

# Jamie Phillips

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## Education

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- 1998**      **Ph. D. Electrical Engineering, The University of Michigan, Ann Arbor**  
Dissertation: Self-Assembled In(Al,Ga)As/Ga(Al)As Quantum Dots  
For Intersubband Detectors. Advisor: Pallab Bhattacharya
- 1996**      **M.S., Electrical Engineering, The University of Michigan, Ann Arbor**
- 1994**      **B.S., Electrical Engineering, University of Michigan, Ann Arbor**

## Professional Experience

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- 2020-present**    **Professor and Department Chair, ECE Department, University of Delaware**
- 2014-2020**    **Arthur F. Thurnau Professor, EECS Department, University of Michigan, Ann Arbor**
- 2019-2020**    **Director, Lurie Nanofabrication Facility, University of Michigan, Ann Arbor**
- 2013-2019**    **Associate Chair of Undergraduate Affairs, ECE, University of Michigan, Ann Arbor**
- 2013-2014**    **Professor, EECS Department, University of Michigan, Ann Arbor**
- 2008-2013**    **Associate Professor, EECS Department, University of Michigan, Ann Arbor**
- 2002-2008**    **Assistant Professor, EECS Department, University of Michigan, Ann Arbor**
- 1999-2001**    **Research Scientist, Rockwell Science Center, Thousand Oaks, California**
- 1998-1999**    **Postdoctoral Researcher, Sandia National Laboratories, Albuquerque, New Mexico**

## Honors and Awards

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- 2020**      **Monroe-Brown Foundation Service Excellence Award, CoE, University of Michigan**
- 2019**      **Staff-Faculty Partnership Award, College of Engineering, University of Michigan**
- 2017**      **Theodore E. Batchman Best Paper Award, IEEE Education Society**
- 2014**      **Arthur F. Thurnau Professorship, University of Michigan**
- 2011**      **University Undergraduate Teaching Award, University of Michigan**
- 2007**      **Young Faculty Award, DARPA/MTO**
- 2007**      **Outstanding Achievement Award, EECS Department, University of Michigan**
- 2003**      **CAREER Award, National Science Foundation**
- 2001**      **Best Paper Award, Military Sensing Symposium Specialty Group on Materials**
- 1999**      **Paul Rappaport Award, IEEE Electron Devices Society**
- 1997**      **Best Student Paper, 16<sup>th</sup> North American Conference on Molecular Beam Epitaxy**

## External Professional Service

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**2021-present** Sensors, Journal Editorial Board  
**2020-present** IEEE Transactions on Electron Devices, Associate Editor  
**2020-present** IEEE-EDS Optoelectronic Devices Technical Committee, Member  
**2020-present** Electronic Materials Conference, Member at Large  
**2019-present** ABET Program Evaluator  
**2011-2020** Journal of Electronic Materials, Associate Editor  
**2018-2019** Electronic Materials Conference, Past Chair  
**2016-2017** Electronic Materials Conference, General Chair  
**2014-2015** Electronic Materials Conference, Program Chair  
**2014** International Workshop on ZnO and Related Materials, Program Chair  
**2011-2013** Electronic Materials Conference, Secretary  
**2011-2013** Device Research Conference, Program Committee  
**2011** MRS Fall Meeting, Co-organizer of Symposium on ZnO and Related Materials  
**2010-2012** AVS Michigan Chapter, Executive Committee  
**2008** International Workshop on ZnO and Related Materials, Program Committee  
**2007-2008** American Vacuum Society EMPD, Executive Committee  
**2006-2010** Electronic Materials Conference, Program Committee  
**2005-2010** J. Electronic Materials, Associate Editor of special issue on III-Nitrides, SiC, and ZnO

## University Service (major assignments)

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### University of Delaware

**2020-present** Chair, Department of Electrical and Computer Engineering

### University of Michigan

**2019-2020** Director, Lurie Nanofabrication Facility  
**2015-2019** ABET Coordinator, EE program  
**2013-2019** Associate Chair of Undergraduate Affairs, ECE division  
**2016-2018** Committee Chair, ECE Undergraduate Curriculum Innovation Committee  
**2011-2018** Committee Chair, ECE Undergraduate Academics Committee  
**2013-2017** Member, College of Engineering Curriculum Committee  
**2011-2017** Member, Lurie Nanofabrication Facility Council  
**2013-2016** Committee Chair, ECE Undergraduate Recruiting and Activities Committee  
**2011-2013** Executive Committee Member, ECE Division  
**2008-2011** President, EECS Alumni Society  
**2006-2011** Member, ECE Graduate Committee  
**2003-2011** Member, College of Engineering Manufacturing Council  
**2002-2007** Academic Advisor, EECS Undergraduate Advising Office  
**2002-2007** Committee Member, Michigan Nanofabrication Facility Operations Committee

