

**ERIC POP**

Professor of Electrical Engineering and (by courtesy) of Materials Science & Engineering  
 Stanford University, Allen Building Room 335X • 420 Via Palou Mall • Stanford, CA 94305 • U.S.A.  
 T: +1.650.725.8768 • E: [epop@stanford.edu](mailto:epop@stanford.edu) • W: <http://poplab.stanford.edu>

**Education**


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Stanford University	Electrical Engineering	Ph.D., 2005
Massachusetts Institute of Technology	Electrical Engineering	M.Eng., 1999
Massachusetts Institute of Technology	Electrical Engineering	B.S., 1999
Massachusetts Institute of Technology	Physics	B.S., 1999

**Appointments**


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Stanford University		
• Professor of Electrical Engineering		2019 – present
• Professor of Materials Science & Engineering (by courtesy)		2019 – present
• Associate Professor of Electrical Engineering		2013 – 2019
• Associate Professor of Materials Science & Engineering (by courtesy)		2016 – 2019
• Chambers Faculty Scholar in the School of Engineering		2016 – present
• Affiliate, Precourt Institute for Energy		2013 – present
University of Illinois at Urbana-Champaign (UIUC)		
• Adjunct Professor, Electrical and Computer Engineering		2013 – 2015
• Associate Professor, Electrical and Computer Engineering (tenured)		2012 – 2013
• Affiliate and Part-Time Faculty, Beckman Institute		2008 – 2013
• Assistant Professor, Electrical and Computer Engineering		2007 – 2012
Intel Corp., Senior Engineer and visiting researcher at Stanford Univ.		2005 – 2007
Stanford University, Post-Doctoral Researcher, Chemistry & Thermal Sciences		2005
Stanford University, KZSU 90.1 FM radio DJ and General Manager		2000 – 2004

**Selected Honors**


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2018	Highly Cited Researcher, Web of Science (Clarivate Analytics)
2017,13-09	Golden Reviewers List, IEEE Electron Device Letters
2016	Most Cited Researchers List in Electrical Engineering by Elsevier
2016	Chambers Faculty Scholar, Stanford
2015,11	Golden Reviewers List, IEEE Transactions on Electron Devices
2014	Okawa Foundation Award
2013	Terman Faculty Fellow, Stanford
2013,11,10	Engineering Council Award for Excellence in Advising, UIUC
2012	Campus Distinguished Promotion Award, UIUC
2011	Outstanding Presentation Award, E\PCOS Symposium
2011	Xerox Award for Faculty Research, UIUC
2011	IEEE Senior Member
2011	Center for Advanced Study (CAS) Fellowship, UIUC
2010	PECASE (Presidential) Award from the White House, highest honor given by the US government to early-career scientists and engineers, nominated by ARO and DOD
2010	ONR Young Investigator Program (YIP) Award
2010	NSF CAREER Award
2010	AFOSR Young Investigator Program (YIP) Award
2009	List of Teachers Ranked as Excellent, UIUC
2008	DARPA Young Faculty Award (YFA)
2007	Arnold O. Beckman Research Award, UIUC
2005	Finalist, Stanford E-Challenge Business Plan Competition (top 4 of 80 teams)

2003,02 Best Paper in Session Award, SRC TechCon  
 2001-04 SRC-IBM Graduate Fellowship

### Selected Honors with Supervised Students

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2020 Best Paper Award, MRS Fall 2020 (I. Datye)  
 2018 2018 OMEEx Emerging Researcher Best Paper Prize (S. Deshmukh)  
 2018 Best Presentation Award, SRC TechCon (C. McClellan)  
 2018 Best Poster Award, IEEE Device Research Conference (S. Bohaichuk)  
 2018 Best Presentation Award, MRS Spring Meeting (M. Chen)  
 2017 Best Paper in Session Award, SRC TechCon (C. McClellan)  
 2017 Best Paper Award, EDISON'20 (K. Smithe)  
 2017 Best Conference Paper Award, IEEE NANO (A. Gabourie and S. Suryavanshi)  
 2016 Best Paper in Session Award, SRC TechCon (N. Wang)  
 2016 Best Poster Award, IEEE Device Research Conference (I. Datye and A. Gabourie)  
 2014 Best Paper in Session Award, SRC TechCon (C. English)  
 2013 Best Paper in Session Award, SRC TechCon (E. Carrion)  
 2011 Best Paper in Session Award, SRC TechCon (F. Xiong)

### Professional Memberships

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- IEEE Senior Member, 2011 – present (Member 1999 – 2010)
- AVS Member, 2013 – present
- AAAS Member, 2012 – present
- APS Member, 2011 – present
- MRS Member, 2007 – present
- HKN Member; Faculty Advisor for Illinois Alpha Chapter, 2009 – 2011

### Conferences Chaired or Organized

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- IEEE VLSI-TSA (Technology, Systems, Applications) program committee, 2022
- IEEE-IEDM (Intl. Electron Devices Meeting)
  - Emerging Device & Computing Technology (EDT) program committee, 2021
- IEEE-SISC (Semiconductor Interface Specialists Conference), 2020
- IEEE-VLSI Technology Symposium, 2015–2019
  - Publications Co-Chair, 2019, Kyoto, Japan
  - Session chair, 2018, Honolulu, HI
  - Focus Session Leader, 2018, Honolulu, HI
  - Focus Session Organizer, 2017, Kyoto, Japan
  - Publications Co-Chair, 2016, Honolulu, HI
  - Session chair, 2016, Honolulu, HI
  - Session chair, 2015, Kyoto, Japan
- IEEE-DRC (Device Research Conference)\*, 2006–present
  - Member of Board of Trustees, 2014–present
  - General Chair, 2015
  - Chair of Technical Program Committee (TPC), 2014
  - Vice-Chair of TPC, 2013
  - Session chair, 2012 and 2006
  - Evening “rump session” organizer, 2011, 2010, 2007
- AVS (American Vacuum Society) Meeting Session Chair, Long Beach, CA 2018
- Stanford-IMEC Resistive Memory Workshop, 2018

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\* Longest-running IEEE electron device conference, since 1942.

- Graphene 2018, Session Chair, Dresden, Germany, 2018
- EDISON'20, Session Chair, Buffalo, NY 2017
- MRS (Materials Research Society) Spring Meeting, 2017, Phoenix, AZ
  - Co-Organizer of “Symposium: Phase-Change Materials and Applications”
- IEEE-IRPS (International Reliability Physics Symposium)
  - XT Committee member, 2017, Monterey, CA
  - XT Committee member, 2016, Pasadena, CA
- ESSDERC (European Solid-State Device Research Conference)
  - North America Publicity Co-Chair, 2017, Leuven, Belgium
  - Session chair, 2016, Lausanne, Switzerland
- IEEE-SNW (Silicon Nanoelectronics Workshop) Session chair, 2016, Honolulu, HI
- E-MRS (European Materials Research Symposium) Session chair, 2016, Lille, France
- MRS (Materials Research Society) Spring Meeting, 2015, San Francisco, CA
  - Co-Organizer of “Symposium: Nanoscale Heat Transport – From Fundamentals to Devices”
- PTES (International Conference on Phononics and Thermal Energy Science), Shanghai, 2013
  - Session chair, 2013
- DATE (Design, Automation, and Test in Europe), 2012
  - Organizer, “The Device-to-System Spectrum – A Tutorial on IC Design with Nanomaterials”
- APS (American Physical Society) March Meeting, 2012
  - Focus session organizer, “Carbon Nanotubes and Related Nanomaterials”
- Nano-DDS (Devices for Defense & Security), 2011
  - Focus session organizer, “Hybrid Molecular & Nanoscale CMOS-Based Architectures”
- IEEE-IEDM (Intl. Electron Devices Meeting)
  - NDT (Nano Device Technology) program committee, 2010–2011
  - Session chair, 2010
- MRS (Materials Research Society) Fall Meeting, Session chair, Boston, 2010
- IEEE-UGIM (University Government Industry Micro/Nano) Symposium, Session chair, Purdue, 2010
- IEEE-ISRDS (Intl. Semiconductor Device Research Symposium), 2009
  - Session chair, ISDRS 2009 and 2007
- ECS (Electrochemical Society) Meeting, Session chair, 2007
- IEEE-GLSVLSI (Great Lakes VLSI) Symposium, Session chair, 2007
- IEEE-SISPAD (Simulation of Semiconductor Processes and Devices), Session chair, 2006

## University Committees and Service

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### At Stanford

- Ad hoc advisory committee to Dean Widom on nanofabrication facilities, 2021 – present
- Culture, Equity, and Inclusion Committee (chair), 2019 – present
- EE Academic Affairs Committee (AAC), 2013 – present
- SystemX, co-lead of Heterogeneous Integration theme, 2015 – present
- MSE Faculty Search Committee, 2019
- Stanford-IMEC Resistive Memory Workshop co-organizer, 2018
- EE Faculty Search Committee, 2017 and 2018
- Rising Stars Committee, 2017
- Stanford Faculty Scholars Committee, 2017
- Stanford Nano Shared Facilities Working Group, 2017
- SNF Shared Nanofabrication Future Plans Committee, 2015 – 2016
- Precourt Institute for Energy, Stanford Interdisciplinary Graduate Fellowship Committee, 2015
- EE21 Committee, 2014 – 2015
- EE Web Site Committee, 2013 – 2015
- SoE Makers Commons Committee, 2013

## At UIUC

- ECE Colloquium Committee, 2007 – 2013
- ECE Public Relations Committee, 2009 – 2013
- ECE Nanotechnology Committee, 2009 – 2013
- Beckman Institute Program Advisory Committee, 2009 – 2012
- ECE Graduate Recruitment Committee, 2007 – 2012
- ECE Advisory Committee, 2011 – 2012
- ECE Curriculum Committee, 2010 – 2012
- ECE Graduate Committee, 2009 – 2010
- ECE New Building Committee, 2008 – 2009
- ECE Graduate Admissions Committee, 2007 – 2008
- ECE Fellowship Committee, 2007 – 2008
- MNTL Characterization Lab Committee, 2007 – 2008

## Editor and Reviewer Service

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- Editorial Board of *2D Materials*
- Editorial Board of *Nano Research*
- Proposal reviewer for:
  - National Science Foundation (NSF) Electronics, Photonics, and Magnetic Devices (EPMD), Thermal Transport Processes (TTP), Division of Materials Research (DMR)
  - Air Force Office of Scientific Research (AFOSR), Army Research Office (ARO)
- Journal reviewer for:
  - Science, Proc. Natl. Academy of Sciences, Nano Research
  - Nature, Nature Nanotechnology, Nature Materials, Nature Communications
  - Nano Letters, ACS Nano, ACS Appl. Materials & Interfaces, 2D Materials
  - IEEE Trans. Nanotechnology, IEEE Trans. Electron Devices, IEEE Electron Device Letters, IEEE Trans. Computer Aided Design, IEEE Trans. Components and Packaging Technologies
  - Physical Review B, X, Letters; Applied Physics Letters, Journal of Applied Physics
  - Nanotechnology, Journal of Physics: Condensed Matter, Solid-State Electronics
  - Journal of Computational Electronics, Journal of Heat Transfer

## Teaching and Advising

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- EE 101A, “Circuits I,” Winter 2020 and 2021 (most recent evaluation: 4.4 out of 5.0)
- EE 323, “Energy in Electronics,” Fall 2014–present (average evaluation: 4.5 out of 5.0)
- EE 116, “Semiconductor Device Physics,” Spring 2014–present (average evaluation: 4.5 out of 5.0)
- EE 216, “Principles & Models of Semiconductor Devices,” Winter 2014–present (average evaluation: 4.6 out of 5.0)
- ECE 340, “Semiconductor Electronics,” 2012–2013 (average evaluation: 4.6 out of 5.0)
- ECE 565, “Energy Dissipation in Electronics,” 2011
- ECE 440, “Solid State Electronics,” 2007–2011 (average evaluation: 4.7 out of 5.0)
- ECE 598EP, “Hot Chips: Atoms to Heat Sinks,” 2008–2010 (average evaluation: 4.7 out of 5.0)
- Undergraduate academic advisees, >100 students total:
  - ~35 at Stanford (2013–present), ~70 at UIUC (2007–2013)
- Classroom instruction, > 700 students total:
  - At Stanford (2013–): ~180 undergrads (EE 101A, 116) and ~140 grad students (EE 216, 323)
  - At UIUC (2007–2013): ~340 undergrads (ECE 340) and ~60 grad students (ECE 565)

## Tutorials, Software and Other Educational Initiatives

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28. “Nanoelectronics & Heterogeneous Integration with 2D Materials,” *Short Course at Nano-KISS* (Korean Intl. Summer School on Nanoelectronics), Korea, Feb 2020

