Micro Oven-Control System for Inertial Sensors, Yang D., Woo J. ,Lee S., Mitchell J., Challoner A., Najafi K., Journal of Microelectromechanical Systems, 6/1/2017
- Fabrication and Characterization of Bi 2 Te 3 -Based Chip-Scale Thermoelectric Energy Harvesting Devices, Cornett J., Chen B., Haidar S., Berney H., McGuinness P., Lane B., Gao Y., He Y., Sun N., Dunham M., Asheghi M., Goodson K., Yuan Y., Najafi K., Journal of Electronic Materials, 5/1/2017
- Anchor Loss in Hemispherical Shell Resonators, Darvishian A., Shiari B., Cho J., Nagourney T., Najafi K., Journal of Microelectromechanical Systems, 2/1/2017
- A 2kPa per stage and 1.3sccm flow rate modular two-stage electrostatic gas micropump with stiffened drive electrodes, Sandoughsaz A., Najafi K., Bernal L., Proceedings of IEEE Sensors, 1/5/2017

Patents Issued

- Actuation and sensing platform for sensor calibration and vibration isolation, K. Najafi, E. E. Aktakka, Patent #: 9874459
- Microsystem Device and Methods for Fabricating the Same, K. Najafi, R. L. Peterson, J. Cho, Z. Cao, G. He, J. A. Gregory, and Y. Yuan, Patent #: 9778039
- Three-Dimensional Microstructures And Fabrication Process, K. Najafi, T. Nagourney, and J. Cho, Patent #: 9796586

Students Advised

- Farzad Asgarian, ECE PHD (admitted 2014)
- Christopher Boyd, ECE PHD (admitted 2012)
- Behnoush Rostami, ECE PHD (admitted 2017)
- Seyed Amin Sandoughsaz Zardini, ECE PHD (admitted 2013)
- Sajal Singh, ECE PHD (admitted 2016)
- Donguk Yang, ECE PHD (admitted 2014)
- Yi Yuan, ECE PHD (admitted 2012)



Norris, Ted

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Research Interests: Application of femtosecond optical techniques to the physics of semiconductor nanostructures, in developing new ultrafast optical and optoelectronic measurement techniques, THz generation and measurement, plasmonics in nanostructures, and novel methods for biological imaging and in vivo sensing.

Recent Publications

- Nanoscale fingerprinting with hyperbolic metamaterials, Huang Z., Narimanov E., Norris T., 2018 Conference on Lasers and Electro-Optics, CLEO 2018 - Proceedings, 08/06/2018
- Carrier relaxation dynamics of InGaN/GaN dot-in-nanowires, George H., Ra Y., Mi Z., Norris T., 2018 Conference on Lasers and Electro-Optics, CLEO 2018 - Proceedings, 08/06/2018
- Controlled Transmission Through Highly Scattering Media Using Semi-Definite Programming as a Phase Retrieval Computation Method, Nagom M., Estakhri N., Norris T., Michielssen E., Nadakuditi R., 2018 Conference on Lasers and Electro-Optics, CLEO 2018 - Proceedings, 08/06/2018
- Nonlinear and Quantum-Light Scattering from Gold Nanorods, Norris T., Girodias B., Lien M., Kim J., Xu Z., George H., Chang Y., Han M., Zhu Y., Schotland J., Kotov N., Kira M., 2018 Conference on Lasers and Electro-Optics, CLEO 2018 - Proceedings, 08/06/2018
- Reference-less method for computing the transmission matrix of a multimode fiber, N'Gom M., Norris T., Michielssen E., Nadakuditi R., 2018 Optical Fiber Communications Conference and Exposition, OFC 2018 - Proceedings, 06/13/2018
- Mode control in a multimode fiber through acquiring its transmission matrix from a reference-less optical system, N'Gom M., Norris T., Michielssen E., Nadakuditi R., Optics Letters, 02/01/2018
- Dipole-like electrostatic asymmetry of gold nanorods, Kim J., Han M., Lien M., Magonov S., Zhu Y., George H., Norris T., Kotov N., Science Advances, 02/01/2018
- Local Conditioning on undirected graphs, Reyes M., Neuhoff D., 2017 Information Theory and Applications Workshop, ITA 2017, 8/30/2017
- Row-centric lossless compression of Markov images, Reyes M., Neuhoff D., IEEE International Symposium on Information Theory - Proceedings, 8/9/2017
- Controlling Light Transmission Through Highly Scattering Media Using Semi-Definite Programming as a Phase Retrieval Computation Method, NGom M., Lien M., Estakhri N., Norris T., Michielssen E., Nadakuditi R., Scientific Reports, 12/1/2017

- Electrically tunable photoresponse in a graphene heterostructure photodetector, Zhang D., Cheng G., Xu Z., Liu C., Beechem T., Goldflam M., Peters D., Zhou M., Norris T., Zhong Z., Optics InfoBase Conference Papers, 1/1/2017
- Interband effects on hot carrier relaxation in titanium nitride films, Ferguson H., Guler U., Kinsey N., Shalaev V., Norris T., Boltasseva A., Optics InfoBase Conference Papers, 1/1/2017
- Non-holographic method to compute the transmission matrix of a multimode fiber for mode control, NGom M., Norris T., Michielssen E., Nadakuditi R., Optics InfoBase Conference Papers, 1/1/2017
- Optical Asymmetry and Nonlinear Light Scattering from Colloidal Gold Nanorods, Lien M., Kim J., Han M., Chang Y., Ferguson H., Zhu Y., Herzing A., Schotland J., Kotov N., Norris T., ACS Nano, 6/27/2017

Patents Issued

- Light Field Imaging with Transparent Photodetectors, Theodore B. Norris, Zhaohui Zhing, Jeffrey A. Fessler, Che-Hung Liu, You-Chia Chang, and Mmiao-bin Lien Patent #: Serial No. 15,430,043
- Photodetector Based on Double Layer Heterostructures, Z. Zhong, T.B. Norris, C.-H. Liu, and Y.-C. Chang Patent #: 9680038

Students Advised

- Zhengyu Huang, ECE PHD (admitted 2017)
- Nooshin Mohammadi Estakhri, ECE PHD (admitted 2013)
- Zhen Xu, ECE PHD (admitted 2016)

Ozay, Necmiye

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Research Interests: Computational aspects of control system design; hybrid and cyber-physical systems; system identification and validation; dynamics-based data analysis.