## Professional Membership

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American Society for Engineering Education (ASEE)  
Institute for Electrical and Electronics Engineers (IEEE), Senior Member  
Materials Research Society (MRS)  
Optical Society of America (OSA)  
Eta Kappa Nu (Electrical and computer engineering honor society of the IEEE)

Phi Kappa Phi (Collegiate honor society)  
Tau Beta Pi (Engineering honor society), Eminent Engineer

## Technical Expertise

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- III-V, II-VI, and oxide semiconductor materials growth by MBE, MOCVD
- Deposition of ferroelectric and semiconducting oxides by pulsed laser deposition
- Materials characterization by XRD, SEM, TEM, AFM, Hall effect, C-V, DLTS, P-E, photoconductive decay, photoluminescence, ellipsometry, reflectance, FTIR, UV-Vis spectroscopy
- Device fabrication processes: photolithography, wet chemistry, CVD, RIE, contact metallization
- Electrical, optical, and electro-optic device characterization
- Laser diodes, photodetectors, E-O modulators, waveguides, MOSFETs, HEMTs, FE capacitors
- Device/circuit modeling using Comsol, Sentaurus Device, Silvaco, SPICE, and Matlab

## Courses Taught

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University of Delaware  
ELEG 205, *Analog Circuits*

University of Michigan  
ENGR 100, *Introduction to Engineering*  
EECS 200, *Electrical Engineering Systems Design*  
EECS 215, *Introduction to Circuits*  
EECS 320, *Introduction to Semiconductor Devices*  
EECS 421, *Properties of Transistors*  
EECS 429, *Semiconductor Optoelectronic Devices*  
EECS 529, *Semiconductor Lasers and LEDs*  
EECS 598, *Solar Cell Device Physics*  
ECE Camp Electrify, *Sense It (Week-long high school summer camp)*

## Doctoral Graduates Advised (primary advisor, dissertation committee chair)

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- 2021 **Michael Barrow**, *Microscale Infrared Technologies for Spectral Filtering and Wireless Neural Dust*
- 2020 **Minhyung Ahn**, *Ultrafast Laser-Material Interactions with Wide Bandgap Semiconductors and High Entropy Oxide Based Memristors*
- 2020 **Eun Seong Moon**, *Photovoltaic Energy Harvesting for Millimeter-Scale Systems*
- 2019 **Justin Easley**, *Carrier Transport in Auger-Suppressed Infrared Detector Materials*
- 2015 **Alan Teran**, *Spectrum-Dependent Photovoltaic Energy Harvesting*
- 2014 **Chihyu Chen**, *ZnTeO and Oxygen Doped II-VI Ternary Alloys for Intermediate Band Solar Cells*
- 2014 **Justin Foley**, *Subwavelength Dielectric Grating-based Broadband Reflectors and Narrowband Transmission Filters*
- 2013 **Jinyoung Hwang**, *Engineered Type-II Heterostructure for High Efficiency Solar Cell Application*
- 2012 **Jeff Siddiqui**, *Investigation of Electrical Instabilities and Interface Change in ZnO Thin Film Transistors*

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- 2012** Anne Itsuno, *Bandgap-Engineered HgCdTe Infrared Detector Structures for Reduced Cooling Requirement*
- 2010** Willie Bowen, *Thin Film Electronics Based on ZnO and ZnO/MgZnO Heterojunctions*
- 2010** Albert Shihchun Lin, *Modeling of Solar Cell Efficiency Improvement Using Optical Gratings and Intermediate Absorption Band*
- 2009** Emine Çağın, *Integration of Functional Oxides With the Semiconductor Zinc Oxide*
- 2009** Weiming Wang, *Intermediate Band Solar Cells Based on ZnTe:O*
- 2009** Pierre Emelie, *HgCdTe Auger-suppressed infrared detectors under non-equilibrium operation*
- 2006** Ding-Yuan Chen, *Ferroelectric thin films for microwave and photonics applications*
- 2006** Kaveh Moazzami, *Characterization of optoelectronic properties of HgCdTe and ZnO II-VI semiconductors for infrared and ultraviolet detector applications*