27. “(Clarifying) A Few Alternative Facts About 2D Materials,” *Tutorial at 2D Materials: Fundamentals to Spintronics Workshop*, Sep 2019, Natal, Brazil. <https://www.youtube.com/watch?v=9RsgQEIobdI>
26. “What Are Two-Dimensional Materials Good For?” *Tutorial at 2D Materials: Fundamentals to Spintronics Workshop*, Sep 2019, Natal, Brazil. [https://www.youtube.com/watch?v=\\_pCqJAKpsxQ](https://www.youtube.com/watch?v=_pCqJAKpsxQ)
25. “Fundamental, Thermal, and Energy Limits of Phase-Change Memory,” *Tutorial at Eurotherm Nanoscale & Microscale Heat Transfer VI (NMHT)*, Dec 2018, Levi, Finland
24. “Benefits of Heterogeneous Integration: The N3XT 1000x,” *Tutorial at SSDM (Intl. Conference on Solid State Devices & Materials)*, Tokyo Japan, Sep 2018
23. “Fundamental, Thermal, and Energy Limits of PCM and ReRAM,” *Tutorial at IEDM (Intl. Electron Devices Meeting)*, San Francisco, CA, Dec 2017
22. “Fundamentals and Ultimate Scaling Limits of Phase-Change Memory,” *Tutorial at 75<sup>th</sup> DRC (Device Research Conference)*, Notre Dame, IN, Jun 2017
21. “Energy, Thermal, and Thermoelectric Effects in Nanoscale Devices,” *Short Course at University of Pisa*, Pisa, Italy, Jun 2017
20. “Thermal and Related Properties of 2D Materials and Devices,” *Short Course at 2D Materials Workshop*, Univ. Minnesota, Jun 2016, <http://minic.umn.edu/2d-materials/summer-program-2016>
19. “Thermal Resistance in Electronic Devices,” *Short Course on nanoHUB-U*, May 2016, <https://nanohub.org/courses/tred>
18. “Electrical & Thermal Transport in 2D Materials and Devices,” *Short Course at Nano-KISS (Korean Intl. Summer School on Nanoelectronics)*, ETRI, Daejeon Korea, Oct 2015
17. “Device and Thermal Fundamentals and Applications of 2D Materials,” *NanoTechnology for Defense Conference (NT4D)*, Chantilly VA, Nov 2014
16. “Thermoelectrics 101,” *GCEP Symposium*, Stanford CA, Oct 2014. <http://gcep.stanford.edu/learn/energy101.html>
15. S2DS : Stanford 2D Semiconductor simulation tool for monolayer transistors, available at [nanoHUB.org](http://nanohub.org)
14. “Energy in Nanoelectronics,” *Tsukuba Summer Lecture Series*, Tsukuba, Japan, Jul-Aug 2014
13. “The Device-to-System Spectrum – A Tutorial on IC Design with Nanomaterials,” *Design, Automation & Test in Europe (DATE)*, Dresden, Germany, Mar 2012
12. Web-Enabled Remote Lab: An interface for measuring electronic devices through the Internet. Devices in the lab can be measured on any web browser (even on an iPhone), anywhere in the world. Developed with undergraduates S. Dutta and S. Prakash. First tested in course ECE 440, Spring 2010. Source code at <http://remotelab.sourceforge.net>. Details published in *IEEE Trans. Educ.* (2011).
11. Graduate Course Online: ECE 598 *Hot Chips: Atoms to Heat Sinks* (Fall 2010) course notes available at <http://poplab.stanford.edu> and audio through <http://nanohub.org>
10. GFETtool : Graphene transistor electro-thermal simulation tool, available at [nanoHUB.org](http://nanohub.org)
9. nanoJoule : Carbon nanotube electro-thermal simulation tool, available at [nanoHUB.org](http://nanohub.org)
8. CNTmob : Carbon nanotube mobility simulation tool, available at [nanoHUB.org](http://nanohub.org)
7. “Carbon Nanoelectronics: Towards Energy-Efficient Computing,” *Design, Automation & Test in Europe (DATE)*, Dresden, Germany, Mar 2010
6. D. Chen, S. Chilstedt, C. Dong, E. Pop, “What Everyone Needs to Know About Carbon-Based Electronics,” *DAC.com Knowledge Center Article*, [www.dac.com](http://www.dac.com), Mar 2010
5. “Graphene Thermal Physics,” *IEEE Device Research Conference (DRC)*, State College PA, Jun 2009
4. K-12 Outreach: Series of talks on “*Memory Technology: Putting the nano in your iPod*” presented at University High School, Urbana IL (Spring 2008). Audio and video available at [nanoHUB.org](http://nanohub.org)
3. Undergraduate Course Online: ECE 440 *Solid-State Electronics* (Fall 2008) course notes available at <http://poplab.stanford.edu> and audio through [nanoHUB.org](http://nanohub.org)
2. “Electro-Thermal Interaction, Modeling and Measurement in Nanoscale Devices,” *Great Lakes VLSI*

(GLSVLSI) Conference, Lago Maggiore, Italy, Mar 2007

1. MONET: Monte Carlo simulation code for transport and heat generation in silicon devices, available at <http://poplab.stanford.edu> along with multimedia and simulation results

### **Journal Publications (h-index: 77; 24,400+ citations in Google Scholar)**

in review: gray; students supervised: **bold**; post-docs supervised: *italic*

217. E. Ber, **R.W. Grady**, E. Pop, **E. Yalon**, “Pinpointing the Dominant Component of Contact Resistance to Atomically Thin Semiconductors,” in review (2021)
216. O. Hemmatyar, S. Abdollahramezani, I. Zeimpekis, S. Lepeshov, A. Krasnok, **A.I. Khan**, **K.M. Neilson**, C. Teichrib, T. Brown, E. Pop, D.W. Hewak, M. Wuttig, A. Alu, O.L. Muskens, A. Adibi, “Enhanced Meta-Displays Using Advanced Phase-Change Materials,” in review, pre-print arXiv:2107.12159 (2021)
215. **A. Sood**, C. Sievers, **Y.C. Shin**, **V. Chen**, S. Chen, **K.K.H. Smithe**, S. Chatterjee, D. Donadio, K.E. Goodson, E. Pop, “Engineering Thermal Transport Across Layered Graphene-MoS<sub>2</sub> Superlattices,” in review, pre-print arXiv:2107.10838 (2021)
214. **S. Wahid**, **A. Daus**, **A.I. Khan**, **V. Chen**, **K. Neilson**, **M. Islam**, E. Pop, “Lateral Transport and Field-Effect Characteristics of Sputtered P-Type Chalcogenide Thin Films,” in review, pre-print arXiv:2107.08301 (2021)
213. V.Z. Costa, L. Liang, **S. Vaziri**, A. Miller, A. Ichimura, E. Pop, A.K.M. Newaz, “Vibrational Properties of a Naturally Occurring Semiconducting van der Waals Heterostructure,” in review, pre-print arXiv:2107.07135 (2021)
212. B. Hoffer, N. Wainstein, **C.M. Neumann**, E. Pop, **E. Yalon**, and S. Kvatinsky, “Crossbar-Compatible Stateful Logic using Phase Change Memory,” in review (2021)
211. S. Das, A. Sebastian, E. Pop, **C.J. McClellan**, A.D. Franklin, T. Grasser, T. Knobloch, Y. Illarionov, A.V. Penumatcha, J. Appenzeller, Z. Chen, W. Zhu, I. Asselberghs, L.-J. Li, U.E. Avci, N. Bhat, T.D. Anthopoulos, R. Singh, “2D-Materials Based Transistors for Future Integrated Circuits: Current Status, Challenges, and Prospects,” in revision (2021)
210. **S.M. Bohaichuk**, S. Kumar, **M. Muñoz Rojo**, R.S. Williams, G. Pitner, J. Jeong, M.G. Samant, S.S.P. Parkin, H.-S.P. Wong, E. Pop, “The Disconnect Between Nano-Scaling and Dynamics of Mott Switches,” in revision (2021)
209. **S. Deshmukh**, **M. Muñoz Rojo**, **E. Yalon**, **S. Vaziri**, **Ç. Köroğlu**, R. Islam, R.A. Iglesias, K. Saraswat, E. Pop, “Direct Measurement of Nanoscale Filamentary Hot Spots in Resistive Memory Devices,” in revision (2021)
208. **A.I. Khan**, H. Kwon, **M.E. Chen**, M. Asheghi, H.-S.P. Wong, K.E. Goodson, E. Pop, “Electro-Thermal Confinement Enables Multi-Level Low-Drift Superlattice Phase Change Memory with Low Current Density,” in revision (2021)
207. K. Nassiri Nazif, **A. Daus**, J. Hong, N. Lee, S. Vaziri, A. Kumar, F. Nitta, **M. Chen**, S. Kananian, R. Islam, K.-H. Kim, J.-H. Park, A. Poon, M.L. Brongersma, E. Pop, K.C. Saraswat, “High-Specific-Power Flexible Transition Metal Dichalcogenide Solar Cells,” in review, pre-print arXiv:2106.10609 (2021)
206. S. Abdollahramezani, O. Hemmatyar, M. Taghinejad, H. Taghinejad, A. Krasnok, A.A. Eftekhari, C. Teichrib, **S. Deshmukh**, M. El-Sayed, E. Pop, M. Wuttig, A. Alu, W. Cai, A. Adibi, “Electrically driven programmable phase-change meta-switch reaching 80% efficiency,” pre-print arXiv:2104.10381 (2021)
205. **A.I. Khan**, **A. Daus**, R. Islam, H.R. Lee, **K. Neilson**, H.-S.P. Wong, E. Pop, “Ultralow Switching Current Density Multi-Level Phase Change Memory on a Flexible Substrate,” *Science*, in press (2021)
204. **A. Tang**, A. Kumar, M. Jaikissoon, K. Saraswat, H.-S.P. Wong, E. Pop, “Towards Low Temperature Solid Source Synthesis of Monolayer MoS<sub>2</sub>,” *ACS Appl. Mater. Interfaces.*, in press (2021)
203. K. Stern, N. Wainstein, Y. Keller, **C.M. Neumann**, E. Pop, S. Kvatinsky, **E. Yalon**, “Sub-Nanosecond Pulses Enable Partial Reset for Analog Phase Change Memory,” *IEEE Electron Dev. Lett.*, DOI: 10.1109/LED.2021.3094765 (2021)

202. H. Kwon, **A.I. Khan**, C. Perez, M. Asheghi, E. Pop, K.E. Goodson, "Thermal and Electrical Characterization of  $\text{Sb}_2\text{Te}_3/\text{GeTe}$  Superlattice Films," *Nano Letters* **21**, 5984-5990 (2021)
201. U. Schmidt, **C.S. Bailey**, J. Englert, **E. Yalon**, G. Ankonina, E. Pop, O. Hollricher, T. Dieing, "A Comprehensive Study of  $\text{WSe}_2$  Crystals Using Correlated Raman, Photoluminescence (PL), Second Harmonic Generation (SHG), and Atomic Force Microscopy (AFM) Imaging," *Spectroscopy* **36**, 23-30 (2021)
200. **V. Chen**, **Y.C. Shin**, E. Mikheev, Q. Lin, J. Martis, Z. Zhang, S. Chatterjee, A. Majumdar, H.-S.P. Wong, D. Goldhaber-Gordon, E. Pop, "Application-Driven Synthesis and Characterization of Hexagonal Boron Nitride on Metal and Carbon Nanotube Substrates," *2D Materials*, DOI: 10.1088/2053-1583/ac10f1, in press (2021)
199. K. Stern, N. Wainstein, Y. Keller, **C.M. Neumann**, E. Pop, S. Kvatinsky, *E. Yalon*, "Uncovering Phase Change Memory Energy Limits by Sub-Nanosecond Probing of Power Dissipation Dynamics," *Adv. Electron. Mater.* 2100217 (2021)
198. A. Daus, S. Vaziri, **V. Chen**, **Ç. Köroğlu**, **R.W. Grady**, **C.S. Bailey**, H.R. Lee, **K. Schauble**, *K. Brenner*, E. Pop, "High-Performance Flexible Nanoscale Field-Effect Transistors Based on Transition Metal Dichalcogenides," *Nature Electronics* **4**, 495-501 (2021)
197. K. Nassiri Nazif, A. Kumar, J. Hong, R. Islam, **C.J. McClellan**, O. Karni, J. van de Groep, T. Heinz, E. Pop, M.L. Brongersma, K. Saraswat, "High-performance p-n junction transition metal dichalcogenide photovoltaic cells enabled by  $\text{MoO}_x$  doping and passivation," *Nano Letters* **21**, 3443-3450 (2021)
196. **M.E. Chen**, *M. Muñoz Rojo*, **F. Lian**, *A. Sood*, S.G. Garrow, J. Koeln, A.G. Alleyne, K.E. Goodson, E. Pop, "Graphene-Based Electromechanical Thermal Switches," *2D Materials* **8**, 035055 (2021)
195. C.-H. Wang, **V. Chen**, **C.J. McClellan**, A. Tang, *S. Vaziri*, L. Li, **M.E. Chen**, E. Pop, H.-S.P. Wong, "Ultrathin Three-Monolayer Tunneling Memory Selectors," *ACS Nano* **15**, 8484-8491 (2021)
194. C. Wen, X. Li, T. Zanotti, F.M. Puglisi, Y. Shi, F. Saiz, A. Antidormi, S. Roche, W. Zheng, X. Liang, J. Hu, S. Duhm, J.B. Roldan, T. Wu, **V. Chen**, E. Pop, B. Garrido, K. Zhu, F. Hui, M. Lanza, "Advanced Data Encryption Using 2D Materials," *Adv. Materials* **33**, 2100185 (2021)
193. **A.J. Gabourie**, Z. Fan, T. Ala-Nissilä, E. Pop, "Spectral Decomposition of Thermal Conductivity: Comparing Velocity Decomposition Methods in Homogeneous Molecular Dynamics Simulations," *Phys. Rev. B*, **103**, 205421 (2021)
192. H.R. Lee, N. Furukawa, A.J. Ricco, E. Pop, Y. Cui, Y. Nishi, "Carbon Nanotube Thermoelectric Devices by Direct Printing: Towards Wearable Energy Converters," *Appl. Phys. Lett.* **118**, 173901 (2021)
191. *F. Xiong*, *E. Yalon*, **C.J. McClellan**, J. Zhang, Ö.B. Aslan, *A. Sood*, J. Sun, C. Andolina, W.A. Saidi, K.E. Goodson, T.F. Heinz, Y. Cui, E. Pop, "Tuning Electrical and Thermal Properties of Bilayer  $\text{MoS}_2$  via Electrochemical Intercalation," *Nanotechnology* **32**, 265202 (2021)
190. S. Abdollahramezani, O. Hemmatyar, M. Taghinejad, H. Taghinejad, Y. Kiarashinejad, M. Zandehshahvar, T. Fan, **S. Deshmukh**, A.A. Eftekhari, W. Cai, E. Pop, M. El-Sayed, A. Adibi, "Dynamic Hybrid Metasurfaces," *Nano Lett.* **21**, 1238-1245 (2021)
189. **C.J. McClellan**, *E. Yalon*, **K.K.H. Smithe**, **S.V. Suryavanshi**, E. Pop, "High Current Density in Monolayer  $\text{MoS}_2$  Doped by  $\text{AlO}_x$ ," *ACS Nano* **15**, 1587-1596 (2021)
188. **A.J. Gabourie**, **S.V. Suryavanshi**, A.B. Farimani, E. Pop, "Thermal Transport in Substrate-Supported and Encased  $\text{MoS}_2$ ," *2D Materials* **8**, 011001 (2021)
187. **A.I. Khan**, H. Kwon, R. Islam, C. Perez, **M.E. Chen**, M. Asheghi, K.E. Goodson, H.-S.P. Wong, E. Pop, "Two-Fold Reduction of Switching Current Density in Phase Change Memory Using  $\text{Bi}_2\text{Te}_3$  Thermoelectric Interfacial Layer," *IEEE Elec. Dev. Lett.* **41**, 1657-1660 (2020)
186. **K. Schauble**, D. Zakhidov, *E. Yalon*, **S. Deshmukh**, **R.W. Grady**, K.A. Cooley, **C.J. McClellan**, *S. Vaziri*, D. Passarello, S.E. Mohny, A.K. Sood, M.F. Toney, A. Salleo, E. Pop, "Uncovering the Effects of Metal Contacts on Monolayer  $\text{MoS}_2$ ," *ACS Nano* **14**, 14798-14808 (2020)
185. *S. Vaziri*, **V. Chen**, L. Cai, Y. Jiang, **M.E. Chen**, **R.W. Grady**, X. Zheng, E. Pop, "Ultrahigh Doping of