Recent Publications

- Learning Constraints from Demonstrations, G. Chou, D. Berenson, and N. Ozay, Proc. 13th International Workshop on the Algorithmic Foundations of Robotics (WAFR), Merida, Mexico, 12/1/2018.
- Fault-tolerant output-feedback path planning with temporal logic constraints, L. Yang and N. Ozay, Proc. 57th IEEE Conference on Decision and Control (CDC), Miami Beach, FL, 12/1/2018.
- Data-driven computation of minimal robust control invariant set, Y. Chen, H. Peng, J. W. Grizzle, and N. Ozay, Proc. 57th IEEE Conference on Decision and Control (CDC), Miami Beach, FL, 12/1/2018.
- Structural Detectability of Faults in Discrete-Time Affine Systems, S. Ghosh, M. Kara, and N. Ozay, Proc. 57th IEEE Conference on Decision and Control (CDC), Miami Beach, FL, 12/1/2018.
- Multi-Agent Coordination Subject to Counting Constraints: A Hierarchical Approach, Y. E. Sahin, N. Ozay, and S. Tripakis, Proc. Int. Symp. on Distributed Autonomous Robotic Systems (DARS), Boulder, CO, 10/1/2018.
- Optimization-Based Design of Bounded-Error Estimators Robust to Missing Data, K. J. Rutledge, S. Z. Yong, and N. Ozay, Proc. 6th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS), Oxford, UK, 7/12018.
- Nonuniform abstractions, refinement and controller synthesis with novel BDD encodings, O. Bulancea Lindvall, P. Nilsson, and N. Ozay, Proc. 6th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS), Oxford, UK, 7/12018.
- Input Design for Nonlinear Model Discrimination via Affine Abstraction, K. R. Singh, Y. Ding, N. Ozay, and S. Z. Yong, Proc. 6th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS), Oxford, UK, 7/12018.
- Using control synthesis to generate corner cases: A case study on autonomous driving, Chou G., Sahin Y., Yang L., Rutledge K., Nilsson P., Ozay N., IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, 11/1/2018

- Optimal Gear Shift Schedule Design for Automated Vehicles: Hybrid System Based Analytical Approach, He C., Qin W., Ozay N., Orosz G., IEEE Transactions on Control Systems Technology, 11/1/2018
- Guaranteed model-based fault detection in cyber-physical systems: A model invalidation approach, Harirchi F., Ozay N., Automatica, 7/1/2018
- Incremental Segmentation of ARX Models, Chou G., Ozay N., Berenson D., IFAC-PapersOnLine, 7/1/2018
- A Robust Algorithm for Online Switched System Identification, Du Z., Balzano L., Ozay N., IFAC-PapersOnLine, 7/1/2018
- Synchronous and Asynchronous Multi-agent Coordination with cLTL+ Constraints, Y. E. Sahin, P. Nilsson, and N. Ozay, Proc. 56th IEEE Conference on Decision and Control (CDC), Melbourne, Australia, 12/1/2017.
- Provably-Correct Fault Tolerant Control with Delayed Information, L. Yang and N. Ozay, Proc. 56th IEEE Conference on Decision and Control (CDC), Melbourne, Australia, 12/1/2017.
- Maximizing the Time of Invariance for Large Collections of Switched Systems, P. Nilsson and N. Ozay, Proc. 56th IEEE Conference on Decision and Control (CDC), Melbourne, Australia, 12/1/2017.
- Guaranteed Fault Detection and Isolation for Switched Affine Models, F. Harirchi, S.Z. Yong, and N. Ozay, Proc. 56th IEEE Conference on Decision and Control (CDC), Melbourne, Australia, 12/1/2017.
- Active Model Discrimination with Applications to Fraud Detection in Smart Buildings, Harirchi F., Yong S., Jacobsen E., Ozay N., IFAC-PapersOnLine, 7/1/2017
- Augmented finite transition systems as abstractions for control synthesis, Nilsson P., Ozay N., Liu J., Discrete Event Dynamic Systems: Theory and Applications, 6/1/2017
- Fuel cell thermal management: Modeling, specifications and correct-by-construction control synthesis, Yang L., Karnik A., Pence B., Waez M., Ozay N., Proceedings of the American Control Conference, 6/29/2017
- Guest editorial: special issue on formal methods in control, Ozay N., Tabuada P., Discrete Event Dynamic Systems: Theory and Applications, 6/1/2017
- On a class of maximal invariance inducing control strategies for large collections of switched systems, Nilsson P., Ozay N., HSCC 2017 - Proceedings of the 20th International Conference on Hybrid Systems: Computation and Control (part of CPS Week), 4/13/2017
- Provably-correct coordination of large collections of agents with counting temporal logic constraints, Sahin Y., Nilsson P., Ozay N., Proceedings - 2017 ACM/IEEE 8th International Conference on Cyber-Physical Systems, ICCPS 2017 (part of CPS Week), 4/18/2017
- Robustification and Parametrization of Switching Controllers for a Class of Set Invariance Problems, Yang L., Ozay N., IFAC-PapersOnLine, 7/1/2017
- Weak adaptive submodularity and group-based active diagnosis with applications to state estimation with persistent sensor faults, Yong S., Gao L., Ozay N., Proceedings of the American Control Conference, 6/29/2017

Students Advised

- Glen Chou, ECE PHD (co-advised) (admitted 2017)
- Zhe Du, ECE PHD (co-advised) (admitted 2017)
- Lixing Huang, ROB PHD (co-advised) (admitted 2017)
- Zexiang Liu, ECE PHD (admitted 2018)
- Kwesi Rutledge, ECE PHD (admitted 2017)
- Yunus Sahin, ECE PHD (admitted 2014)
- Andrew Wintenberg, ECE PHD (co-advised) (admitted 2018)
- Liren Yang, ECE PHD (admitted 2015)

Peterson, Becky

Website: https://sites.google.com/a/umich.edu/petersonlab/

Research Interests: Oxide semiconductor materials and devices; 3D-IC heterointegration of oxide-based thin film electronics with silicon CMOS; solution-processed inorganic electronic materials; crystalline gallium oxide for power devices.

Recent Publications

- Observation of impurity band conduction and variable range hopping in heavily doped (010) β-Ga_2O_3, Kabilova Z., Kurdak C., and Peterson R.L., Semiconductor Science and Technology, 2/6/2019
- Interfacial reactions of titanium/gold ohmic contacts with Sn-doped β-Ga_2O_3, Lee M.-H., Peterson R.L., APL Materials, 2/1/2019
- Exploiting In Situ Redox and Diffusion of Molybdenum to Enable Thin-Film Circuitry for Low-Cost Wireless Energy Harvesting, Son Y., Peterson R.L., Advanced Functional Materials, 11/30/2018
- The effects of localized tail states on charge transport mechanisms in amorphous zinc tin oxide Schottky diodes, Son Y., Peterson R.L., Semiconductor Science and Technology, 11/7/2017
- The roles of rare-earth dopants in solution-processed ZnO-based transparent conductive oxides, Hu W., Peterson R.L., Journal of Applied Physics, 9/11/2017
- Effect of relative humidity and pre-annealing temperature on spin-coated zinc tin oxide films made: Via the metal-organic decomposition route, Son Y., Liao A., Peterson R.L., Journal of Materials Chemistry C, 7/22/2017
- Enhancing breakdown voltage in amorphous zinc tin oxide Schottky diode, Son Y., Peterson R.L., 2017 75th Annual Device Research Conference Digest, IEEE, 6/25-28/2017
- Increased blocking voltage in solution processed ZTO HVTFTs through drain offset, Allemang C., Peterson R.L., 2017 75th Annual Device Research Conference Digest, IEEE, 6/25-28/2017
- In Situ Chemical Modification of Schottky Barrier in Solution-Processed Zinc Tin Oxide Diode, Son Y., Li J., Peterson R.L., ACS Applied Materials and Interfaces 8/25/2016
- Thermally stable yttrium–scandium oxide high-*k* dielectrics deposited by a solution process, Hu W., Frost B., Peterson R.L., J. Phys. D: Applied Physics, 2/17/2016.