### **Current Doctoral Students (primary research advisor)**

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- 2019-present** Armando Gil, *Type-II Superlattices for SWIR Detection*
- 2016-present** Hannah Masten, (co-advisor with Becky Peterson) *Gallium Oxide Materials and Devices for Power Electronics*

### **Masters Students (serving as research advisor)**

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- 2015-2018** Martin Scherr, *Infrared Spectral Filters Based on Subwavelength Dielectric Gratings*
- 2012-2014** Connor Field, *Quantum Dots for Next Generation Solar Cells*
- 2010-2012** Adrian Bayraktaroglu, *Ferroelectric and semiconducting oxide thin films*
- 2010-2012** Bor-Chau Juang, *Electronic Structure and Optical Properties of Type-II Quantum Dots*
- 2002-2005** Tim Murphy, *Epitaxial Growth and Doping of ZnO by Molecular Beam Epitaxy*

### **Undergraduate Students (serving as research advisor)**

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- 2019-2020** Sarah Puzycki, *Selective Dry Etching of GaAs/AlGaAs*, ECE
- 2019** Arynn Gallegos, *Infrared Optoelectronics for Biosensing*, SROP program
- 2015** Cristina Guillen, *Parylene Infiltration in GaAs Nanowires*, NNIN REU program
- 2015** Marshall Versteeg, *Femtosecond Laser-Induced Doping of SiC*, UM Energy Institute UROP program
- 2015** Nick Folz, *Infrared Absorption in Glucose*
- 2015** Ian Raber, *Indoor Photovoltaic Characterization*, RISE program
- 2014-2015** Joeson Wong, *Photovoltaic Energy Harvesting from Indoor Lighting*
- 2013** Arthur Bowman, *Infrared Filtering Via Sub-Wavelength Gratings for Hyperspectral Imaging*, NNIN REU program
- 2013** Jiazhen Zheng, *Photoluminescence of ZnTeO*
- 2013** Kevin Nguy, *Photoluminescence of Wide Bandgap II-VI Materials*
- 2012** Amy Chiang, *Admittance Spectroscopy of Solar Cell Materials*

- 2012** Katherine Nygren, *Infrared Sub-Wavelength Gratings for Infrared Detectors*, NNIN REU program
- 2011** Connor Field, *Chemical Bath Deposition of ZnS Thin Films*
- 2010-2011** Tanya Das, *Modeling of HgCdTe Infrared Detectors and Integrated Optical Elements*
- 2010** Scott Bakkila, *Ferroelectric thin films for reconfigurable RF Electronics in Next Generation Wireless Communications*, NNIN REU program
- 2010** Michael Tulman, *Modeling of Integrated Optical Elements for Infrared Imaging*
- 2009** Du Nguyen, *Atomic Layer Deposition of High-k dielectrics for Thin Film Transistors*, NNIN REU program
- 2008** Michael McCormick, *Modeling of Wire Grid Polarizers and Fabry-Perot Cavities for Infrared Detection*
- 2007** David Maxwell, *Pulsed Laser Deposition of Vanadium Oxide Thin Films*
- 2005-2006** Pak-Yuen Chan, *Pulsed Laser Deposition of ZnO*
- 2006** George Cramer, *ZnO Thin Film Transistors*, NNIN REU program
- 2005** Vinay Alexander, *Pulsed Laser Deposition of Thin Film Ferroelectrics*
- 2005** Song Liang Chua, *Electronic Characterization of ZnO Thin Films*
- 2004-2005** William Luong, *Pulsed Laser Deposition of Ferroelectric Thin Films for Tunable Microwave Capacitors*
- 2004** Nicole Staszkiwicz, *ZnO Nanowires*, NNIN REU program
- 2003-2004** Jeremy Tolbert, *Capacitance-Voltage Measurements for Material Characterization*
- 2003** Nafisa Muzzafar, *Thin Film Mach-Zendher Interferometers*
- 2003-2004** Jeremy Tolbert, *Epitaxial Growth Simulations*
- 2002** DaHan Liao, *Optical Properties of HgCdTe*