- Graphene Using Flame-Deposited MoO<sub>3</sub>,” *IEEE Electron Dev. Lett.* **41**, 1592-1595 (2020)
184. D. Somvanshi, E. Ber, **C.S. Bailey**, E. Pop, *E. Yalon*, “Improved Current Density and Contact Resistance in Bilayer MoSe<sub>2</sub> by AlO<sub>x</sub> Capping,” *ACS Appl. Mater. Interfaces.* **12**, 36355-36361 (2020)
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274. K. Stern, Y. Keller, **C.M. Neumann**, E. Pop, **E. Yalon**, "Temperature-Dependent Reset Power Consumption in Phase Change Memory," *EPCOS (European Phase-Change and Ovonic Symposium)*, Sep 2021
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270. **V. Chen**, H.R. Lee, **C. Koroglu**, **C.J. McClellan**, *A. Daus*, E. Pop, "Ambipolar Thermoelectric Measurements of Multilayer  $\text{WSe}_2$ ," *Virtual MRS Spring Meeting*, Apr 2021
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266. **K. Schauble**, **R. Grady**, E. Pop, "MoS<sub>2</sub> Defect Insights using Raman Spectroscopy," *Virtual MRS Spring & Fall Meeting*, Nov 2020
265. S.-J. Yu, J.A. Roberts, Q. Lin, **S. Bohaichuk**, Y. Luo, Y.T. Choi, P.-H. Ho, K. Lee, A.L. Falk, W.L. Wilson, E. Pop, H.-S.P. Wong, J.A. Fan, "Highly confined plasmons in individual single-walled carbon nanotube nanoantennas," *IEEE Conf. Lasers & Electro-Optics (CLEO)*, May 2020
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254. **A.J. Gabourie** and E. Pop, “Interface Dependence of Thermal Properties in Two-Dimensional MoS<sub>2</sub>,” *IEEE Semicon. Interface Specialist Conf. (SISC)*, Dec 2019, San Diego, CA
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239. L. Brandt, A.S. Yalamarthy, P. Satterthwaite, S. Vaziri, S. Benbrook, E. Pop, D. Senesky, “Graphene as a Diffusion Barrier in High-Temperature Electronics,” *APS March Meeting*, Mar 2019, Boston MA
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233. M. Muñoz Rojo, **Z. Li**, C. Sievers, **A.C. Bornstein**, E. Yalon, **S. Deshmukh**, S. Vaziri, M.-H. Bae, **F. Xiong**, D. Donadio, E. Pop, “Thermal Transport Across Graphene Step Junctions,” *Eurotherm Nanoscale & Microscale Heat Transfer VI (NMHT)*, Dec 2018, Levi, Finland
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231. A. Sood, Y.C. Shin, **V. Chen**, **K.K.H. Smithe**, K.E. Goodson, E. Pop, “Towards Engineering Giant Thermal Resistivity in Multilayer Graphene-MoS<sub>2</sub> Heterostructures,” *MRS Fall Meeting*, Nov 2018, Boston MA
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228. K.L. Okabe, A. Sood, E. Yalon, **C.M. Neumann**, E. Pop, M. Asheghi, K.E. Goodson, H.-S.P. Wong, “Electrical and Thermal Analysis of Interfacial Phase Change Memory,” *EPCOS (European Phase-Change and Ovonic Symposium)*, Catania Italy, Sep 2018 (**Best Presentation Award, 3rd Prize**)
227. E. Yalon, K. Okabe, **C.M. Neumann**, H.-S.P. Wong, E. Pop, “Improving PCM Energy-Efficiency by Reducing Pulse Widths,” *EPCOS (European Phase-Change and Ovonic Symposium)*, Catania Italy, Sep 2018
226. **C.J. McClellan**, E. Yalon, L. Cai, **S. Suryavanshi**, X. Zheng, E. Pop, “Effective Hole Doping and Steep Switching in WSe<sub>2</sub> Transistors,” *SRC TECHCON*, Sep 2018, Austin TX (**Best Presentation Award**)
225. **K. Schauble**, E. Yalon, D. Zakhidov, **S. Deshmukh**, **C.J. McClellan**, S. Vaziri, A.K. Sood, A. Salleo, E. Pop, “Interfacial Reactions and Doping Effects at Metal Contacts to Monolayer MoS<sub>2</sub>,” *SRC TECHCON*, Sep 2018, Austin TX
224. **S. Deshmukh**, M. Muñoz Rojo, E. Yalon, S. Vaziri, E. Pop, “Nanoscale Thermometry of RRAM Filaments with Intimate Graphene Contacts,” *SRC TECHCON*, Sep 2018, Austin, TX

223. **K. Schauble**, E. Yalon, D. Zakhidov, **S. Deshmukh**, **C.J. McClellan**, S. Vaziri, A.K. Sood, A. Salleo, E. Pop, "Interfacial Reactions and Doping Effects at Metal Contacts to Monolayer MoS<sub>2</sub>," *Electronic Materials Conference (EMC)*, Jun 2018, Santa Barbara, CA
222. **C.J. McClellan**, E. Yalon, L. Cai, **S.V. Suryavanshi**, X. Zheng, E. Pop, "Sub-Thermionic Steep Switching in Hole-Doped WSe<sub>2</sub> Transistors," *IEEE Device Research Conference (DRC)*, Jun 2018, Santa Barbara, CA
221. **I.M. Datye**, M. Muñoz Rojo, E. Yalon, **M.J. Mleczko**, E. Pop, "Localized Heating in MoTe<sub>2</sub>-Based Resistive Memory Devices," *IEEE Device Research Conference (DRC)*, Jun 2018, Santa Barbara CA
220. E. Yalon, K. Okabe, **C.M. Neumann**, H.-S.P. Wong, E. Pop, "Energy-Efficient Phase Change Memory Programming by Nanosecond Pulses," *IEEE Device Research Conference (DRC)*, Jun 2018, Santa Barbara CA
219. Y.Y. Illarionov, **K.K.H. Smithe**, M. Walzl, **R.W. Grady**, **S. Deshmukh**, E. Pop, T. Grasser, "Annealing and Encapsulation of CVD-MoS<sub>2</sub> FETs with 10<sup>10</sup> On/Off Current Ratio," *IEEE Device Research Conference (DRC)*, Jun 2018, Santa Barbara CA
218. **S. Deshmukh**, M. Muñoz Rojo, E. Yalon, S. Vaziri, E. Pop, "Probing Self-Heating in RRAM Devices by Sub-100 nm Spatially Resolved Thermometry," *IEEE Device Research Conference (DRC)*, Jun 2018, Santa Barbara CA
217. **S.M. Bohaichuk**, M. Muñoz Rojo, G. Pitner, **C.J. McClellan**, F. Lian, J. Li, J. Jeong, M.G. Samant, S.S.P. Parkin, H.-S. P. Wong, E. Pop, "Low Power Nanoscale Switching of VO<sub>2</sub> using Carbon Nanotube Heaters," *IEEE Device Research Conference (DRC)*, Jun 2018, Santa Barbara CA (**Best Poster Award**)
216. J. Zheng, A. Khanolkar, P. Xu, S. Colburn, **S. Deshmukh**, J. Myers, J. Frantz, E. Pop, N. Boechler, A. Majumdar, "Non-volatile All-Optical Quasi-Continuous Switching in GST-on-Silicon Microring Resonators," *CLEO 2018*, May 2018, San Jose CA
215. **R.L. Xu**, M. Muñoz Rojo, S.M. Islam, B. Vareskic, H.G. Xing, D. Jena, E. Pop, "Thermal Transport in AlN Single Crystals and AlN/GaN Superlattices," *MRS Spring Meeting*, Apr 2018, Phoenix AZ
214. **F. Lian**, T. Lei, **V. Chen**, A. Sood, Z. Li, K. Goodson, V. Gambin, Z. Bao, E. Pop, "High Electron and Hole Thermopower in Ultra-Pure Carbon Nanotube Networks," *MRS Spring Meeting*, Apr 2018, Phoenix AZ
213. **M. Chen**, **F. Lian**, M. Muñoz Rojo, A. Sood, K. Goodson, E. Pop, "Electrostatic Cycling of Suspended Graphene Thermal Switches," *MRS Spring Meeting*, Apr 2018, Phoenix AZ (**Best Presentation Award**)
212. A.S. Yalamathy, M. Muñoz Rojo, A. Bruefach, E. Pop, D.G. Senesky, "Low-Temperature Seebeck Coefficient Enhancement in Gated AlGaIn/GaN Heterostructures," *MRS Spring Meeting*, Apr 2018, Phoenix AZ
211. **K.K.H. Smithe**, Z. Zhu, **C.S. Bailey**, E. Pop, A. Yoon, "Investigation of Monolayer MX<sub>2</sub> as Sub-Nanometer Copper Diffusion Barriers," *IEEE Intl. Reliability Physics Symp. (IRPS)*, Mar 2018, Burlingame, CA
210. E. Barré, J.A. Incorvia, S.H. Kim, **C. McClellan**, E. Pop, H.-S.P. Wong, T.F. Heinz, "Spin and Valley Hall Effect in Monolayer WSe<sub>2</sub> Transistors at Near-Room Temperature," *APS March Meeting*, Los Angeles CA, Mar 2018
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208. A. Newaz, A. Yore, T. Mou, S. Jha, **K. Smithe**, B. Wang, E. Pop, "Photoresponse of Natural van der Waals Heterostructures," *APS March Meeting*, Los Angeles CA, Mar 2018
207. O. Karni, **K. Smithe**, **C. McClellan**, **C. Bailey**, E. Pop, T. Heinz, "Temperature dependence of charge transfer processes in WS<sub>2</sub>/MoSe<sub>2</sub> heterobilayers probed by ultrafast spectroscopy," *APS March Meeting*, Los Angeles CA, Mar 2018