Patents Issued

- Microsystem device and methods for fabricating the same, K. Najafi, R. L. Peterson, J. Y. Cho, Z. Cao, G. He, J. Gregory, Y. Yuan, Patent #: 9778039
- Fluid Flow Sensor, K. Najafi, M. Sadeghi, R. L. Peterson, Patent #9400197

Students Advised

- Christopher Allemang, ECE PHD (admitted 2016)
- Baran Demir, ECE PHD (admitted 2016)
- Jaesung Jo, ECE PHD (admitted 2018)
- Zumrad Kabilova, ECE PHD (admitted 2016)
- Ming-Hsun Lee, MSE PHD (admitted 2019)
- Youngbae Son, ECE PHD (admitted 2014)
- Hannah Masten, ECE PHD (co-advised) (admitted 2016)

Phillips, Jamie D.

Website: https://phillips.engin.umich.edu/

Research Interests: Optoelectronic materials and devices for the next generation of infrared imagers, photovoltaics, and thin film electronics.

Recent Publications

- Engineering Circuit Analysis, W. H. Hayt, J. E. Kemmerly, J. D. Phillips, and S. M. Durbin. (McGraw-Hill, 2019).
- Analysis of Carrier Transport in n-Type Hg1−xCdxTe with Ultra-Low Doping Concentration, J. Easley, E. Arkun, B. Cui, M. Carmody, L. Peng, M. Grayson and J. Phillips, *Journal of Electronic Materials* 47, 5699-5704 (2018).
- Influence of Subwavelength Grating Asymmetry on Long-Wavelength Infrared Transmittance Filters, M. Barrow, M. Scherr and J. Phillips, *IEEE Photonics Journal* 10, 2700808 (2018).
- Low damage electrical modification of 4H-SiC via ultrafast laser irradiation, M. Ahn, R. Cahyadi, J. Wendorf, W. Bowen, B. Torralva, S. Yalisove and J. Phillips, *Journal of Applied Physics* 123, 145106 (2018).
- A 179-lux Energy-Autonomous Fully-Encapsylated 17 mm3 Sensor Node with Initial Charge Delay Circuit for Battery Protection, Lee, G. Kim, E. Moon, S. Jeong, D. Kim, J. Phillips and D. Blaauw, Symposia on VLSI Technology and Circuits, (2018).
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- Three-bandgap absolute quantum efficiency in GaSb/GaAs quantum dot intermediate band solar cells, Ramiro, E. Antolin, H. Jinyoung, A. Teran, A. J. Martin, P. G. Linares, J. Millunchick, J. Phillips, A. Marti and A. Luque, *IEEE Journal of Photovoltaics* 7, 508-12 (2017).
- Subcutaneous Photovoltaic Infrared Energy Harvesting for Bio-implantable Devices, E. Moon, D. Blaauw and J. D. Phillips, *IEEE Transactions on Electron Devices* 64, 2432-2437 (2017).
- Small-Area Si Photovoltaics for Low-Flux Infrared Energy Harvesting, E. Moon, D. Blaauw and J. D. Phillips, *IEEE Transactions on Electron Devices* 64, 15-20 (2017).

- Variable-Field Hall Effect Analysis of HgCdTe Epilayers with Very Low Doping Density, J. Easley, E. Arkun, M. Carmody and J. Phillips, *Journal of Electronic Materials* 46, 5479-5483 (2017).

Patents Issued

- Narrowband transmission filter, J. Foley, J. D. Phillips, and S. Young, US Paten# 9945666B2 (2018).

Current Doctoral Students

- Hannah Masten, ECE PHD (co-advised) (admitted 2016)
- Minhyung Ahn, ECE PHD (admitted 2015)
- Michael Barrow, ECE PHD (admitted 2016)
- Justin Easley, Applied Physics PHD (expected graduation 2019)
- Eunseong Moon, ECE PHD (admitted 2015)

Pradhan, S. Sandeep

Website: https://pradhan.engin.umich.edu/

Research Interests: Distributed compression, sensor networks, information theory, channel coding, and multirate signal processing.

Recent Publications

- Lattices from Linear Codes and Fine Quantization: General Continuous Sources and Channels, Shirani F., Pradhan S., IEEE International Symposium on Information Theory - Proceedings, 08/15/2018
- Bounds on the Effective-length of Optimal Codes for Interference Channel with Feedback, Heidari M., Shirani F., Pradhan S., IEEE International Symposium on Information Theory - Proceedings, 08/15/2018
- An Achievable Rate-Distortion Region for Multiple Descriptions Source Coding Based on Coset Codes, Shirani F., Pradhan S., IEEE Transactions on Information Theory, 05/01/2018
- Achievable Rate Region for Three User Discrete Broadcast Channel Based on Coset Codes, Padakandla A., Sandeep Pradhan S., IEEE Transactions on Information Theory, 04/01/2018
- A new achievable rate region for multiple-access channel with states, Heidari M., Shirani F., Pradhan S., IEEE International Symposium on Information Theory - Proceedings, 8/9/2017
- An Achievable Rate Region Based on Coset Codes for Multiple Access Channel with States, Padakandla A., Pradhan S., IEEE Transactions on Information Theory, 10/1/2017
- On the correlation between Boolean functions of sequences of random variables, Chaharsooghi F., Sandeep Pradhan S., IEEE International Symposium on Information Theory - Proceedings, 8/9/2017
- On the necessity of structured codes for communications over MAC with feedback, Heidari M., Shirani F., Sandeep Pradhan S., IEEE International Symposium on Information Theory - Proceedings, 8/9/2017
- On the sub-optimality of single-letter coding in multi-terminal communications, Chaharsooghi F., Pradhan S., IEEE International Symposium on Information Theory - Proceedings, 8/9/2017

Students Advised

- Touheed Anwar Atif, ECE PHD (admitted 2017)
- Tyler Doiron, ECE Master's (co-advised)
- Mohsen Heidari Khoozani, ECE PHD (admitted 2013)
- Chin-Jen Pang, ECE PHD (co-advised) (admitted 2017)

Rand, Stephen

Website: https://rand.engin.umich.edu/

Research Interests: Optical magnetism and optical refrigeration.