## Sponsored Projects

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- 5/21-4/24 **Army Research Office**, PI, *Lattice-Matched InGaBiAs on InP for Extended Wavelength SWIR Detection*
- 4/19-1/21 **Air Force subcontract from Princeton Infrared Technologies**, PI, *Modeling and Development of Optimized 2.1um Detection MQW Material*
- 6/18-5/21 **NSF**, co-PI, *Design and growth of high entropy oxides with tailored ionic dynamics for memory and computing applications*
- 9/18-8/20 **DSTL/MoD**, co-PI, *Ultra-Miniature Imager Technical Demonstrator*
- 6/18-8/20 **NIH**, co-PI, *A 100um Scale Single Unit Neural Recording Probe Using IR-Based Powering and Communication*
- 1/19-5/19 **Air Force subcontract from Princeton Infrared Technologies**, PI, *MultiQuantum Well Avalanche Photodiodes for 2.04um Detection*
- 3/19-9/19 **OSD subcontract from Princeton Infrared Technologies**, PI, *High Resolution SWIR E-O Seeker*

- 1/19-5/19 **MDA subcontract from Princeton Infrared Technologies**, PI, *Avalanche Photodiode Design for Low Earth Orbit LADAR System*
- 9/16-8/19 **Lloyd's Register Foundation**, PI, *Ultrafast Nanostructuring of Wide Bandgap SiC for Electronics in Harsh Environments*
- 10/16-3/18 **DSTL/MoD**, co-PI, *Highly Size Constrained Logging Sensor Development*
- 9/16-8/18 **NSF subcontract from Cubeworks**, PI, *Millimeter-Scale Wireless Sensor Node for Intracranial Pressure Monitoring*
- 11/15-10/18 **MDA**, PI, *Narrow-Band Spectral Filtering via Silicon Subwavelength Dielectric Gratings.*
- 6/14-5/18 **NSF, NIH**, co-PI, *SCH: INT: Wireless Implantable Electronic Biosensors for Tumor Monitoring.*
- 11/17-4/18 **Air Force subcontract from Princeton Infrared Technologies**, PI, *Focal Plane Array for Coherent LADAR.*
- 4/14-3/16 **DSTL/MoD**, co-PI, *Architectural design Study for M3 MM Scale Computing GPS Logger*
- 2/12-1/13 **Toyota**, PI, *Highly Mismatched Alloys with Intermediate Band for High-Efficiency Solar Energy Conversion*
- 8/10-7/15 **NSF**, PI, *Materials World Network: Intermediate Band Semiconductor Materials for High Efficiency Solar Energy Conversion*
- 2/11-12/11 **ARO subcontract from EPIR Technologies**, PI, *High Operating Temperature Detectors and Subwavelength Gratings*
- 2/11-12/11 **ARO subcontract from EPIR Technologies**, PI, *Sub-Wavelength Gratings for Infrared Spectroscopy*
- 7/10-6/12 **KAUST**, co-PI, *Energy Efficient Photonic and Spintronic Devices*
- 1/10-6/10 **NASA subcontract from EPIR Technologies**, PI, *Passively-Cooled Hyperspectral Infrared Detectors*
- 9/09-8/12 **NSF**, co-PI, *Novel RF/Microwave Switchable Filters Based on Electrostrictive Resonance in Ferroelectric Thin Films*
- 8/09-7/14 **DOE**, co-PI, *EFRC: Center for Solar and Thermal Energy Conversion (CSTEC)*
- 3/08-8/11 **ACS-PRF**, PI, *Intermediate-band optoelectronic transitions in ZnTeO for high efficiency solar energy*
- 10/08-9/10 **ARO, subcontract from EPIR Technologies**, PI, *Advanced High Operating Temperature Midwave Infrared Detectors*
- 1/08-12/08 **EPIR Technologies**, PI, *Approaches for high-performance LWIR detectors based on HgCdTe/Si*
- 1/08-6/08 **MDA, subcontract from EPIR Technologies**, PI, *High Operating Temperature HgCdTe Detectors for Interceptor Seekers*
- 7/07-6/08 **DARPA**, PI, *Oxide Electronics for Integrated Microsystems and Displays*
- 1/06-4/06 **ARO, subcontract from EPIR Technologies**, PI, *Development of low stress ohmic contacts to HgCdTe*