206. **S.V. Suryavanshi**, B. Sklenard, B. Magyari-Köpe, E. Pop, P. Blaise, “Understanding 2D Semiconductor-Metal Interface for Efficient Carrier Injection,” *IEEE SISC*, Dec 2017, San Diego CA
205. R. Yang, H. Li, **K.K.H. Smithe**, T.R. Kim, K. Okabe, E. Pop, J.A. Fan, H.-S.P. Wong, “2D Molybdenum Disulfide (MoS<sub>2</sub>) Transistors Driving RRAMs with 1T1R Configuration,” *IEEE Intl. Electron Devices Meeting (IEDM)*, Dec 2017, San Francisco CA
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201. S. Chen, *A. Sood*, E. Pop, K. Goodson, D. Donadio, “Largely tunable anisotropic thermal conductivity of pristine and lithiated MoS<sub>2</sub>,” *APS Meeting of the Far West Section*, Nov 2017, Merced CA
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195. C.-L. Lo, M. Catalano, **K.K.H. Smithe**, L. Wang, E. Pop, M.J. Kim, Z. Chen, “On the Potential of 2D Layered Materials as Diffusion Barriers for Cu Interconnect Technology,” *SRC TECHCON*, Sep 2017, Austin, TX
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192. **K.K.H. Smithe**, **C.D. English**, **S.V. Suryavanshi**, E. Pop, “High-Field Transport and Velocity Saturation in Monolayer MoS<sub>2</sub>,” *SRC TECHCON*, Sep 2017, Austin TX
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190. *F. Xiong*, *A. Sood*, H. Wang, *E. Yalon*, **C.J. McClellan**, J. Zhang, J. Sun, K. Goodson, Y. Cui, E. Pop, “Tuning Electrical and Thermal Properties in Molybdenum Disulfide via Li Intercalation,” *Intl. Materials Research Congress (MRS-IMRC)*, Aug 2017, Cancun Mexico
189. *J.A. Currivan-Incorvia*, E. Barre, S.H. Kim, **C. McClellan**, E. Pop, H.-S.P. Wong, T. Heinz, “Room Temperature Electrical Control of Spin and Valley Hall Effect in Monolayer WSe<sub>2</sub> Transistors for Spintronic Applications,” *IEEE Nano*, Jul 2017, Pittsburgh PA
188. **S.V. Suryavanshi**, **A.J. Gabourie**, A.B. Farimani, *E. Yalon*, E. Pop, “Thermal Boundary Conductance of the MoS<sub>2</sub>-SiO<sub>2</sub> Interface,” *IEEE Nano*, Jul 2017, Pittsburgh PA (**Best Paper Award**)

187. **S. Deshmukh, F. Lian, E. Yalon, G. Pitner, H.-S.P. Wong, E. Pop**, “Sub-15 nm Nanowires Enabled by Cryo Pulsed Self-Aligned Nanotrench Ablation on Carbon Nanotubes,” *IEEE Nano*, Jul 2017, Pittsburgh PA
186. S. Colburn, A. Zhan, A. Majumdar, **S. Deshmukh, E. Pop, J. Myers, J. Frantz**, “Active Metasurfaces Based on Phase-Change Memory Material Digital Metamolecules,” *IEEE Nano*, Jul 2017, Pittsburgh PA
185. **K.K.H. Smithe, C.D. English, S.V. Suryavanshi, E. Pop**, “High-Field Transport and Velocity Saturation in CVD Monolayer MoS<sub>2</sub>,” *EDISON 20*, Jul 2017, Buffalo NY (**Best Student Paper Award**)
184. **C.J. McClellan, E. Yalon, K.K.H. Smithe, S.V. Suryavanshi, E. Pop**, “Effective n-type Doping of Monolayer MoS<sub>2</sub> by AlO<sub>x</sub>,” *IEEE Device Research Conference (DRC)*, Jun 2017, Notre Dame, IN
183. **N.C. Wang, S. Sinha, B. Cline, C.D. English, G. Yeric, E. Pop**, “Replacing Copper Interconnects with Graphene at a 7-nm Node,” *IEEE Intl. Interconnect Tech. Conf. (IITC)*, May 2017, Hsinchu, Taiwan
182. C.-L. Lo, **K.K.H. Smithe, R. Mehta, S. Chugh, E. Pop, Z. Chen**, “Atomically Thin Diffusion Barriers for Ultra-Scaled Cu Interconnects Implemented by 2D Materials,” *IEEE Intl. Reliability Physics Symp. (IRPS)*, Apr 2017, Monterey, CA
181. **C. McClellan, L. Cai, E. Yalon, X. Zheng, E. Pop**, “Record Current Density in Monolayer p-type WSe<sub>2</sub> with Ultrathin MoO<sub>3</sub> Hole Doping Layers,” *MRS Spring Meeting*, Apr 2017, Phoenix AZ
180. **S. Bohaichuk, G. Pitner, F. Lian, J. Jeong, M.G. Samant, S.S.P. Parkin, H.-S. Philip Wong, E. Pop**, “Probing Metal-Insulator Transitions in VO<sub>2</sub> with Ultra-Narrow Carbon Nanotube Electrodes,” *MRS Spring Meeting*, Apr 2017, Phoenix AZ
179. **M.J. Mleckzo, A.C. Yu, Y.C. Shin, C. Smyth, R.M. Wallace, Y. Nishi, E. Pop**, “De-Pinning Metal Contacts to MoTe<sub>2</sub> Using Monolayer h-BN,” *MRS Spring Meeting*, Apr 2017, Phoenix AZ
178. **F. Xiong, E. Yalon, C.J. McClellan, A. Sood, J. Zhang, J. Sun, K.E. Goodson, Y. Cui, E. Pop**, “Probing electrical and thermal properties in electrochemically Li-intercalated MoS<sub>2</sub> nanosheets with Raman spectroscopy,” *MRS Spring Meeting*, Apr 2017, Phoenix AZ
177. **M. Chen, M. Muñoz-Rojo, F. Lian, E. Pop**, “Thermal Switching with Collapsible Graphene Membranes,” *MRS Spring Meeting*, Apr 2017, Phoenix AZ
176. A. Sood, **F. Xiong, H. Wang, Y. Cui, E. Pop, K.E. Goodson**, “Understanding and tuning heat conduction in MoS<sub>2</sub>: cross-plane diffusive-ballistic transport, and dynamic electrochemical Tuning of Thermal Conductivity by Li Intercalation,” *MRS Spring Meeting*, Apr 2017, Phoenix AZ (**Graduate Student Gold Award**)
175. **E. Yalon, K.K.H. Smithe, O.B. Aslan, C. McClellan, F. Xiong, Y.C. Shin, A. Sood, S. Suryavanshi, A.J. Gabourie, R.L. Xu, C. Neumann, K.E. Goodson, T.F. Heinz, E. Pop**, “Thermal Boundary Conductance between Monolayer MoS<sub>2</sub> and SiO<sub>2</sub> via In Situ Raman Spectroscopy of Functioning MoS<sub>2</sub> Transistors,” *MRS Spring Meeting*, Apr 2017, Phoenix AZ
174. O.B. Aslan, **I. Datye, H.-H. Kuo, M. Mleckzo, I. Fisher, E. Pop, T.F. Heinz**, “Probing the Band Structure of Ultrathin MoTe<sub>2</sub> via Strain,” *APS March Meeting*, New Orleans LA, Mar 2017
173. A.K.M. Newaz, A.E. Yore, A. Miller, W. Crumrine, B. Redd, J.A. Tuck, B. Wang, **K.K.H. Smithe, E. Pop**, “Visualization of defect-induced excitonic properties of the edges and grain boundaries in synthesized monolayer molybdenum disulfide,” *APS March Meeting*, New Orleans LA, Mar 2017
172. **K.K.H. Smithe, S. Suryavanshi, C.D. English, E. Pop**, “High-Field Transport and Velocity Saturation in Synthetic Monolayer MoS<sub>2</sub>,” *APS March Meeting*, New Orleans LA, Mar 2017
171. A.K.M. Newaz, **K.K.H. Smithe, K. Ray, A.E. Yore, B. Wang, E. Pop**, “Opto-Electronic Properties of Synthesized Monolayer Molybdenum Disulfide,” *2nd Intl. Symposium on Science & Technology of 2D Materials*, Orlando FL, Feb 2017
170. **F. Xiong, E. Yalon, A. Behnam, C.M. Neumann, K.L. Grosse, S. Deshmukh, E. Pop**, “Towards Ultimate Scaling Limits of Phase-Change Memory,” *IEEE Intl. Electron Devices Meeting (IEDM)*, Dec 2016, San Francisco CA (**Invited Paper**)

169. **C.D. English, K.K.H. Smithe, R.L. Xu**, E. Pop, "Approaching Ballistic Transport in Monolayer MoS<sub>2</sub> Transistors with Self-Aligned 10 nm Top Gates," *IEEE Intl. Electron Devices Meeting (IEDM)*, Dec 2016, San Francisco CA
168. *Y.C Shin*, A. Sood, **K.K.H. Smithe**, K.E. Goodson, E. Pop, "Optical and thermal properties of heterogeneously integrated CVD-grown 2D materials," *MRS Fall Meeting*, Nov 2016, Boston MA
167. **K.K.H. Smithe**, E. Pop, "Large-Grain Synthesis of Monolayer MoSe<sub>2</sub> and WSe<sub>2</sub>," *MRS Fall Meeting*, Nov 2016, Boston MA
166. S. Dutta, Y. Yang, **N. Wang**, E. Pop, V. Cadambe, P. Grover, "Reliable matrix multiplication using error-prone dot-product nanofunctions with an application to logistic regression," *SRC TECHCON*, Sep 2016, Austin TX
165. **N.C. Wang**, S.K. Gonugondla, I. Nahlus, N.R. Shanbhag, E. Pop, "GDOT: A Graphene-Based Nanofunction for Dot-Product Computation," *SRC TECHCON*, Sep 2016, Austin TX (**Best Paper in Session Award**)
164. M. Morea, K. Gu, V. Savikhin, C.S. Fenrich, E. Pop, J.S. Harris, "Optimization of TCR and Heat Transport in Group-IV Multiple-Quantum-Well Microbolometers," *Proc. SPIE*, Aug 2016, San Diego CA
163. Y.K. Koh, **A.S. Lyons**, D.G. Cahill, E. Pop, "Electronic control of phonon heat flow across graphene interfaces," *ASME Summer Heat Transfer Conference*, Jul 2016, Washington DC
162. **C.J. McClellan, M.J. Mleczko, K.K.H. Smithe**, Y. Nishi, E. Pop, "WTe<sub>2</sub> as a Two-Dimensional (2D) Metallic Contact for 2D Semiconductors," *IEEE Device Research Conference (DRC)*, Jun 2016, Univ. Delaware DE
161. *E. Yalon*, **C.J. McClellan, K.K.H. Smithe, Y.C. Shin, R.L. Xu**, E. Pop, "Direct Observation of Power Dissipation in Monolayer MoS<sub>2</sub> Devices," *IEEE Device Research Conference (DRC)*, Jun 2016, Univ. Delaware DE
160. **I.M. Datye, A.J. Gabourie, C.D. English, N.C. Wang**, E. Pop "Reduction of Hysteresis in MoS<sub>2</sub> Transistors Using Pulsed Voltage Measurements," *IEEE Device Research Conference (DRC)*, Jun 2016, Univ. Delaware DE (**Best Poster Award**)
159. **M.J. Mleczko**, C. Zhang, H.R. Lee, H.H. Kuo, B. Magyari-Köpe, Z.-X. Shen, R.G. Moore, I.R. Fisher, Y. Nishi, E. Pop, "Atomically-Thin HfSe<sub>2</sub> Transistors with Native Metal Oxides," *IEEE Device Research Conference (DRC)*, Jun 2016, Univ. Delaware DE
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157. **R.L. Xu, M.J. Mleczko, S. Bohaichuk**, Y. Nishi, E. Pop, "Thermal Limitations of Two-Dimensional Semi-Metallic WTe<sub>2</sub> Devices," *IEEE SNW (Silicon Nanoelectronics Workshop)*, Jun 2016, Honolulu HI
156. **R.S. Luo**, A.R. Alpert, M. Asheghi, E. Pop, K.E. Goodson, "Analytical Model of Graphene-Enabled Ultra-Low Power Phase Change Memory," *ITHERM (Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems)*, Jun 2016, Las Vegas NV
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154. A. Yore, W. Crumrine, **K.K.H. Smithe**, E. Pop, B. Wang, A. Newaz, "Giant blue shifted photoluminescence peak from the edges of CVD grown monolayer MoS<sub>2</sub>," *APS March Meeting*, Mar 2016, Baltimore, MD
153. Y.K. Koh, **A.S. Lyons**, D.G. Cahill, E. Pop, "Electronic control of phonon heat flow across graphene interfaces," *Micro/Nanoscale Heat & Mass Transfer International Conference*, Jan 2016, Singapore
152. **S. Deshmukh**, R. Islam, C. Chen, *E. Yalon*, K.C. Saraswat, E. Pop, "Thermal Modeling of Metal Oxides for Highly Scaled Nanoscale RRAM," *SISPAD*, Sep 2015, Washington DC
151. **S.V. Suryavanshi** and E. Pop, "Physics-based Verilog-A Model for Circuit Simulations of Two-dimensional Semiconductor Devices," *SRC TECHCON*, Sep 2015, Austin TX