Recent Publications

- Optical magnetization, part III: theory of molecular magneto-electric rectification, Dreyer E., Fisher A., Smail G., Anisimov P., Rand S., Optics Express 26, 17755(2018).
- Optical Magnetization Part II: Theory of induced optical magnetism, A. A. Fisher, E. F. C. Dreyer, A. Chakrabarty, and S. C. Rand, Optics Express 24, 26055(2016).
- Optical Magnetization Part I: Experiments on Radiant Optical Magnetization in Solids, A. A. Fisher, E. F. C. Dreyer, A. Chakrabarty, and S. C. Rand, Optics Express 24, 26064(2016).
- Evidence of magnetic torque dynamics in optically-induced magnetization, Makhal K., Trinh M., Rand S., Optics Express (to be published)
- Laser cooling of crystalline Yb: YAG and Yb: KYW, Cheng L., Andre L., Salkeld, A., Rand S., Optics Letters (to be published)
- Evanescent coupling between refillable ring resonators and laser-inscribed optical waveguides, Chandrahalim H., Rand S., Fan X., Applied Optics, 6/1/2017
- Steerable THz pulses from thin emitters via optical pulse-front tilt, B. C. Smith, J. F. Whitaker, and S. C. Rand, Optics Express 24, 20755(2016).
- Fusion of Renewable Ring Resonator Lasers and Ultrafast Laser Inscribed Photonic Waveguides, Chandrahalim H., Rand S., Fan X., Scientific Reports 6, 32668 (2016).
- Holographic imaging through a scattering medium by diffuser-aided statistical averaging, M. Purcell, M. Kumar, S.C. Rand, and V. Lakshminarayanan, J.O.S.A. A 33, 1291(2016).
- Design Principles for Magneto-Electric Materials: All-Electric Susceptibilities Relevant to Optimal Molecular Chromophores, A. J.-T. Lou, E. F. C. Dreyer, S. C. Rand, T. J. Marks, J. Phys. Chem. C 121, 16491-16500 (2017).
- S.C. Rand, “Lectures on Light: The Density Matrix in Nonlinear and Quantum Optics,” Second Edition, Oxford University Press, Oxford, 2016.
- S.C. Rand, “Methods for Laser Cooling of Solids,” in Laser Cooling of Solids, Pan Stanford Publishing, Chapter 6 (2016).

Patents Issued

- Optically-induced Charge Separation and Induced Magnetism in Dielectrics for Optical Energy Conversion and Intense Magnetic Field Generation, S.C. Rand and W.M. Fisher (filed 2016, accepted 2018).

Students Advised

- Laura Andre, ECE PHD; Innovation & Entrepreneur Cert (admitted 2016)
- Long Cheng, ECE PHD (admitted 2017)
- Gregory Smail, Applied Physics PHD (admitted 2018)
- Cameron Spitzfaden, Physics PHD (admitted 2017)

Revzen, Shai

Website: http://www.birds.eecs.umich.edu/

Research Interests: Bio-inspired control; dynamical systems; biomechanics; legged locomotion; modular robotics.

Recent Publications

- Geometrically optimal gaits: a data-driven approach, Bittner B., Hatton R., Revzen S., Nonlinear Dynamics, 11/01/2018
- Global linearization and fiber bundle structure of invariant manifolds, Eldering J., Kvalheim M., Revzen S., Nonlinearity, 08/02/2018
- Longitudinal quasi-static stability predicts changes in dog gait on rough terrain, Wilshin S., Reeve M., Haynes G., Revzen S., Koditschek D., Spence A., Journal of Experimental Biology, 5/15/2017
- Morphology and the gradient of a symmetric potential predict gait transitions of dogs, Wilshin S., Haynes G., Porteous J., Koditschek D., Revzen S., Spence A., Biological Cybernetics, 8/1/2017
- Rapidly Prototyping Robots: Using Plates and Reinforced Flexures, Fitzner I., Sun Y., Sachdeva V., Revzen S., IEEE Robotics and Automation Magazine, 3/1/2017
- Why We Need More Degrees of Freedom, Revzen S., Koditschek D., Procedia IUTAM, 1/1/2017

Students Advised

- Brian Bittner, ROB PHD
- George Council, ECE PHD (admitted 2014)
- Yue Sun, ROB PHD
- Dan Zhao, ME PHD

Sarabandi, Kamal

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Research Interests: Microwave and millimeter wave radar technology; geoscience and remote sensing; antennas and wave propagation; metamaterials.

Recent Publications

- A W-Shaped Antenna with Spatial Polarization Variation for Direction Finding, Choi S., Sarabandi K., IEEE Antennas and Wireless Propagation Letters, 12/01/2018
- Excitation of Space Wave, Leaky Wave, and Creeping Waves in Cylindrical Media, Singh M., Ghosh B., Sarabandi K., IEEE Transactions on Antennas and Propagation, 12/01/2018
- A Sub-THz Rectangular Waveguide Phase Shifter Using Piezoelectric-Based Tunable Artificial Magnetic Conductor, Ibrahim A., Shaman H., Sarabandi K., IEEE Transactions on Terahertz Science and Technology, 11/01/2018
- A Novel Frequency Beam-Steering Antenna Array for Submillimeter-Wave Applications, Sarabandi K., Jam A., Vahidpour M., East J., IEEE Transactions on Terahertz Science and Technology, 11/01/2018
- A Tunable, High-Gain, Very Low-Profile Composite Monopole Antenna for Low-Frequency Applications, Rao M., Sarabandi K., IEEE Transactions on Antennas and Propagation, 07/01/2018
- Superresolution DoA Estimation with Circular Arrays Using Signal Segregation Algorithm in Conjunction with a Nulls-Synthesis Method, Amjadi S., Sarabandi K., IEEE Transactions on Antennas and Propagation, 06/01/2018
- Loop Excitation of a Conical Horn, Ghosh B., Chakraborty K., Santra G., Sarabandi K., IEEE Transactions on Antennas and Propagation, 06/01/2018
- Fragmented antenna realization using coupled small radiating elements, Barani N., Harvey J., Sarabandi K., IEEE Transactions on Antennas and Propagation, 04/01/2018
- Evaluation of Efficient Green's Functions for Spherically Stratified Media, Bhattacharya D., Ghosh B., Goswami P., Sarabandi K., IEEE Transactions on Antennas and Propagation, 03/01/2018
- A Polarimetric Active Transponder with Extremely Large RCS for Absolute Radiometric Calibration of SMAP Radar, Sarabandi K., Kashanianfard M., Nashashibi A., Pierce L., Hampton R., IEEE Transactions on Geoscience and Remote Sensing, 03/01/2018
- Lake Icepack and Dry Snowpack Thickness Measurement Using Wideband Autocorrelation Radiometry, Mousavi S., De Roo R., Sarabandi K., England A., Wong S., Nejati H., IEEE Transactions on Geoscience and Remote Sensing, 03/01/2018