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- 9/05-7/06     **DARPA, subcontract from EPIR Technologies**, PI, *Modeling of Infrared Detectors for High-Speed Room Temperature Imaging*
- 4/04-3/08     **DARPA**, co-PI, *Center for Optoelectronic Nanostructured Semiconductor Technologies (CONSRT)*
- 9/04-8/07     **AFOSR**, co-PI, *Ultraviolet Electrically Injected Light Sources With Epitaxial ZnO Based Heterojunctions*
- 2/03-1/08     **NSF**, PI, *CAREER: Ferroelectric Heterostructure Integration With GaAs Optoelectronic Devices*
- 5/02-1/05     **ONR**, PI, *Infrared Focal Plane Array Material Science Project - Optical Properties of HgCdTe*

## Books

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- [1] W. H. Hayt, J. E. Kemmerly, J. D. Phillips, and S. M. Durbin. *Engineering Circuit Analysis, 9th Edition* (McGraw-Hill, 2019).

## Book Chapters

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- [1] J. Phillips, E. Moon, and A. Teran, "Indoor Photovoltaics Based on AlGaAs", *Indoor Photovoltaics*, edited by M. Freunek Muller (Scrivener Publishing, 2020).
- [2] J. Phillips, W. Bowen, E. Cagin, and W. Wang. "Electronic and Optoelectronic Devices Based on Semiconducting Zinc Oxide", *Comprehensive Semiconductor Science and Technology*, edited by P. Bhattacharya, R. Fornari, and H. Kamimura, volume 6, 101–127 (Elsevier, 2011).
- [3] J. Phillips, A. Stiff-Roberts, and P. Bhattacharya. "Quantum Dot Infrared Detectors". *Handbook of Semiconductor Nanostructures and Nanodevices*, edited by A. A. Balandin and K. L. Wang, volume 4, 195–215 (American Scientific Publishers, 2006).
- [4] J. Phillips, A. Stiff-Roberts, and P. Bhattacharya. "Quantum Dot Infrared Photodetector". *Encyclopedia of Nanoscience and Nanotechnology*, edited by H. Nalwa, 131–141 (American Scientific Publishers, 2004).

## Patents

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- [1] J. Foley, J.D. Phillips, and S. Young, *Narrowband transmission filter*, US9945666B2.

## Journal Articles (peer-reviewed archival journals)

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- [1] E. Moon, M. Barrow, J. Lim, J. Lee, S. R. Nason, J. Costello, H. S. Kim, C. Chestek, T. Jang, D. Blaauw, and J. D. Phillips, "Bridging the 'Last Millimeter' Gap of Brain-Machine Interfaces via Near-Infrared Wireless Power Transfer and Data Communications," *ACS Photonics*, vol. 8, no. 5, pp. 1430–1438, May 2021, doi: 10.1021/acsp Photonics.1c00160.
- [2] M. Ahn, Y. Park, S. H. Lee, S. Chae, J. Lee, J. T. Heron, E. Kioupakis, W. D. Lu, and J. D. Phillips, "Memristors Based on (Zr, Hf, Nb, Ta, Mo, W) High-Entropy Oxides," *Advanced Electronic Materials*, vol. 7, no. 5, p. 2001258, 2021, doi: <https://doi.org/10.1002/aelm.202001258>.