150. **N.C. Wang, E.A. Carrion, M.C. Tung** and E. Pop, "Reducing Graphene Device Variability with Yttrium Sacrificial Layers," *SRC TECHCON*, Sep 2015, Austin TX
149. **K.K.H. Smithe, C.D. English**, E. Pop, "Record-High Mobility in Monolayer MoS<sub>2</sub> Devices Grown by Chemical Vapor Deposition," *SRC TECHCON*, Sep 2015, Austin TX
148. P. Pedrinazzi, L. Anzi, M. Fiocco, E. Guerriero, A. Mansouri, *A. Behnam*, **E.A. Carrion**, A. Pesquera, A. Centeno, A. Zurutuza, E. Pop, R. Sordan, "Ultra-low contact resistance in graphene devices," *Graphene Week*, Jun 2015, Manchester UK
147. **K.K.H. Smithe, C.D. English, S.V. Suryavanshi**, E. Pop, "High Mobility in Monolayer MoS<sub>2</sub> Devices Grown by Chemical Vapor Deposition," *IEEE Device Research Conference (DRC)*, Jun 2015, Ohio State OH
146. **S.V. Suryavanshi** and E. Pop, "Physics-Based Compact Model for Circuit Simulations of 2-Dimensional Semiconductor Devices," *IEEE Device Research Conference (DRC)*, Jun 2015, Ohio State OH
145. C.-S. Lee, E. Pop, H.-S.P. Wong, "Compact Modeling and Design Optimization of Carbon Nanotube Field-Effect Transistors for the Sub-10-nm Technology Nodes," *IEEE Device Research Conference (DRC)*, Jun 2015, Ohio State OH
144. **S. Deshmukh, F. Xiong, F. Lian**, Y. Cui, E. Pop, "Characterization of Highly Resistive Nanoscale RRAM Contacts," *MRS Spring Meeting*, Apr 2015, San Francisco CA
143. **K.K.H. Smithe, T.I. Anderson, N.C. Wang**, A.U. Tang, H.-S.P. Wong, E. Pop, "Large-Scale Analysis of Devices from MoS<sub>2</sub> Grown by Chemical Vapor Deposition," *MRS Spring Meeting*, Apr 2015, San Francisco CA
142. **N.C. Wang** and E. Pop, "Reducing Graphene Device Variability with Yttrium Sacrificial Layers," *MRS Spring Meeting*, Apr 2015, San Francisco CA
141. **M.J. Mleczko**, H.H. Kuo, H.R. Lee, B. Magyari-Kope, I. Fisher, Y. Nishi, E. Pop, "Growth and Device Applications of Narrow-Gap Dichalcogenide Semiconductors," *MRS Spring Meeting*, Apr 2015, San Francisco CA
140. A. Sood, **F. Xiong**, H. Wang, **F. Lian, Z. Li**, Y. Cui, E. Pop, K. Goodson, "Tunable thermal conductivity in MoS<sub>2</sub> thin films via Li intercalation," *MRS Spring Meeting*, Apr 2015, San Francisco CA
139. Y. An, B. Wu, *A. Behnam*, E. Pop, A. Ural, "Metal-oxide-semiconductor capacitors based on graphene and p-type silicon," *APS March Meeting*, Mar 2015, San Antonio TX
138. **S. Islam, A.Y. Serov**, I. Meric, J. Lee, D. Akinwande, K. Shepard, E. Pop, "Substrate Dependent High-Field Transport of Graphene Transistors," *SRC TECHCON*, Sep 2014, Austin TX
137. **C.D. English, V.E. Dorgan**, G. Shine, K.C. Saraswat, E. Pop, "Improving Contact Resistance in MoS<sub>2</sub> Field Effect Transistors," *SRC TECHCON*, Sep 2014, Austin TX (**Best Paper in Session Award**)
136. J.-W. Do, **D. Estrada**, X. Xie, N.N. Chang, J.L. Mallek, G.S. Girolami, J.A. Rogers, E. Pop, J.W. Lyding, "Self-Limiting and Selective Nanosoldering of Carbon Nanotube Junctions for Improved Device Performance," *International Conference on Nanoscience + Technology (ICN+T)*, July 2014, Vail CO
135. **A.Y. Serov, V.E. Dorgan, C.D. English**, E. Pop, "Multi-Valley High-Field Transport in 2-Dimensional MoS<sub>2</sub> Transistors," *IEEE Device Research Conference (DRC)*, Jun 2014, Santa Barbara CA
134. **E.A. Carrion, J.D. Wood**, *A. Behnam*, **M.C. Tung**, J.W. Lyding, E. Pop, "Variability of Graphene Mobility and Contacts: Surface Effects, Doping and Strain," *IEEE Device Research Conference (DRC)*, Jun 2014, Santa Barbara CA
133. **C.D. English, G. Shine, V.E. Dorgan**, K.C. Saraswat, E. Pop, "Improving Contact Resistance in MoS<sub>2</sub> Field Effect Transistors," *IEEE Device Research Conference (DRC)*, Jun 2014, Santa Barbara CA
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131. **F. Lian, J.P. Llinas, Z. Li, D. Estrada**, E. Pop, "Thermal Transport in Chirality-Sorted Carbon Nanotube Networks," *MRS Spring Meeting*, Apr 2014, San Francisco CA
130. **A.Y. Serov, V.E. Dorgan, C.D. English**, E. Pop "High-Field Transport in MoS<sub>2</sub> Field-Effect Transistors," *MRS Spring Meeting*, Apr 2014, San Francisco CA
129. **F. Xiong, Y. Dai, A. Behnam**, E. Pop, "Activation Energy of Carbon Nanotube Joule Breakdown in Variable Oxygen Environments," *MRS Spring Meeting*, Apr 2014, San Francisco CA
128. S. Raoux, H.-Y. Cheng, J. Jordan-Sweet, **F. Xiong**, E. Pop, "GaSb-Based Phase Change Materials as Candidates for Phase Change Memory," *MRS Spring Meeting*, Apr 2014, San Francisco CA
127. **C.D. English, V.E. Dorgan**, G. Shine, **F. Xiong**, K.C. Saraswat, E. Pop, "Improving Contact Resistance in MoS<sub>2</sub> Field Effect Transistors," *MRS Spring Meeting*, Apr 2014, San Francisco CA
126. O. Khatib, **J.D. Wood**, G.P. Doidge, G.L. Damhorst, A. Rangarajan, R. Bashir, E. Pop, J.W. Lyding, D.N. Basov, "Graphene-based platform for nano-scale infrared near-field spectroscopy of biological materials," *APS March Meeting*, Mar 2014, Denver CO
125. **Z. Li**, Y. Liu, Y. Xu, W. Duan, E. Pop, "Ballistic Thermal Conductance in Layered Two-Dimensional Materials," *APS March Meeting*, Mar 2014, Denver CO
124. E. Piccinini, A. Cappelli, **F. Xiong**, *A. Behnam*, F. Buscemi, R. Brunetti, M. Rudan, E. Pop, C. Jacoboni, "Novel 3D Random-Network Model for Threshold Switching of Phase-Change Memories," *IEEE Intl. Electron Devices Meeting (IEDM)*, Dec 2013, Washington DC
123. **V.E. Dorgan, C.D. English**, E. Pop, "High-Field Negative Differential Conductance in MoS<sub>2</sub> Field-Effect Transistors," *MRS Fall Meeting*, Nov 2013, Boston MA
122. S. Raoux, H.-Y. Cheng, J. Jordan-Sweet, T. Monin, **F. Xiong**, A. König, D. Garbin, R. Cheek, E. Pop, M. Wuttig "Crystallization properties of Ga-Sb Phase Change Alloys," *EPCOS*, Sep 2013, Berlin, Germany
121. A. Cappelli, E. Piccinini, F. Buscemi, **F. Xiong**, *A. Behnam*, R. Brunetti, M. Rudan, E. Pop, C. Jacoboni, "3D-nHD: transport in a 3D network using the HydroDynamic model," *EPCOS*, Sep 2013, Berlin, Germany
120. **E.A. Carrion, M. Tung, A. Malik**, *A. Behnam*, E. Pop, "Variability of Graphene Transistors: Roles of Contacts and Enhanced Characterization Techniques," *SRC TECHCON*, Sep 2013, Austin TX (**Best Paper in Session Award**)
119. **A.Y. Serov, S. Islam** and E. Pop, "Simulation of realistic graphene transistors including non-ideal behavior," *SRC TECHCON*, Sep 2013, Austin TX
118. **S. Islam, A.Y. Serov, E. Carrion**, E. Pop, "Effect of Channel Length Scaling on Current Saturation in Graphene Transistors," *SRC TECHCON*, Sep 2013, Austin TX
117. **V.E. Dorgan**, *A. Behnam*, H.J. Conley, K.I. Bolotin, E. Pop, "High-Field Electrical and Thermal Transport in Suspended Graphene," *SRC TECHCON*, Sep 2013, Austin TX
116. A. Cappelli, E. Piccinini, **F. Xiong**, *A. Behnam*, R. Brunetti, E. Pop, C. Jacoboni, "3D-nHD: A hydrodynamic model for trap-limited conduction in a 3D network," *IEEE SISPAD*, Sep 2013, Glasgow, Scotland
115. M.P. Gupta, **D. Estrada**, *A. Behnam*, E. Pop, S. Kumar, "Impact of Network Morphology on Electrical Breakdown of Carbon Nanotube Thin-Film Transistors," *InterPACK 2013*, Jul 2013, San Francisco CA
114. P.K. Mohseni, *A. Behnam*, **J.D. Wood, C.D. English**, L. Yu, D. Wasserman, J.W. Lyding, E. Pop, X. Li, "When van der Waals Epitaxy Meets a Commensurate Interface: Self-Segregation of InGaAs Nanowires on Graphene," *Electronic Materials Conf. (EMC)*, Jun 2013, Notre Dame IN
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- Chen, R. Bashir, E. Pop, J.W. Lyding, "Layered Graphene Membranes for Biomolecule Preservation and Programmable Hydration," *Graphene Week*, June 2013, Chemnitz Germany
110. M. Bianchi, L. Rizzi, A. Behnam, **E. Carrion**, E. Guerriero, L. Polloni, E. Pop, R. Sordan, "Cascading Wafer-Scale Integrated Graphene Complementary Inverters in Ambient Air," *E-MRS Spring Meeting*, May 2013, Strasbourg France
109. **J.D. Wood**, G.P. Doidge, J.C. Koepke, **E.A. Carrion**, G. Damhorst, E. Salm, R. Bashir, E. Pop, J.W. Lyding, "Clean Transfer of CVD Graphene for Biomolecule-Graphene Nanosandwiches," *MRS Spring Meeting*, Apr 2013, San Francisco CA
108. C.-L. Tsai, **F. Xiong**, Y. Jiang, **Y. Dai**, E. Pop, M. Shim, "Low-Power  $\text{AlO}_x$ -Based RRAM with Carbon Nanotube Crossbar Electrodes," *MRS Spring Meeting*, Apr 2013, San Francisco CA
107. **K.L. Grosse**, **F. Xiong**, **S. Hong**, W.P. King, E. Pop, "Nanometer-Scale Joule and Peltier Effects at Phase-Change Memory Contacts," *MRS Spring Meeting*, Apr 2013, San Francisco CA
106. M.P. Gupta, A. Behnam, **D. Estrada**, E. Pop, S. Kumar, "Size Effects on Heat Dissipation and Thermal Reliability of Carbon Nanotube Thin-Film Transistors," *MRS Spring Meeting*, Apr 2013, San Francisco CA
105. **F. Lian**, **D. Estrada**, H. Tian, **A.J. Hoag**, **J.P. Llinas**, M.Y. Timmermans, A.G. Nasibulin, E.I. Kauppinen, S. Sinha, E. Pop, "Thermal Imaging and Analysis of Carbon Nanotube Composites," *MRS Spring Meeting*, Apr 2013, San Francisco CA
104. **V.E. Dorgan**, A. Behnam, E. Pop, "High-Field Transport in Suspended Graphene," *MRS Spring Meeting*, Apr 2013, San Francisco CA
103. Y. An, A. Behnam, E. Pop, A. Ural, "Graphene/p-type silicon metal-semiconductor-metal photodetectors," *MRS Spring Meeting*, Apr 2013, San Francisco CA
102. **D. Estrada**, **Z. Li**, S.N. Dunham, G.M. Choi, **N. Wang**, Y. Meng, **F. Lian**, J. Lee, J.-M. Zuo, W.P. King, J.A. Rogers, D.G. Cahill, E. Pop, "Thermal Anisotropy of Layer-by-Layer Assembled Graphene Films," *MRS Spring Meeting*, Apr 2013, San Francisco CA
101. A. Behnam, A. Cappelli, **F. Xiong**, **Y. Dai**, S. Hong, **E. Carrion**, **A.S. Lyons**, E. Piccinini, C. Jacoboni, E. Pop, "Phase Change Memory with Graphene Ribbon Electrodes," *MRS Spring Meeting*, Apr 2013, San Francisco CA
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96. P.K. Mohseni, A. Behnam, **J.D. Wood**, J.W. Lyding, E. Pop, and X. Li, "Van der Waals Epitaxy of Self-Organized  $\text{In}_x\text{Ga}_{1-x}\text{As}/\text{InAs}$  Nanowire Heterostructures on Single Layer Graphene Substrates," *MRS Fall Meeting*, Nov 2012, Boston MA
95. **A.D. Liao**, **C.M. Neumann**, E. Pop, "Probing the Upper Limits of Current Density in One-Dimensional Carbon Interconnects," *MRS Fall Meeting*, Nov 2012, Boston MA
94. **K.L. Grosse**, X. Xie, **F. Xiong**, **M.-H. Bae**, **F. Lian**, **V.E. Dorgan**, J.A. Rogers, E. Pop, W.P. King, "Nanometer-scale Thermometry of Graphene, Carbon Nanotubes, and Phase Change Memory," *Intl. Mechanical Engineering Congress and Expo (IMECE)*, Nov 2012, Houston TX
93. M.P. Gupta, L. Chen, **D. Estrada**, A. Behnam, E. Pop, S. Kumar, "Impact of Network Morphology on Electrical Breakdown of Carbon Nanotube Thin-Film Transistors," *IMECE*, Nov 2012, Houston TX