- A High-Isolation Two-Port Planar Antenna System for Communication and Radar Applications, Douglas T., Sarabandi K., IEEE Access, 02/1/2018
- All-Directions Through-the-Wall Imaging Using a Small Number of Moving Omnidirectional Bi-Static FMCW Transceivers, Yektakhah B., Sarabandi K., IEEE Transactions on Geoscience and Remote Sensing, 01/01/2018
- Experimental Characterization of Multi-Polarization Radar Backscatter Response of Vehicles at J-Band, Alaqeel A., Ibrahim A., Nashashibi A., Shaman H., Sarabandi K., IEEE Transactions on Intelligent Transportation Systems, 01/01/2018
- Low-Power Low-VHF Ad-Hoc Networking in Complex Environments, Choi, J., F.T. Dagefu, B. Sadler, and K. Sarabandi, IEEE Access, 11/1/2017.
- A Wideband Circularly Polarized Omnidirectional Antenna Based on Excitation of Two Orthogonal Circular TE 21 Modes, Yektakhah B., Sarabandi K., IEEE Transactions on Antennas and Propagation, 8/1/2017
- Vehicular Optically Transparent UHF Antenna for Terrestrial Communication, Kashanianfard M., Sarabandi K., IEEE Transactions on Antennas and Propagation, 8/1/2017
- A low-profile, high-gain, and full-band subarray of cavity-backed slot antenna, Amjadi S., Sarabandi K., IEEE Transactions on Antennas and Propagation, 7/1/2017
- An iterative array signal segregation algorithm: A method for interference cancelation and multipath mitigation in complex environments, Hoque M., Sarabandi K., IEEE Antennas and Propagation Magazine, 6/1/2017
- A compact single conductor transmission line launcher for telemetry in borehole drilling, Amjadi S., Sarabandi K., IEEE Transactions on Geoscience and Remote Sensing, 5/1/2017
- A Submillimeter-Wave Near-Field Measurement Setup for On-Wafer Pattern and Gain Characterization of Antennas and Arrays, Jam A., Sarabandi K., IEEE Transactions on Instrumentation and Measurement, 4/1/2017
- Compact Omnidirectional Circularly Polarized Antenna, Wu J., Sarabandi K., IEEE Transactions on Antennas and Propagation, 4/1/2017
- Evaluation of efficient closed-form greens function in a cylindrically stratified medium, Bhattacharya D., Ghosh B., Sarabandi K, IEEE Transactions on Antennas and Propagation, 3/1/2017
- Function-Reconfigurable Between SPDT Switch and Power Divider Based on Switchable HMSIW Unit, Chen H., Che W., Cao Y., Feng W., Sarabandi K., IEEE Microwave and Wireless Components Letters, 3/1/2017
- Pattern and Gain Characterization Using Nonintrusive Very-Near-Field Electro-Optical Measurements over Arbitrary Closed Surfaces, Sarabandi K., Choi J., Sabet A., Sabet K., IEEE Transactions on Antennas and Propagation, 2/1/2017
- An Accurate Circuit Model for Input Impedance and Radiation Pattern of Two-Port Loop Antennas as E- and H-Probe, Kashanianfard M., Sarabandi K., IEEE Transactions on Antennas and Propagation, 1/1/2017

- Directional Full-Duplex RF Booster for 2450 MHz ISM Band, Kashanianfard M., Sarabandi K., IEEE Transactions on Antennas and Propagation, 1/1/2017
- Evaluation of Efficient Green's Functions for Spherically Stratified Media, Bhattacharya, D., B. Ghosh, P. K. Goswami, and K. Sarabandi, IEEE Transactions on Antennas and Propagation, 3/1/2017
- Phenomenology of Foliage Effect on 5G Millimeter-Wave V2V Communications, Cai, X, C. Han, and K. Sarabandi, *Proceedings: IEEE Global Communications Conference*, 9-13 December 2018, Abu Dhabi, UAE.
- All-Directions Through-the-Wall Imaging Using Omnidirectional Bi-Static FMCW Transceivers: Imaging Technique and Performance Evaluation, Yektakhah, B., and K. Sarabandi, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- Tapered Low Profile UWB Directive Antenna for Radar and Sensing Applications, Chiu, J., and K. Sarabandi, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- High Resolution Subsurface Imaging of Buried Targets Using Distributed Robotic Sensors, Yektakhah, B., K. Sarabandi, and H. Bukhari, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- A Compact, Broadband, Two-Port Slot Antenna System for Full-Duplex Applications, Amjadi, M., and K. Sarabandi, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- Calibration of Fully Polarimetric Wideband FMCW Instrumentation Radar at Sub-TeraHertz Frequencies, Nashashibi, A., A. Alaqeel, K. Sarabandi, H. Shaman, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- A Low Profile, Wideband, Polarization Reconfigurable Antenna Using an Array of Sectorial Loop Antennas for Subsurface Imaging Systems, Yektakhah, B., H. Bukhari, and K. Sarabandi," *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- Direct Measurement of Terrestrial Snow and Ice Accumulation Using Wideband Autocorrelation Radiometry, Yektakhah, B., H. Bukhari, and K. Sarabandi, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- Effect of the Surface Roughness of the Water and Ice Boundary on Lake Icepack Thickness Measurement using Wideband Autocorrelation Radiometry, Mousavi, S., R. De Roo, K. Sarabandi, A. W. England, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- Characteristics of a Monopole Antenna in the Vicinity of a Grounded Cylindrical Stratified Media, Bhattacharya, D., B. Ghosh, K. Sarabandi, *Proceedings: IEEE*

International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting, Boston, Massachusetts 8-13 July 2018.

- Characterizing the Polarimetric Radar Backscatter Response of Road Surfaces at 230 GHz in Support of Next Generation Sensors for Autonomous Vehicles, Alaqeel, A., A. Ibrahim, A. Nashashibi, H. Shaman, and K. Sarabandi, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- Estimation of Scattering and Attenuation of a Random Distribution of Metallic Wires Using Radiative Transfer, Geroski, D., and K. Sarabandi, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- Bandwidth Enhanced Low-VHF Communications with a Miniature Non-Foster Antenna, Choi, J., F. Dagefu, B. Sadler, K. Sarabandi, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- Radar Backscatter Measurements of Road Surfaces at 77 GHz, Giallorenzo, M., X. Cai, A. Nashashibi, K. Sarabandi, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- A High-Gain Extremely Low-profile Antenna for Low-VHF Band Applications, Rao, M., and K. Sarabandi, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- Physics-based Statistical Models of Traffic Targets for Automotive Radar Scene Simulations, Cai, X., and K. Sarabandi, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- 77 GHz Radar Traffic Scene Simulator Based on Physical Optics Method, Cai, Z., and K. Sarabandi, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- Compact Planar Antenna System for Full-Duplex Wireless Applications, Douglas, T., and K. Sarabandi, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- Mechanical Antennas: Emerging Solution for Very-Low Frequency (VLF) Communication, Barani, N. and K. Saarbandi, *Proceedings: IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, Boston, Massachusetts 8-13 July 2018.
- Effect of a thin dry snow layer on the Lake Ice Thickness Measurement using Wideband Autocorrelation Radiometry, Mousavi, S.M., R. De Roo, K. Sarabandi, and A. W. England, *IEEE International Geoscience and Remote Sensing Symposium, Velencia, Spain*, July 23-27, 2018.
- A Phenomenological Study of Radar Backscatter Response of Vehicles for the Next Generation Automotive Radars, Alaqeel, A., A. Ibrahim, A. Nashashibi, H. Shaman, and K.

Sarabandi, *IEEE International Geoscience and Remote Sensing Symposium, Velencia, Spain*, July 23-27, 2018.

- A Simulation Based Approach to Estimating the Three Dimensional Structure of the Harvard Forest with Multi-Modal Remote Sensing, Benson, M., L. Pierce, and K. Sarabandi, *IEEE International Geoscience and Remote Sensing Symposium, Velencia, Spain*, July 23-27, 2018.
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Patents Issued

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Students Advised

- Abdulrahman Alaqeel, ECE PHD (admitted 2018)
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- Michael Giallorenzo, ECE PHD (admitted 2016)
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- Menglou Rao, ECE PHD (admitted 2018)
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Research Interests: Machine learning theory, methods, and applications.