- [3] H. N. Masten, J. D. Phillips, and R. L. Peterson, "Charge trapping and recovery in ALD HfO<sub>2</sub>/Beta-Ga<sub>2</sub>O<sub>3</sub> (010) MOS capacitors," *Semicond. Sci. Technol.*, vol. 36, no. 4, p. 04LT01, Mar. 2021, doi: 10.1088/1361-6641/abe880.
- [4] J. D. Phillips, "Energy Harvesting in Nanosystems: Powering the Next Generation of the Internet of Things," *Front. Nanotechnol.*, vol. 3, 2021, doi: 10.3389/fnano.2021.633931.
- [5] J. D. Phillips, "Thermoradiative Cell Equivalent Circuit Model," *IEEE Transactions on Electron Devices*, vol. 68, no. 2, pp. 928–930, Feb. 2021, doi: 10.1109/TED.2020.3041428.
- [6] I. Ramiro, J. Villa, J. Hwang, A. J. Martin, J. Millunchick, J. Phillips and A. Martí, "Demonstration of a GaSb/GaAs Quantum Dot Intermediate Band Solar Cell Operating at Maximum Power Point", *Physical Review Letters* **125**, 247703 (2020).
- [7] E. Moon, M. Barrow, J. Lim, D. Blaauw and J. D. Phillips, "Dual-Junction GaAs Photovoltaics for Low Irradiance Wireless Power Transfer in Submillimeter-Scale Sensor Nodes", *IEEE Journal of Photovoltaics* **10**, 1721-1726 (2020).
- [8] M. Barrow and J. Phillips, "Polarization-independent narrowband transmittance filters via symmetry-protected modes in high contrast gratings", *Optics Letters*, vol. 45(15), pp. 4348-4351, 2020.
- [9] E. Moon, I. Lee, D. Blaauw, and J. D. Phillips, "High-efficiency photovoltaic modules on a chip for millimeter-scale energy harvesting," *Progress in Photovoltaics: Research and Applications*, vol. 27, pp. 540-546, 2019.
- [10] H. N. Masten, J. D. Phillips, and R. L. Peterson, "Ternary Alloy Rare Earth Scandate as Dielectric for  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> MOS Structures," *IEEE Transactions on Electron Devices*, vol. 66, pp. 2489-2495, 2019.
- [11] J. Easley, C. R. Martin, M. H. Ettenberg, and J. Phillips, "InGaAs/GaAsSb Type II Superlattices for SWIR Detection," *Journal of Electronic Materials*, pp. <https://doi.org/10.1007/s11664-019-07441-x>, 2019.
- [12] C. Chen, V. A. Stoica, R. D. Schaller, R. Clarke, and J. D. Phillips, "Carrier dynamics of intermediate sub-bandgap transitions in ZnTeO," *Journal of Applied Physics*, vol. 126, p. 135701, 2019.
- [13] M. Ahn, A. Sarracino, A. Ansari, B. Torralva, S. Yalisove, and J. Phillips, "Surface morphology and straight crack generation of ultrafast laser irradiated  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>," *Journal of Applied Physics*, vol. 125, p. 223104, 2019.
- [14] J. Easley, E. Arkun, B. Cui, M. Carmody, L. Peng, M. Grayson, and J. Phillips, "Analysis of Carrier Transport in n-Type Hg<sub>1-x</sub>CdxTe with Ultra-Low Doping Concentration," *Journal of Electronic Materials*, vol. 47, pp. 5699-5704, July 17 2018.
- [15] M. Barrow, M. Scherr, and J. Phillips, "Influence of Subwavelength Grating Asymmetry on Long-Wavelength Infrared Transmittance Filters," *IEEE Photonics Journal*, vol. 10, p. 2700808, 2018.
- [16] M. Ahn, R. Cahyadi, J. Wendorf, W. Bowen, B. Torralva, S. Yalisove, and J. Phillips, "Low damage electrical modification of 4H-SiC via ultrafast laser irradiation," *Journal of Applied Physics*, vol. 123, p. 145106, 2018.
- [17] M. Scherr, M. Barrow, and J. Phillips, "Long-wavelength infrared transmission filters via two-step subwavelength dielectric gratings," *Optics Letters*, vol. 42, pp. 518-521, 2017.