92. **A.Y. Serov**, E. Pop, "High Field Transport and Velocity Saturation in Graphene Transistors," *SRC TECHCON* 2012, Sep 2012, Austin TX
91. J.-W. Do, **D. Estrada**, X. Xie, N. Chang, G. Girolami, J. Rogers, E. Pop, J. Lyding, "Nanosoldering Carbon Nanotube Junctions with Metal via Local Chemical Vapor Deposition for Improved Device Performance," *IEEE Nano*, Aug 2012, Birmingham UK
90. K.T. He, **J.D. Wood**, G.P. Doidge, E. Pop, J.W. Lyding, "Scanning Tunneling Microscopy Characterization of Graphene-Coated Few-layered Water on Mica," *IEEE Nano*, Aug 2012, Birmingham UK
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87. **A.Y. Serov**, E. Pop, "Grain-Boundary Limited Thermal Transport in Graphene," *Phonons 2012*, Jul 2012, Ann Arbor, MI
86. **Z. Li**, *M.-H. Bae*, **P. Martin**, E. Pop, "Ballistic to Diffusive Crossover of Phonon Flow in Graphene Ribbons," *Phonons 2012*, Jul 2012, Ann Arbor, MI
85. **E. Carrion**, **A. Malik**, *A. Behnam*, **S. Islam**, **F. Xiong**, E. Pop, "Pulsed Nanosecond Characterization of Graphene Transistors," *IEEE Device Research Conference (DRC)*, Jun 2012, State College PA
84. **F. Xiong**, *M.-H. Bae*, **Y. Dai**, **A.D. Liao**, *A. Behnam*, **E. Carrion**, **S. Hong**, D. Ielmini, E. Pop, "Nanowire Phase Change Memory with Carbon Nanotube Electrodes," *IEEE Device Research Conference (DRC)*, Jun 2012, State College PA
83. **N. Wang**, **C.D. English**, E. Pop, "Comparison of Graphene Nanoribbons With Cu and Al Interconnects," *IEEE Device Research Conference (DRC)*, Jun 2012, State College PA
82. **A.Y. Serov**, **Z.-Y. Ong**, **V.E. Dorgan**, Eric Pop, "Role of Screening, Heating, and Dielectrics on High-Field Transport in Graphene," *IEEE Device Research Conference (DRC)*, Jun 2012, State College PA
81. *A. Behnam*, **A. Lyons**, *M.-H. Bae*, E.K. Chow, **S. Islam**, **C.M. Neumann**, E. Pop, "Graphene Nanoribbons from CVD Graphene," *MRS Spring Meeting*, Apr 2012, San Francisco CA
80. *M.-H. Bae*, **Z. Li**, P. Martin, **F. Lian**, E. Pop, "From Ballistic to Diffusive Thermal Transport in Graphene and Graphene Nanoribbons," *MRS Spring Meeting*, Apr 2012, San Francisco CA
79. *A. Behnam*, **D. Estrada**, V. Sangwan, X. Zhong, D. Jariwala, L. Lauhon, T.J. Marks, M.C. Hersam, E. Pop, "Performance Limits and Degradation of Carbon Nanotube Network Transistors," *MRS Spring Meeting*, Apr 2012, San Francisco CA
78. W. Ye, P.A.P. Martin, N. Kumar, **D. Estrada**, S.R. Daly, A.A. Rockett, J.R. Abelson, E. Pop, G.S. Girolami, J.W. Lyding, "Nanometalization of Single-Wall Carbon Nanotubes and Graphene Quantum Dots," *ACS (American Chemical Society) 243rd National Meeting*, Mar 2012, San Diego CA
77. **J.D. Wood**, S. Schmucker, G. Doidge, T. Krawczyk, **A.S. Lyons**, E. Pop, J.W. Lyding, "Crystallographic effects of copper substrate on graphene growth and fluorination," *APS March Meeting*, Mar 2012, Boston MA
76. **A.D. Liao**, **C. Neumann**, E. Pop, "Fundamental Limits of Current Flow in One-dimensional Carbon Nanomaterials," *APS March Meeting*, Mar 2012, Boston MA
75. G. Doidge, **J.D. Wood**, E. Pop, J.W. Lyding, "Confinement of organic solvents by wet transfer of graphene," *APS March Meeting*, Mar 2012, Boston MA
74. M.P. Gupta, **D. Estrada**, E. Pop, S. Kumar, "Impact of Contact Resistances on Electrical and Thermal Transport in Carbon Nanotube Network Transistors," *ASME Micro/Nanoscale Heat & Mass Transfer Intl. Conf.*, Mar 2012, Atlanta GA
73. V. Solovyeva, E. Chow, *M.-H. Bae*, **D. Estrada**, S. Banerjee, *A. Behnam*, **V.E. Dorgan**, W.J. Chang, E. Pop, R. Bashir, "New technique of DNA sensing: transverse nanoribbon electrodes," *Biophysical*

*Society 56th Annual Meeting*, Feb 2012, San Diego CA

72. **J.D. Wood**, K.T. He, E. Pop, J.W. Lyding, "Scanning Tunneling Microscopy and Nanomanipulation of Graphene-Coated Water on Mica," *AVS Meeting* 2011, Oct 2011, Nashville TN
71. **A. Liao**, J. Wu, X. Wang, K. Tahy, D. Jena, H. Dai, E. Pop, "Thermally-Limited Current Carrying Ability of Graphene Nanoribbons," *SRC TECHCON*, Sep 2011, Austin TX
70. **F. Xiong**, *M.-H. Bae*, **A. Liao**, **Y. Dai**, E. Pop, "Phase-Change Memory Nanowires with Self-Aligned Carbon Nanotube Electrodes," *SRC TECHCON*, Sep 2011, Austin TX (**Best Paper in Session Award**)
69. **S. Islam**, *M.-H. Bae*, **V. Dorgan**, E. Pop, "Effect of Oxide Thickness Scaling on Self-Heating in Graphene Transistors," *IEEE Device Research Conference (DRC)*, Jun 2011, Santa Barbara CA
68. **A. Lyons**, *A. Behnam*, E.K. Chow, E. Pop, "Transport Properties of CVD-Grown Graphene Nanoribbon Field-Effect Transistors," *IEEE Device Research Conference (DRC)*, Jun 2011, Santa Barbara CA
67. M.Y. Timmermans, **D. Estrada**, A.G. Nasibulin, E. Pop, E.I. Kauppinen, "Optimizing Carbon Nanotube Network Morphology for Thin Film Transistors," *Nanotubes-11 (NT11)*, Jul 2011, Cambridge, UK
66. **D. Estrada**, **C.-M. Chin**, **D. Ortigara**, E. Pop, "Dissipation and Breakdown in Carbon Nanotube Network Transistors," *Nanotubes* 2011 (NT11), Jul 2011, Cambridge, UK
65. **A. Liao**, J. Wu, X. Wang, K. Tahy, D. Jena, H. Dai, E. Pop, "Thermally-Limited Current Carrying Ability of Graphene Nanoribbons," *Graphene* 2011, Apr 2011, Bilbao, Spain
64. **A.S. Lyons**, E.K. Chow, **V.E. Dorgan**, E. Pop, "Large Scale CVD Graphene Nanoribbon Transistors with High- $\kappa$  Dielectrics and Top Gates," *Graphene* 2011, Apr 2011, Bilbao, Spain
63. **J.D. Wood**, S.W. Schmucker, J.C. Koepke, **A.S. Lyons**, E. Pop, J.W. Lyding, "Effects of Polycrystalline Cu Substrate on Graphene Growth by Chemical Vapor Deposition," *Graphene* 2011, Apr 2011, Bilbao, Spain
62. J. Koepke, **J.D. Wood**, **D. Estrada**, E. Pop, J.W. Lyding, "Atomic Scale Electronic Characterization of Grain Boundaries in Graphene Grown by Chemical Vapor Deposition on Copper Foil," *Graphene* 2011, Apr 2011, Bilbao, Spain
61. **J.D. Wood**, S.W. Schmucker, **A.S. Lyons**, E. Pop, J.W. Lyding, "Copper Crystallographic Dependence for Graphene Grown by Chemical Vapor Deposition," *MRS Spring Mtg.*, Apr 2011, San Francisco CA
60. **F. Xiong**, *M.-H. Bae*, **A. Liao**, **Y. Dai**, E. Pop, "GST Nanowires with Self-aligned Carbon Nanotube Electrodes," *MRS Spring Meeting*, Apr 2011, San Francisco CA
59. **J. Wood**, S. Sivapalan, **V. Dorgan**, C. Murphy, E. Pop, J.W. Lyding, "Aligned, ultra-long graphene nanoribbon network fabrication by nanowire etch masks," *APS March Meeting*, Mar 2011, Dallas TX
58. **Z.-Y. Ong**, E. Pop, "Surprising Effects of Substrate on Thermal Transport in Supported Graphene," *APS March Meeting*, Mar 2011, Dallas TX
57. J. Koepke, **D. Estrada**, **J. Wood**, E. Pop, J. Lyding, "Scanning Tunneling Microscopy Study of Grain Boundaries in Graphene Grown by Chemical Vapor Deposition on Copper Foil," *APS March Meeting*, Mar 2011, Dallas TX
56. **F. Xiong**, **A. Liao**, *M.-H. Bae*, **D. Estrada**, E. Pop, "Integrating Carbon-Based Nanoelectronics with Chalcogenide Phase Change Memory," *IEEE EDSSC*, Dec 2010, Hong Kong
55. **K. Grosse**, *M.-H. Bae*, **F. Lian**, E. Pop, W.P. King, "Current Crowding, Joule Heating, and Peltier Cooling at Graphene Device Contacts," *MRS Fall Meeting*, Nov 2010, Boston MA
54. M. Rudan, F. Giovanardi, **T. Tsafack**, **F. Xiong**, E. Piccinini, F. Buscemi, **A. Liao**, E. Pop, R. Brunetti, C. Jacoboni, "Modeling of the Voltage Snap-Back in Amorphous-GST Memory Devices," *SISPAD*, Sep 2010, Bologna Italy
53. **V. Dorgan**, *M.-H. Bae*, E. Pop, "Mobility and Velocity-Field Relationship in Graphene above Room Temperature," *SRC TECHCON*, Sep 2010, Austin TX
52. **A. Liao**, R. Alizadegan, **S. Dutta**, **Z.-Y. Ong**, K. J. Hsia, E. Pop, "Thermal Dissipation, Reliability, and Breakdown of Single-Wall Carbon Nanotubes," *SRC TECHCON*, Sep 2010, Austin TX

51. **D. Estrada, S. Dutta, A. Liao**, E. Pop, "Pulsed characterization for hysteresis-free carbon nanotube mobility measurements," *Nanotubes 2010 (NT10)*, June 2010, Montreal, Canada
50. **J. D. Wood**, V. Nazareth, J. W. Lyding, E. Pop, "Wafer-Scale Carbon Nanotube Alignment and Interaction on Hydrophobic and Hydrophilic Surfaces," *Nanotubes 2010 (NT10)*, Montreal Canada
49. **F. Xiong, A. Liao, D. Estrada**, E. Pop, "Ultra-Low Power Phase Change Memory with Carbon Nanotube Interconnects," *IEEE Device Research Conference (DRC)*, June 2010, Notre Dame IN
48. **V. Dorgan, M.-H. Bae**, E. Pop, "Mobility and Velocity-Field Relationship in Graphene," *IEEE Device Research Conference (DRC)*, June 2010, Notre Dame IN
47. **S. Dutta, S. Prakash, D. Estrada**, E. Pop, "A Web Service and Interface for Electronic Device Characterization," *American Society of Engineering Education (ASEE) Annual Conference & Expo*, June 2010, Louisville KY
46. **V. Dorgan, M.-H. Bae**, E. Pop, "Mobility and High-Field Velocity Saturation in Graphene," *6th Intl. Nanotechnology Conference on Communication & Cooperation (INC6)*, May 2010, Grenoble, France
45. Y. K. Koh, **M.-H. Bae**, E. Pop, D. G. Cahill, "Thermal Conductance of Monolayer and Few-Layer Graphenes," *MRS Spring Meeting*, Apr 2010, San Francisco CA
44. **A. Liao, S. Dutta, Z.-Y. Ong**, E. Pop, "Joule Breakdown and Thermal Dissipation of Carbon Nanotubes with SiO<sub>2</sub> Substrates," *MRS Spring Meeting*, Apr 2010, San Francisco CA
43. **M.-H. Bae, Z.-Y. Ong, D. Estrada**, E. Pop, "Infrared imaging of power dissipation in graphene field effect transistors," *APS March Meeting*, Mar 2010, Portland OR
42. **Z.-Y. Ong** and E. Pop, "Molecular dynamics simulation of carbon nanotube to SiO<sub>2</sub> heat dissipation," *APS March Meeting*, Mar 2010, Portland OR
41. C. Richter, O. Jurchescu, X. Liang, D. Gundlach, **A. Liao**, E. Pop, "Noise in single-wall carbon nanotubes under high electric field stress," *APS March Meeting*, Mar 2010, Portland OR
40. **D. Estrada, A. San Miguel, R. Pecora**, E. Pop, "Tailored ON/OFF ratio of nanotube network transistors by pulsed breakdown," *IEEE Intl. Semic. Device Research Symposium (ISDRS)*, Univ. Maryland, College Park MD, Dec 2009
39. **F. Xiong, A. Liao**, E. Pop, "Ultra-Low Current Phase-Change Antifuse with Carbon Nanotube Electrodes," *IEEE Non-Volatile Memory Technology Symposium (NVMTS)*, Oct 2009, Portland OR
38. E. Pop, **M.-H. Bae, D. Estrada, A. Liao, Z.-Y. Ong, F. Xiong**, "Energy Efficiency in Nanoscale Electronic Devices," *NANO-DDS*, Oct 2009, Ft Lauderdale FL
37. **Z.-Y. Ong** and E. Pop, "Molecular Dynamics Simulation of Thermal Boundary Resistance Between Carbon Nanotubes and SiO<sub>2</sub>," *SRC TECHCON*, Sep 2009, Austin TX
36. **A. Liao, F. Xiong**, K. Darmawikarta, J. Abelson, E. Pop, "Chalcogenide Phase Change Induced with Single-Wall Carbon Nanotube Heaters," *SRC TECHCON*, Sep 2009, Austin TX
35. **P. Martin, Z. Aksamija**, E. Pop, U. Ravaoli, "Prediction of Reduced Thermal Conductivity in Nano-Engineered Rough Semiconductor Nanowires," *EDISON 16*, Aug 2009, Montpellier France
34. **M.-H. Bae, Z.-Y. Ong, D. Estrada**, E. Pop, "Infrared Microscopy of Joule Heating in Graphene Field Effect Transistors," *IEEE Nano*, July 2009, Genoa Italy
33. **B. Ramasubramanian** and E. Pop, "Comparison of Energy Relaxation in One-Dimensional Thermionic and Tunneling Transistors," *IEEE Nano*, July 2009, Genoa Italy
32. **D. Estrada, S. Dutta, A. Liao**, E. Pop, "Reduction of Hysteresis in Mobility Measurements of Carbon Nanotube Transistors by Pulsed Characterization," *IEEE Device Research Conference (DRC)*, Jun 2009, State College PA
31. **A. Liao, F. Xiong**, K. Darmawikarta, J. Abelson, E. Pop, "Chalcogenide Phase Change Induced with Single-Wall Carbon Nanotube Heaters," *IEEE Device Research Conference (DRC)*, Jun 2009, State College PA
30. **Z.-Y. Ong** and E. Pop, "Molecular dynamics simulation of interfacial thermal resistance between a (10,10) carbon nanotube and SiO<sub>2</sub>," *MRS Spring Mtg.*, Apr 2009, San Francisco CA