Recent Publications

- Dictionary-Free MRI PERK: Parameter Estimation via Regression with Kernels, Nataraj G., Nielsen J., Scott C., Fessler J., IEEE Transactions on Medical Imaging, 09/01/2018
- Optimal change point detection in Gaussian processes, Keshavarz H., Scott C., Nguyen X., Journal of Statistical Planning and Inference, 2/1/2018
- Sparse Approximation of a Kernel Mean, Cortes E., Scott C., IEEE Transactions on Signal Processing, 3/1/2017

Students Advised

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Stark, Wayne E.

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Research Interests: Wireless Communications; mobile communications; spread-spectrum communications; coding theory.

Recent Publications

- Bounds on Error Probability for Direct-Sequence Spread-Spectrum Multiple-Access Communications, Borth D., Pursley M., Sarwate D., Stark W., Technology Review, 1/1/2017

Steel, Duncan

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Research Interests: Laser spectroscopy, optical physics, condensed matter physics, biophysics, quantum computing.

Recent Publications

- Interactions of amyloid-b peptides on lipid bilayer studied by single molecule imaging and tracking, Chang C., Edwald E., Veatch S., Steel D., Gafni A., Biochimica et Biophysica Acta - Biomembranes, 09/01/2018
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Students Advised

- Darwin Cordovilla, Applied Physics PHD
- Jesus Hinojosa, Applied Physics PHD
- Weishu Wu, ECE Master's student

Subramanian, Vijay

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Research Interests: Social networks, network economics, random graphs, communication networks, information theory, stochastic modeling, and applied probability.

Recent Publications

- Balanced Allocation on Graphs with Random Walk Based Sampling, D. Tang and V. G. Subramanian, *2018 56th Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, Monticello, IL, USA, 2018
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Students Advised

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- Mehrdad Moharrami, ECE PHD (co-advised) (admitted 2014)
- Shih-Tang Su, ECE PHD (admitted 2017)
- Dengwang Tang, ECE PHD (admitted 2016)
- Daniel Vial, ECE PHD (admitted 2015)
- Andrew Wintenberg, ECE PHD (co-advised) (admitted 2018)

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Research Interests: Low power integrated circuit design, computer-aided design for VLSI.

Recent Publications

- An area-efficient 128-channel spike sorting processor for real-time neural recording with 0.175 m W/Channel in 65-nm CMOS, Do A., Zeinolabedin S., Jeon D., Sylvester D., Kim T., IEEE Transactions on Very Large Scale Integration (VLSI) Systems, 01/01/2019
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- Circuit and System Designs of Ultra-Low Power Sensor Nodes With Illustration in a Miniaturized GNSS Logger for Position Tracking: Part I - Analog Circuit Techniques, Jang T., Kim G., Kempke B., Henry M., Chiotellis N., Pfeiffer C., Kim D., Kim Y., Foo Z., Kim H., Grbic A., Sylvester D., Wentzloff D., Blaauw D., IEEE Transactions on Circuits and Systems I: Regular Papers, 9/1/2017
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- Exploiting the analog properties of digital circuits for malicious hardware, Yang K., Hicks M., Dong Q., Austin T., Sylvester D., Communications of the ACM, 9/1/2017
- Hardware Designs for Security in Ultra-Low-Power IoT Systems: An Overview and Survey, Yang K., Blaauw D., Sylvester D., IEEE Micro, 11/1/2017
- iRazor: Current-Based Error Detection and Correction Scheme for PVT Variation in 40-nm ARM Cortex-R4 Processor, Zhang Y., Khayatzadeh M., Yang K., Saligane M., Pinckney N., Alioto M., Blaauw D., Sylvester D., IEEE Journal of Solid-State Circuits, 10/5/2017
- Recryptor: A reconfigurable in-memory cryptographic Cortex-M0 processor for IoT, Zhang Y., Xu L., Yang K., Dong Q., Jeloka S., Blaauw D., Sylvester D., IEEE Symposium on VLSI Circuits, Digest of Technical Papers, 8/10/2017
- Rectified-linear and recurrent neural networks built with spin devices, Dong Q., Yang K., Fick L., Blaauw D., Sylvester D., Proceedings - IEEE International Symposium on Circuits and Systems, 9/25/2017
- RF-Echo: A non-line-of-sight indoor localization system using a low-power active rf reflector ASIC tag, Chuo L., Luo Z., Sylvester D., Blaauw D., Kim H., Proceedings of the Annual International Conference on Mobile Computing and Networking, MOBICOM, 10/4/2017

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- Hyochan An, ECE PHD (admitted 2017)
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- Jeongsup Lee, ECE PHD (admitted 2015)
- Jongyup Lim, ECE PHD (admitted 2016)

- Yimai Peng, ECE PHD (admitted 2018)
- Jihwan Seol, ECE PHD (co-advised) (admitted 2017)
- Jingcheng Wang, ECE PHD (admitted 2014)
- Li Xu, ECE PHD (admitted 2016)
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Research Interests: Electronic properties of materials and their effects on devices; physics of solid state devices.

Recent Publications

- Generation of near-diffraction-limited, high-power supercontinuum from 1.57 mm to 12 mm with cascaded fluoride and chalcogenide fibers, Guo K., Martinez R., Plant G., Maksymiuk L., Janiszewski B., Freeman M., Maynard R., Islam M., Terry F., Bedford R., Gibson R., Chenard F., Chatigny S., Ifarraguerri A., Applied Optics, 04/01/2018
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Research Interests: Wave propagation, random media, rough surfaces, electromagnetic theory and computational electromagnetics with applications in environmental remote sensing, signal integrity, electromagnetic compatibility, and photonic crystals.

Recent Publications

- Forward and inverse radar modeling of terrestrial snow using snowSAR data, Zhu J., Tan S., King J., Derksen C., Lemmetyinen J., Tsang L., IEEE Transactions on Geoscience and Remote Sensing, 12/01/2018
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- Electromagnetic scattering from one dimensional random rough surfaces of dielectric layered media with waveguide modes using second order small perturbation method, Sanamzadeh M., Tsang L., Johnson J., Burkholder R., Tan S., Progress In Electromagnetics Research B, 01/01/2018
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- Fast Broadband Modeling of Traces Connecting Vias in Printed Circuit Boards Using Broadband Greens Function Method, Huang S., Tsang L., IEEE Transactions on Components, Packaging and Manufacturing Technology, 8/1/2017
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- Greens functions, including scatterers, for photonic crystals and metamaterials, Tan S., Tsang L., Journal of the Optical Society of America B: Optical Physics, 11/1/2017
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- Scaling laws for the mechanics of loose and cohesive granular materials based on Baxters sticky hard spheres, Gaume J., Lowe H., Tan S., Tsang L., Physical Review E, 9/27/2018
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- Using Broadband Greens function method to model interconnects of traces and vias, Huang S., Tsang L., IEEE International Symposium on Electromagnetic Compatibility, 10/20/2017

Patents Issued

- Full Wave Modeling and Simulations of the Waveguide Behavior of Printed Circuit Boards Using a Broadband Green's Function, Leung Tsang and Shaowu Huang, US Patent number 9946825, April 17, 2018

Students Advised

- Weihui Gu, ECE PHD (admitted 2016)
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Ulaby, Fawwaz T.