- [18] I. Ramiro, J. Villa, C. Tablero, E. Antolín, A. Luque, A. Martí, J. Hwang, J. Phillips, A. J. Martin, and J. Millunchick, "Analysis of the intermediate-band absorption properties of type-II GaSb/GaAs quantum-dot photovoltaics," *Physical Review B*, vol. 96, p. 125422, 09/15/ 2017.
- [19] I. Ramiro, E. Antolin, H. Jinyoung, A. Teran, A. J. Martin, P. G. Linares, J. Millunchick, J. Phillips, A. Marti, and A. Luque, "Three-bandgap absolute quantum efficiency in GaSb/GaAs quantum dot intermediate band solar cells," *IEEE Journal of Photovoltaics*, vol. 7, pp. 508-12, 03/ 2017.
- [20] E. Moon, D. Blaauw, and J. D. Phillips, "Subcutaneous Photovoltaic Infrared Energy Harvesting for Bio-implantable Devices," *IEEE Transactions on Electron Devices*, vol. 64, pp. 2432-2437, 2017.
- [21] E. Moon, D. Blaauw, and J. D. Phillips, "Small-Area Si Photovoltaics for Low-Flux Infrared Energy Harvesting," *IEEE Transactions on Electron Devices*, vol. 64, pp. 15-20, 2017.
- [22] E. Moon, D. Blaauw, and J. Phillips, "Infrared Energy Harvesting in Millimeter-Scale GaAs Photovoltaics," *IEEE Transactions on Electron Devices*, vol. 64, pp. 4554 - 4560, 2017.
- [23] J. Easley, E. Arkun, M. Carmody, and J. Phillips, "Variable-Field Hall Effect Analysis of HgCdTe Epilayers with Very Low Doping Density," *Journal of Electronic Materials*, vol. 46, pp. 5479-5483, May 24 2017.
- [24] A. S. Teran, E. Moon, W. Lim, G. Kim, I. Lee, D. Blaauw, and J. D. Phillips, "Energy Harvesting for GaAs Photovoltaics Under Low-Flux Indoor Lighting Conditions," *IEEE Transactions on Electron Devices*, vol. 63, pp. 2820-2825, 2016.
- [25] S. Sengupta, T. Templeman, C. Chen, E. Moon, M. Shandalov, V. Ezersky, J. Phillips, and Y. Golan, "Chemical epitaxy and interfacial reactivity in solution deposited PbS on ZnTe," *Journal of Materials Chemistry C*, vol. 4, pp. 1996-2002, 2016.
- [26] I. Ramiro, E. Antolín, J. Hwang, A. Teran, A. J. Martin, P. G. Linares, J. Millunchick, J. Phillips, A. Martí, and A. Luque, "Three-Bandgap Absolute Quantum Efficiency in GaSb/GaAs Quantum Dot Intermediate Band Solar Cells," *IEEE Journal of Photovoltaics*, vol. 7, pp. 508-512, 2016.
- [27] J. Foley, S. Daly, C. Lenaway, and J. Phillips, "Investigating Student Motivation and Performance in Electrical Engineering and its Subdisciplines," *IEEE Trans. Education*, vol. 59, pp. 241-247, 2016.
- [28] M. DeJarld, A. Teran, M. Luengo-Kovac, L. Yan, E. Moon, S. Beck, C. Guillen, V. Sih, J. Phillips, and J. Mirecki Millunchick, "The effect of doping on low temperature growth of high quality GaAs nanowires on polycrystalline films," *Nanotechnology*, vol. 27, p. 495605, 2016.
- [29] A. S. Teran, C. Chen, E. Lopez, P. G. Linares, I. Artacho, A. Marti, A. Luque, and J. D. Phillips, "Heterojunction Band Offset Limitations on Open-Circuit Voltage in p-ZnT-ZnSe Solar Cells," *IEEE J. Photovoltaics*, vol. 5, pp. 874-877, 2015.
- [30] A. Teran, J. Wong, W. Lim, G. Kim, Y. Lee, D. Blaauw, and J. Phillips, "AlGaAs Photovoltaics for Indoor Energy Harvesting in mm-Scale Wireless Sensor Nodes," *IEEE Transactions on Electron Devices*, vol. 62, pp. 2170-2175, 2015.
- [31] J. Foley and J. Phillips, "Normal incidence narrowband transmission filtering capabilities using symmetry protected modes of a dielectric grating," *Optics Letters*, vol. 40, pp. 2637-2640, 2015.
- [32] L. Zhou, C. Chen, H. Jia, C. Ling, D. Banerjee, J. Phillips, and Y. Wang, "Oxygen Incorporation in ZnTeO Alloys via Molecular Beam Epitaxy," *Journal of Electronic Materials*, vol. 43, pp. 889-893, 2014/04/01 2014.

- [33] S. A. Sis, S. Lee, V. Lee, A. K. Bayraktaroglu, J. D. Phillips, and A. Mortazawi, "Intrinsically switchable, high-Q ferroelectric-silicon composite film bulk acoustic resonators," *Ultrasonics, Ferroelectrics and Frequency Control, IEEE Transactions on*, vol. 61, pp. 231-238, 2014.
- [34] E. Plis, S. Myers, D. Ramirez, E. P. Smith, D. Rhiger, C. Chen, J. D. Phillips, and S. Krishna, "Dual color longwave InAs/GaSb type-II strained layer superlattice detectors," *Infrared Physics & Technology*, 2014.
- [35] J. Hwang, K. Lee, A. Teran, S. Forrest, J. D. Phillips, A. J. Martin, and J. Millunchick, "Multiphoton Sub-Band-Gap Photoconductivity and Critical Transition Temperature in Type-II GaSb Quantum-Dot Intermediate-Band Solar Cells," *Physical Review Applied*, vol. 1, p. 051003, 2014.
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