29. **I. Chen** and E. Pop, "Compact Thermal Model for Segmented Nanowire Phase Change Memory Cell," *MRS Spring Mtg.*, Apr 2009, San Francisco CA
28. K. Darmawikarta, B. Lee, S. Raoux, **A. Liao**, E. Pop, S. Bishop, J. Abelson, "Analysis of Nanoscale Transformation of Phase Change Materials," *MRS Spring Mtg.*, Apr 2009, San Francisco CA
27. **Z.-Y. Ong**, E. Pop, "A Two-Temperature Model of Narrow-Body Silicon Transistors under Steady State and Transient Operation," *ASME 3<sup>rd</sup> Energy Nanotech. Conf. (ENIC)*, Jacksonville FL, Aug 2008
26. **A. Liao**, E. Pop, "Impact Ionization in Semiconducting Single Wall Carbon Nanotubes," *IEEE Device Research Conference (DRC)*, Santa Barbara CA, Jun 2008
25. E. Pop, "Role of Electrical and Thermal Contact Resistance in the High-Bias Joule Breakdown of Single-Wall Carbon Nanotube Devices," *IEEE Device Research Conf. (DRC)*, Jun 2007, Notre Dame IN
24. S. Verma, E. Pop, P. Kapur, P. Majhi, K. Parat, K. Saraswat, "Feasibility Study of Composite Dielectric Tunnel Barriers for Flash Memory," *IEEE Device Research Conf. (DRC)*, Jun 2007, Notre Dame IN
23. E. Pop, "Heat Generation and Transport in SOI and GOI Devices," *211th Electrochemical Society (ECS) Meeting*, SOI Symposium, May 2007, Chicago IL
22. D. Mann, Y. K. Kato, E. Pop and H. Dai, "Electro-thermal Light Emission in Individual Metallic Single-walled Carbon Nanotubes," *MRS Spring Meeting*, Apr 2007, San Francisco CA
21. J. Reifenberg, S. Kim, Y. Zhang, E. Pop, H.-S. P. Wong, K. Goodson, "Phase Transitions and Thermal Properties of GeSbTe," *MRS Spring Meeting*, Apr 2007, San Francisco CA
20. Y. K. Kato, D. Mann, A. Kinkhabwala, E. Pop, J. Cao, X. Wang, L. Zhang, Q. Wang, J. Guo and H. Dai, "Electrically driven thermal light emission from individual single-walled carbon nanotubes," *APS March Meeting*, Mar 2007, Denver CO
19. J. Reifenberg, E. Pop, A. Gibby, S. Wong and K. Goodson, "Multiphysics Modeling and Impact of Thermal Boundary Resistance in Phase Change Memory Devices," *ITHERM*, May 2006, San Diego CA
18. M. Panzer, G. Zhang, D. Mann, X. Hu, E. Pop, H. Dai, K. Goodson, "Thermal Properties of Metal-Coated Vertically-Aligned Single Wall Nanotube Films," *ITHERM*, p. 1306, May 2006, San Diego, CA
17. D. Mann, E. Pop, H. Dai, "Hot Phonons in Suspended Carbon Nanotubes," *Electrochemical Society (ECS) 209th Meeting*, May 2006, Denver CO
16. D. Mann, E. Pop, J. Cao, H. Dai, "Self-Heating and Non-Equilibrium Optical Phonons in Suspended Carbon Nanotubes," *APS March 2006 Meeting*, Baltimore, MD
15. E. Pop, D. Mann, J. Reifenberg, K. Goodson and H. Dai, "Electro-Thermal Transport in Metallic Single-Wall Carbon Nanotubes for Interconnect Applications," *IEEE Intl. Electron Devices Meeting (IEDM)*, pp. 253-256, Dec. 2005, Washington, DC
14. J. Rowlette, E. Pop, S. Sinha, M. Panzer and K. Goodson, "Thermal Phenomena in Deeply Scaled MOSFETs," *IEEE Intl. Electron Devices Meeting (IEDM)*, pp. 984-987, Dec. 2005, Washington, DC
13. J. Rowlette, E. Pop, S. Sinha, M. Panzer and K. Goodson, "Thermal Simulation Techniques for Nano-Transistors," *IEEE-ACM ICCAD*, pp. 225-228, Nov. 2005, San Jose CA
12. J. Rowlette, E. Pop, S. Sinha, R. Dutton and K. Goodson, "Coupled Electron-Phonon Transport in Nanometer-Scale Silicon Devices," *SRC TECHCON*, Oct. 2005, Portland OR
11. E. Pop, J. Rowlette, R. Dutton and K. Goodson, "Joule Heating under Quasi-Ballistic Transport Conditions in Bulk and Strained Silicon Devices," *SISPAD*, p. 307-310, Sep. 2005, Tokyo Japan
10. E. Pop, C. O. Chui, S. Sinha, R. Dutton, K. Goodson, "Electro-Thermal Comparison and Performance Optimization of Thin-Body SOI and GOI MOSFETs," *IEEE Intl. Electron Devices Meeting (IEDM)*, pp. 411-414, Dec. 2004, San Francisco, CA
9. S. Sinha, E. Pop, K. Goodson, "A Split-Flux Model for Phonon Transport Near Hotspots," *ASME Intl. Mechanical Engineering Congress and Expo (IMECE)*, Nov. 2004, Anaheim, CA
8. E. Pop, K. Goodson, R. Dutton, "Thermal Analysis of Ultra-Thin Body Device Scaling," *IEEE Intl. Electron Devices Meeting (IEDM)*, pp. 883-886, Dec. 2003, Washington DC

7. E. Pop, K. Goodson, R. Dutton, "Detailed Heat Generation Simulations via the Monte Carlo Method," *SISPAD*, pp. 121-124, Sep. 2003, Boston MA
6. E. Pop, K. Goodson, R. Dutton, "Monte Carlo Simulation of Heat Generation in Silicon Nano-Devices," *SRC TECHCON*, Aug. 2003, Dallas TX (**Best Paper in Session Award**)
5. E. Pop, S. Sinha, K. Goodson, "Monte Carlo Modeling of Heat Generation in Electronic Nanostructures," *ASME Intl. Mech. Eng. Congress and Expo (IMECE)*, Nov. 2002, New Orleans, LA
4. E. Pop, "Heat Generation in Three- and Two-Dimensional Nanostructures," *SRC TECHCON*, Sep. 2002, Dallas, TX (**Outstanding Research Presentation Award**)
3. E. Pop, K. Banerjee, P. Sverdrup, R. Dutton, K. Goodson, "Localized Heating Effects and Scaling of Sub-0.18 Micron CMOS Devices", *IEEE Intl. Electron Dev. Mtg. (IEDM)*, p. 677, Dec. 2001, Washington DC
2. P. Sverdrup, S. Sinha, E. Pop, O. Tornblad, R. Dutton, K. Goodson. "Advanced Electro-Thermal Modeling and Simulation Techniques for Deep Sub-Micron Devices," *SRC TECHCON*, Sep. 2000, Phoenix AZ
1. J. Slinkman, E. Pop, W. Clark, "Temperature Dependence of Subthreshold Current in Submicron Metal-Oxide-Silicon Field Effect Transistors," *APS March Meeting*, Mar 1998, Los Angeles CA

### **Invited Presentations (plenaries, keynotes, tutorials and awards in bold)**

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- 207. Virtual Graphene 2021 Keynote, Grenoble France, Nov 2021**
- 206. IIRW (Intl. Integrated Reliability Workshop) Tutorial, Oct 2021**
205. Univ. Michigan MSE Department Seminar, Sep 2021
204. National Research Council of Canada (NRC-CNRC), Aug 2021
203. 3rd International Memory Symposium, Hong Kong, May 2021
- 202. CarbOnlineHagen Keynote, Copenhagen Denmark, Apr 2021, <http://www.carbonhagen.com>**
201. Wayne State Physics Seminar (via Zoom), Oct 2020
200. SSDM (Intl. Conference on Solid State Devices & Materials), Tokyo Japan (via Zoom), Sep 2020
199. Micron Summer Intern Seminar (via Zoom), Jun 2020
198. Yonsei University Seminar, Seoul Korea, Feb 2020
197. Samsung Seminar, Seoul Korea, Feb 2020
196. SK Hynix Seminar, Seoul Korea, Feb 2020
- 195. Nano-KISS (Korean Intl. Summer School on Nanoelectronics), KCS, Korea, Feb 2020**
194. Micron Seminar, Boise, ID, Feb 2020
193. Boise State Materials Research Seminar, Boise, ID, Feb 2020
192. "How to Prepare for the Academic Interview," Stanford BEAM (Career Services) Seminar, Stanford CA, Jan 2020
191. UC Berkeley, Berkeley CA, Dec 2019
190. WINDS (Workshop on Innovative Nanoscale Devices and Systems), Waimea HI, Dec 2019
189. Duke University, Durham NC, Oct 2019
188. IEEE NVMTS (Non-Volatile Memory Technology Symposium), Durham NC, Oct 2019
187. IMEC Memory Workshop, Leuven Belgium, Oct 2019
186. Apple Seminar, Cupertino CA, Oct 2019
185. SLAC SSRL/LCLS Users' Meeting, Sep 2019
- 184. "2D Materials: From Fundamentals to Spintronics" Workshop, Natal Brazil, Sep 2019**
183. Peking University, Beijing China, Sep 2019
182. Tsinghua University, Beijing China, Sep 2019
181. Beijing Information Science & Technology University (BISTU), Beijing China, Sep 2019



- 180. IEEE DRC (Device Research Conference) Rump Session, Ann Arbor, MI, Jun 2019**
- 179. IEEE SNW (Silicon Nanoelectronics Workshop), Kyoto Japan, Jun 2019
- 178. IEEE VLSI Symposium Workshop on 2D Materials & Applications, Kyoto Japan, Jun 2019**
- 177. US-EU Workshop on 2D Layered Materials and Devices, State College PA, May 2019
- 176. "Let's Have an Awesome Time Doing Science" (LHAATDS) Workshop, Stanford CA, May 2019
- 175. Micron Seminar, Boise ID, Apr 2019
- 174. IEEE WMED (Workshop on Microelectronics & Electron Devices), Boise ID, Apr 2019**
- 173. MRS Spring Meeting (Symposium QN03), Phoenix AZ, Apr 2019
- 172. MRS Spring Meeting (Symposium EP08), Phoenix AZ, Apr 2019
- 171. MIT MTL Seminar, Cambridge MA, Mar 2019
- 170. APS (American Physical Society) March Meeting, Boston MA, Mar 2019
- 169. UIUC MNTL Seminar, Urbana IL, Feb 2019
- 168. Stanford GLAM Condensed Matter Seminar, Stanford CA, Feb 2019
- 167. Apple Seminar, Cupertino CA, Jan 2019
- 166. Applied Materials (AMAT) Seminar, Santa Clara CA, Jan 2019
- 165. Eurotherm Nanoscale & Microscale Heat Transfer VI (NMHT), Levi, Finland, Dec 2018**
- 164. Stanford BEAM (Career Services) Future Faculty Seminar, Stanford CA, Oct 2018
- 163. AVS (American Vacuum Society) 65th Intl. Symposium & Exhibition, Long Beach CA, Oct 2018
- 162. IEEE NMDC (Nanotechnology Materials & Devices Conf.), Portland OR, Oct 2018
- 161. E\PCOS (European Phase-Change and Ovonic Symposium), Catania, Italy, Sep 2018
- 160. CEA-LETI Seminar, Grenoble France, Sep 2018
- 159. Graphene Week, San Sebastian Spain, Sep 2018
- 158. SSDM (Intl. Conference on Solid State Devices & Materials), Tokyo Japan, Sep 2018**
- 157. Graphene 2018 Keynote, Dresden Germany, Jun 2018**
- 156. Lawrence Symposium, Arizona State Univ., Phoenix AZ, Feb 2018
- 155. Rising Stars Workshop, Stanford CA, Nov 2017
- 154. Stanford BEAM (Career Services) Future Faculty Seminar, Stanford CA, Oct 2017
- 153. US-EU Workshop on 2D Layered Materials and Devices, Arlington VA, Oct 2017
- 152. MIT S3TEC Seminar, Cambridge MA, Sep 2017
- 151. Micron Seminar, Boise ID, Sep 2017
- 150. Lund University Colloquium, Lund Sweden, Aug 2017
- 149. Carbonhagen Keynote (8th Symposium on 2D Materials), Copenhagen, Aug 2017**
- 148. IEEE NANO, Pittsburgh PA, Jul 2017
- 147. EDISON 20 Keynote (Intl. Conf. Electron Dynamics Semic., Opto., Nano.), Buffalo NY, Jul 2017**
- 146. Western Digital, San Jose CA, Jun 2017
- 145. IEEE DRC (Device Research Conf.), Phase-Change Memory tutorial, Notre Dame IN, Jun 2017**
- 144. "Nanoscale Energy, Thermal & Thermoelectric Effects" short course, Univ. Pisa, Italy, Jun 2017**
- 143. UT Austin, NASCENT Colloquium, Austin TX, May 2017
- 142. IEEE ICICDT (Intl. Conf. IC Design & Tech.), Austin TX, May 2017
- 141. UC Santa Cruz, EE Colloquium, Santa Cruz CA, Apr 2017
- 140. MRS Spring Meeting (Symposium NM2), Phoenix AZ, Apr 2017
- 139. MRS Spring Meeting (Symposium NM1), Phoenix AZ, Apr 2017
- 138. 2nd Intl. Symposium on Science & Technology of 2D Materials, Orlando FL, Feb 2017
- 137. Northrop Grumman NG Next Workshop, Redondo Beach CA, Jan 2017
- 136. Monash Univ., Melbourne Australia, Jan 2017