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Research Interests: Microwave and millimeter wave remote sensing, radar systems, radio wave propagation.

Recent Publications

- Remote sensing code library, Ulaby F., IEEE Geoscience and Remote Sensing Magazine, 6/1/2017
- Image Processing For Engineers, Andrew Yagle and Fawwaz Ulaby, Textbook.

Wakefield, Greg

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Research Interests: Audio and music processing, psychoacoustics, and sound quality engineering

Recent Publications

- Temporal integration and multiple looks, revisited, Wakfield G, The Journal of the Acoustical Society of America, March 2018
- The Effects of Training on Real-Time Localization of Headphone-Rendered, Spatially Processed Sounds, McMullen K.A., Wakefield G., Proceedings of the Human Factors and Ergonomic Society Annual Meeting, 9/28/1

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Research Interests: RF circuits and systems; highly integrated energy- and volume-constrained wireless systems.

Recent Publications

- Analysis of Circuit Noise and Non-Ideal Filtering Impact on Energy Detection Based Ultra-Low-Power Radios Performance, Alghaihab A., Kim H., Wentzloff D., IEEE Transactions on Circuits and Systems II: Express Briefs, 12/01/2018
- A 470mW-92.5dBm OOK/FSK Receiver for IEEE 802.11 WiFi LP-WUR, Im J., Kim H., Wentzloff D., ESSCIRC 2018 - IEEE 44th European Solid State Circuits Conference, 10/16/2018
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- A 217mW -82dBm IEEE 802.11 Wi-Fi LP-WUR using a 3rd-harmonic passive mixer, Im J., Kim H., Wentzloff D., Digest of Papers - IEEE Radio Frequency Integrated Circuits Symposium, 08/07/2018
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- A 486 mw all-digital bluetooth low energy transmitter with ring oscillator based ADPLL for IoT applications, Chen X., Breiholz J., Yahya F., Lukas C., Kim H., Calhoun B., Wentzloff D., Digest of Papers - IEEE Radio Frequency Integrated Circuits Symposium, 08/07/2018
- A MURS Band Digital Quadrature Transmitter with Class-B I/Q Cell Sharing for Long Range IoT Applications, Kosari A., Kim H., Wentzloff D., IEEE Transactions on Circuits and Systems II: Express Briefs, 06/01/2018

- A receiver/antenna co-design for a 1.5mJ per fix fully-integrated 10x10x6mm^3 GPS logger, Kim H., Chiotellis N., Ansari E., Faisal M., Jang T., Grbic A., Blaauw D., Wentzloff D., 2018 IEEE Custom Integrated Circuits Conference, CICC 2018, 05/09/2018
- Static timing analysis for ring oscillators, Moore D., Fredenburgh J., Faisal M., Wentzloff D., Proceedings: Asia and South Pacific Design Automation Conference, 02/20/2018
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Patents Issued

- Ultra-low power long range transceiver, Patent #: 9667294
- Integrated ultra wideband transceiver, Patent #: 9681389
- Ultra-low-power radio for short-range communication, Patent #: 6196299
- Dual-loop programmable and dividerless clock generator for ultra low power applications, Patent #: 9641183

Students Advised

- Omar Abdelatty, ECE PHD (co-advised) (admitted 2015)
- Abdullah Alghaihab, ECE PHD (admitted 2016)
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- Jaeho Im, ECE PHD (admitted 2016)
- Avish Koochakkosari, ECE PHD (admitted 2014)
- Kyumin Kwon, ECE PHD (admitted 2019)
- Kyle Laferty, ECE PHD (admitted 2017)
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- Trevor Odelberg, ECE PHD (admitted 2018)
- Christine Weston, ECE PHD (co-advised) (admitted 2017)
- Brandon Russell, ECE PHD; Plasma Science & Engin Cert

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Research Interests: Laser-driven electron and ion acceleration, relativistic laser propagation through underdense and near-critical density plasmas, laser-driven magnetic reconnection, and proton radiography to study electric and magnetic fields generated during the laser-plasma interactions.

Recent Publications

- Laser-wakefield accelerators for high-resolution X-ray imaging of complex microstructures, Hussein, A. E., Senabulya, N., Ma, Y., Streeter, M. J. V.,Kettle, B., Dann, S. J. D., Albert, F.,Bourgeois, N., Cipiccia, S., Cole, J. M., Finlay, O., Gerstmayr, E., Gallardo Gonzalez, I., Higginbotham, A., Jaroszynski, D. A., Falk, K., Krushelnick, K., Lemos, N., Lopes, N. C., Lumsdon, C., Lundh, O., Mangles, S. P. D., Najmudin, Z., Rajeev, P. P., Schlepütz, C. M., Shahzad, M., Smid, M., Spesyvtsev, R., Symes, D. R., Vieux, G., Willingale, L., Wood, J. C., Shahani, A. J., and Thomas, A. G. R., accepted for publication in Scientific Reports, 2019
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- Angular streaking of betatron X-rays in a transverse density gradient laser-wakefield accelerator, Ma Y., Seipt D., Dann S., Streeter M., Palmer C., Willingale L., Thomas A., Physics of Plasmas, 11/01/2018
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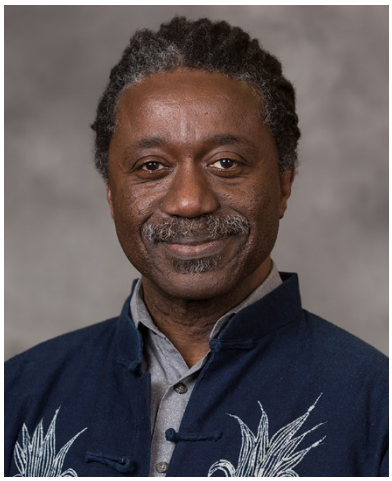
Students Advised

- Laura Elgin, ECE PHD (admitted 2012)
- Paul Campbell, Applied Physics PHD (admitted 2014)
- Amina Hussein, Applied Physics PHD (admitted 2015)
- Brandon Russell, ECE PHD (admitted 2017)



Winful, Herbert

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Research Interests: Nonlinear optics and photonics; fiber laser arrays; nonlinear periodic structures; tunneling time; nanophotonics; semiconductor laser frequency combs.

Recent Publications

- Physics of frequency-modulated comb generation in quantum-well diode lasers, Dong M., Cundiff S., Winful H., Physical Review A, 05/16/2018
- Realization and optimization of phase-shifted distributed feedback fiber Bragg grating Raman lasers, Loranger S., Tehranchi A., Winful H., Kashyap R., Optica, 03/20/2018
- Quantum-well diode lasers for frequency comb generation, Dong M., Winful H., Cundiff S., Optics InfoBase Conference Papers, 01/01/2018
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Research Interests: Integrated circuits and microsystems; BioMEMS and lab-on-chips; implantable biomedical sensors; low-power mixed-mode circuits.

Recent Publications

- A miRNA-Mediated Approach to Dissect the Complexity of Tumor-Initiating Cell Function and Identify miRNA-Targeting Drugs, Belur Nagaraj A., Joseph P., Ponting E., Fedorov Y., Singh S., Cole A., Lee W., Yoon E., Baccarini A., Scacheri P., Buckanovich R., Adams D., Drapkin R., Brown B., DiFeo A., Stem Cell Reports, 01/08/2019
- Morphology-based prediction of cancer cell migration using an artificial neural network and a random decision forest, Zhang Z., Chen L., Humphries B., Brien R., Wicha M., Luker K., Luker G., Chen Y., Yoon E., Integrative Biology (United Kingdom), 12/01/2018
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- Dynamic Power Reduction in Scalable Neural Recording Interface Using Spatiotemporal Correlation and Temporal Sparsity of Neural Signals, S.-Y. Park, J. Cho, K. Lee, and E. Yoon, IEEE Journal of Solid-State Circuits, vol. 56 no. 4, pp. 1102-1114, Apr. 2018
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- Single-cell analysis of progenitor cell dynamics and lineage specification of the human fetal kidney, Rajasree Menon, Edgar A Otto, Austin Kokoruda, Jian Zhou, Zidong Zhang, Euisik Yoon, Yu-Chih Chen, Olga Troyanscaya, Jason Spence, Matthias Kretzler, Cristina Cebrian, Development, 145(16), 164038, 2018
- Modular 128-Channel D - DS Analog Front-End Architecture Using Spectrum Equalization Scheme for 1024-Channel 3-D Neural Recording Microsystems, Park S., Cho J., Na K., Yoon E., IEEE Journal of Solid-State Circuits, 02/01/2018
- Minimally-invasive neural interface for distributed wireless electrocorticogram recording systems, Chang S., Park S., Yoon E., Sensors (Switzerland), 01/17/2018
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- 3.37 mw/Ch modular scalable neural recording system with embedded lossless compression for dynamic power reduction, Park S., Cho J., Yoon E., IEEE Symposium on VLSI Circuits, Digest of Technical Papers, 8/10/2017
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- Compact system with handheld microfabricated optoelectronic probe for needle-based tissue sensing applications, Lee S., Na K., Pakela J., Scheiman J., Yoon E., Mycek M., Progress in Biomedical Optics and Imaging - Proceedings of SPIE, 1/1/2017
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- Endothelial-derived interleukin-6 induces cancer stem cell motility by generating a chemotactic gradient towards blood vessels, Kim H., Chen Y., Nor F., Warner K., Andrews A., Wagner V., Zhang Z., Martins M., Pearson A., Yoon E., Nor J., Oncotarget, 1/1/2017
- High-throughput cancer cell sphere formation for 3D cell culture, Chen Y., Yoon E., Methods in Molecular Biology, 1/1/2017
- Low-power low-noise pseudo-open-loop preamplifier for neural interfaces, Chang S., Park S., Yoon E., IEEE Sensors Journal, 8/1/2017
- Mesenchymal Stem Cell-Induced DDR2 Mediates Stromal-Breast Cancer Interactions and Metastasis Growth, Gonzalez M., Martin E., Anwar T., Arellano-Garcia C., Medhora N., Lama A., Chen Y., Tanager K., Yoon E., Kidwell K., Ge C., Franceschi R., Kleer C., Cell Reports, 1/31/2017

- Pyramidal Cell-Interneuron Circuit Architecture and Dynamics in Hippocampal Networks, English D., McKenzie S., Evans T., Kim K., Yoon E., Buzsaki G., Neuron, 10/11/2017
- Sampling from single-cell observations to predict tumor cell growth in-vitro and in-vivo, Pearson A., Ingram P., Bai S., OHayer P., Chung J., Yoon E., Jackson T., Buckanovich R., Oncotarget, 1/1/2017
- Selective Photomechanical Detachment and Retrieval of Divided Sister Cells from Enclosed Microfluidics for Downstream Analyses, Chen Y., Baac H., Lee K., Fouladdel S., Teichert K., Ok J., Cheng Y., Ingram P., Hart A., Azizi E., Guo L., Wicha M., Yoon E., ACS Nano, 5/23/2017

Patents Issued

- Neural Probe with Optical Stimulation Capability, E. Yoon, and I.-J. Cho, Patent #: 9642545

Students Advised

- Dimitri James, ECE PHD (admitted 2017)
- Kanghwan Kim, ECE PHD (admitted 2015)
- Kyuseok Lee, ECE PHD (admitted 2014)
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- Kyounghwan Na, ECE PHD (admitted 2011)
- Sungjin Oh, ECE PHD (admitted 2018)
- Hyunsoo Song, ECE PHD (admitted 2016)
- Yuting Wu, ECE PHD (admitted 2018)
- Dongxiao Yan, ECE PHD (admitted 2016)
- Zhixiong Zhang, ECE PHD (admitted 2013)

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Research Interests: VLSI architecture, digital systems, implementations of communication and signal processing systems.

Recent Publications

- A 0.23mW Heterogeneous Deep-Learning Processor Supporting Dynamic Execution of Conditional Neural Networks, Wu H., Zhang Z., Papaefthymiou M., ESSCIRC 2018 - IEEE 44th European Solid State Circuits Conference, 10/16/2018
- A 2.56-mm^2 718GOPS Configurable Spiking Convolutional Sparse Coding Accelerator in 40-nm CMOS, Liu C., Cho S., Zhang Z., IEEE Journal of Solid-State Circuits, 10/01/2018
- A Maximum-Likelihood Sequence Detection Powered ADC-Based Serial Link, Song S., Choo K., Chen T., Jang S., Flynn M., Zhang Z., IEEE Transactions on Circuits and Systems I: Regular Papers, 07/01/2018
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Patents Issued

- Iterative detection-decoding system, Z. Zhang and C.-H. Chen, Patent #: 9565581

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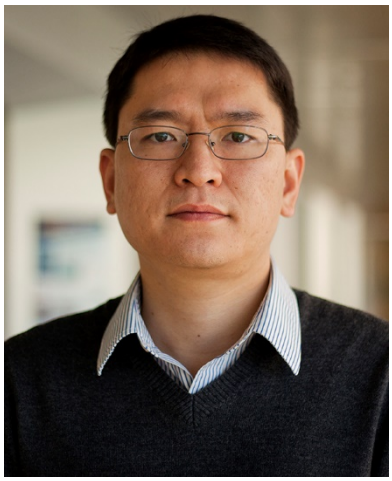
- Sung-Gun Cho, ECE PHD (admitted 2015)
- Teyuh Chou, ECE PHD (admitted 2016)
- Chester Liu, ECE PHD (admitted 2014)
- Shengshuo Lu, ECE Master's
- Reid Pinkham, ECE PHD (admitted 2017)
- Shiming Song, ECE Master's/PHD (admitted 2013)
- Wei Tang, ECE PHD (admitted 2014)
- Jie-Fang Zhang, ECE PHD (admitted 2018)



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Recent Publications

- Electrically tunable photoresponse in a graphene heterostructure photodetector, Zhang D., Cheng G., Xu Z., Liu C., Beechem T., Goldflam M., Peters D., Zhou M., Norris T., Zhong Z., Optics InfoBase Conference Papers, 1/1/2017
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- Photodetectors Based On Double Layer Heterostructures, Z. Zhong, T. Norris, C. H. Liu, and Y. C. Chang, Patent #: 9680038

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