135. IEEE IEDM (Intl. Electron Devices Meeting), San Francisco CA, Dec 2016
134. Stanford BEAM (Career Services) Future Faculty Seminar, Stanford CA, Oct 2016
133. 2Dfun (2D Functional MX2-Graphene Heterostructures) Workshop, IMEC, Leuven Belgium, Oct 2016
132. EU-US Workshop on 2D Layered Materials and Devices, Manchester UK, Oct 2016
131. IEEE SFBA Nanotechnology Council, Santa Clara CA, Sep 2016
130. CEA-LETI Seminar, Grenoble France, Sep 2016
129. STW (Steep Transistor Workshop), Lausanne Switzerland, Sep 2016
128. StarNET LEAST & SONIC Beyond CMOS Circuits & Systems Workshop, Notre Dame IN, Aug 2016
127. TSMC R&D Technical Forum, Jul 2016
126. IEEE Electron Devices Society (EDS) Santa Clara Valley Chapter, Santa Clara CA, Jul 2016
125. InterPACK Workshop on IOT Packaging, Santa Clara CA, Jun 2016
- 124. Univ. Minnesota 2D Summer School, Minneapolis MN, Jun 2016**
123. E-MRS (European Materials Research Society) Spring Meeting, Lille, France, May 2016
122. ON Semiconductor, Phoenix, AZ, Mar 2016
121. MRS Spring Meeting, Phoenix AZ, Mar 2016
120. SPIE Photonics West, San Francisco CA, Feb 2016
119. DARPA MTO Unplugged Offsite Meeting, Warrensburg VA, Jan 2016
118. Samsung R&D Future Technology Seminar, Hwaseong, Korea, Oct 2015
- 117. Nano-KISS (Korean Intl. Summer School on Nanoelectronics), ETRI, Daejeon Korea, Oct 2015**
116. IEEE NMDC (Nanotechnology Materials and Devices Conference), Anchorage AK, Sep 2015
115. Intl. Materials Research Congress (MRS-IMRC), Cancun Mexico, Aug 2015
114. IEEE NANO, Rome Italy, Jul 2015
113. USC, MHI Distinguished Speaker Series, Los Angeles CA, Jun 2015
112. MRS Spring Meeting, San Francisco CA, Apr 2015
111. US-EU Workshop on 2D Layered Materials and Devices, Arlington VA, Apr 2015
110. SystemX Alliance Seminar, Stanford CA, Apr 2015
- 109. NanoTechnology for Defense Conference (NT4D) 2D devices tutorial, Chantilly VA, Nov 2014**
108. AVS (American Vacuum Society), Baltimore MD, Nov 2014
- 107. "Thermoelectrics 101," GCEP Symposium, Stanford CA, Oct 2014**
- 106. ESSDERC (European Solid-State Device Conference) plenary talk, Venice Italy, Sep 2014**
105. Army Research Lab (ARL) 2D Technology Applications Meeting, Adelphi MD, Aug 2014
104. Tsukuba Nanotechnology Symposium 2014 (TNS'14), Tsukuba Japan, Jul 2014
103. US-Japan Joint Seminar on Nanoscale Transport Phenomena, Santa Cruz CA, Jul 2014
102. Lockheed-Martin Space Systems Company (LMCO), Palo Alto CA, Jun 2014
- 101. Japan-America Frontiers of Engineering Symposium (JAFOE), Tokyo Japan, Jun 2014**
100. SPIE DSS (Defense, Security, Sensing), Baltimore MD, May 2014
99. Micron Seminar, Boise ID, May 2014
98. Boise State University (BSU) Colloquium, Boise ID, May 2014
97. Applied Materials (AMAT) Seminar, Santa Clara CA, Jan 2014
96. Sandia Labs "Beyond Moore Workshop," Albuquerque NM, Jan 2014
95. DARPA DSRC (Defense Sciences Research Council), Arlington VA, Jan 2014
94. ISDRS (Intl. Semiconductor Device Research Symposium), Bethesda MD, Dec 2013
93. IEEE IEDM (Intl. Electron Devices Meeting), Washington DC, Dec 2013
92. Stanford MSE (Materials Science and Engineering) Colloquium, Stanford CA, Nov 2013
91. SLAC (Stanford Linear Accelerator Center) SIMES Seminar, Palo Alto CA, Oct 2013

90. UC Berkeley Nanoscience and Nanoengineering Institute (BNNI) Seminar, Oct 2013
89. NRL (Naval Research Lab), Alexandria VA, Oct 2013
88. Stanford Precourt Institute for Energy (PIE) Energy Seminar, Stanford CA, Sep 2013
87. EMS (Electronic Materials Symposium), Santa Clara CA, Sep 2013
86. Univ. Erlangen Colloquium, Erlangen Germany, Sep 2013
85. E\PCOS (European Phase-Change and Ovonic Symposium), Berlin, Germany, Sep 2013
84. PTES (First International Conference on Phononics and Thermal Energy Science), Shanghai, China, Sep 2013
83. IWCE (Intl. Workshop Computational Electronics), Nara, Japan, Jun 2013
82. Keio University EE Seminar, Tokyo, Japan, Jun 2013
81. Univ. Tokyo ME Seminar, Tokyo, Japan, Jun 2013
80. HGST (Hitachi Global Storage Technologies) seminar, San Jose CA, May 2013
79. Stanford Energy & Environment Affiliates Program (EEAP), Stanford CA, May 2013
78. UT Austin, Nanoscale Thermal Energy Symposium, Austin TX, May 2013
77. Intel Corp., memory seminar, Santa Clara CA, Apr 2013
76. MRS Spring Meeting, San Francisco CA, Apr 2013
75. Univ. Minnesota, Mechanical Engineering Colloquium, Minneapolis MN, Mar 2013
74. Beckman Institute Director's Seminar, Univ. Illinois Urbana-Champaign, Urbana IL, Jan 2013
73. MRS Fall Meeting, Boston MA, Nov 2012
72. IEEE Nanotechnology Materials and Devices Conf. (IEEE-NMDC), Honolulu HI, Oct 2012
71. Wright-Patterson Air Force Research Labs (AFRL), Dayton OH, Oct 2012
70. Intl. Materials Research Congress (MRS-IMRC), Cancun Mexico, Aug 2012
69. CMOS Emerging Technologies (ET) Conference, Vancouver BC, Canada, Jul 2012
68. Silicon Nanoelectronics Workshop (IEEE-SNW), Honolulu HI, June 2012
67. IEEE Intl. Conference on IC Design and Technology (IEEE-ICICDT), Austin TX, May 2012
66. UT Dallas, Materials Science & Engineering Seminar, Dallas TX, May 2012
65. U. Washington, Center for Nanotechnology Seminar, Seattle WA, Apr 2012
64. MRS Spring Meeting, San Francisco CA, Apr 2012
63. MIT, EECS Seminar, Cambridge MA, Apr 2012
62. Georgia Tech, MRSEC Seminar Series, Atlanta GA, Mar 2012
61. TU Delft, Quantum Nanoscience Seminar, Netherlands, Mar 2012
- 60. "The Device-to-System Spectrum – A Tutorial on IC Design with Nanomaterials," co-taught tutorial at *Design, Automation & Test in Europe (DATE)*, Dresden, Germany, Mar 2012**
59. Stanford, Electrical Engineering seminar, Stanford CA, Feb 2012
58. Cornell, joint Physics and EE seminar, Ithaca NY, Feb 2012
57. RPI, joint Materials Science and Mechanical Engineering Colloquium, Troy NY, Feb 2012
56. Stanford, Materials Science & Engineering Colloquium, Stanford CA, Nov 2011
55. Purdue, Electrical & Computer Engineering Colloquium, West Lafayette IN, Nov 2011
54. Univ. Missouri, Dept. Physics O.M. Stewart Colloquium, Columbia MO, Oct 2011
53. UIUC Condensed Matter Physics Colloquium, Urbana IL, Oct 2011
52. Politecnico di Milano, Milano Italy, Sep 2011
51. Micron and STMicroelectronics, Agrate Italy, Sep 2011
50. E\PCOS, Zurich Switzerland, Sep 2011 (**Outstanding Oral Presentation Award**)
49. NANO-DDS, Brooklyn NY, Aug 2011
48. Nanotubes 2011, Graphene Satellite Workshop, Cambridge UK, July 2011

47. Albany Nanotechnology Center (IBM and Global Foundries), Albany NY, July 2011
46. DARPA DSRC (Defense Sciences Research Council), Norfolk VA, June 2011
45. CalTech, Applied Physics Colloquium, Pasadena CA, May 2011
44. MIT, Mechanical Eng. Seminar, Cambridge MA, May 2011
43. FET11 Conference, Micro-Energy ICT Panel, Budapest, Hungary, May 2011
42. UC Berkeley, EECS Seminar, Berkeley CA, April 2011
41. APS March 2011 Meeting, Dallas TX, Mar 2011
40. MRS Fall 2010 Meeting, Boston MA, Nov 2010
39. D. Estrada and E. Pop, Argonne National Labs, Argonne IL, Oct 2010
38. Washington U., Applied Physics Seminar, St. Louis MO, Oct 2010
37. Carbon Electronics Workshop, SUNY Albany, Sep 2010
36. SRC Compact Modeling Workshop, Berkeley CA, Aug 2010
35. Wright-Patterson Air Force Research Labs (AFRL), Dayton OH, July 2010
34. TIENCS Workshop, Natl. Univ. Singapore (NUS), Singapore, July 2010
33. UGIM Symposium, Purdue University, West Lafayette IN, June 2010
32. Univ. Wisconsin, Madison WI, Apr 2010
31. M.-H. Bae, Z.-Y. Ong, D. Estrada, E. Pop, ECS Meeting, Vancouver BC, Canada, Apr 2010
30. ECS Meeting, Vancouver BC, Canada, Apr 2010
29. **“Carbon Nanoelectronics: Towards Energy-Efficient Computing,” invited tutorial at *Design, Automation & Test in Europe (DATE)*, Dresden, Germany, Mar 2010**
28. Univ. Michigan WIMS Seminar, Ann-Arbor MI, Feb 2010
27. IMECE (Intl. Mech. Eng. Congress and Expo), Lake Buena Vista FL, Nov 2009
26. Univ. Maryland Physics Colloquium, College Park, MD, Oct 2009
25. UT Austin, Dept. of Mechanical Eng., Electrical Eng. and Physics, Austin TX, Sep 2009
24. **“Graphene Thermal Physics,” invited tutorial at *IEEE Device Research Conference (DRC)*, June 2009, State College PA**
23. University of Modena, Italy, June 2009
22. IRPS (Intl. Reliability Phys. Symp.), Montreal Canada, Apr 2009
21. IBM T.J. Watson Center, Yorktown Heights NY, Jan 2009
20. **ENIC-2008 (ASME 3rd Energy Nano Intl. Conf.) Keynote talk, Jacksonville FL, Aug 2008**
19. Argonne National Labs, Argonne IL, Aug 2008
18. 6th US-Japan Joint Seminar on Nanoscale Transport, MIT, Cambridge MA, Jul 2008
17. Northrop-Grumman Space Technology, Redondo Beach CA, Jun 2008
16. Institute for Energy Technology (IFE), Kjeller, Norway, Jun 2008
15. **“Memory Technology: Putting the *nano* in your iPod,” University High School, Urbana IL, May 2008 – available on the nanoHUB.org**
14. Beckman Institute Nanohour, Urbana IL, May 2008 – available on the nanoHUB.org
13. Notre Dame Univ., Solid-State Colloquium, South Bend IN, Apr 2008
12. CSL (Coordinated Science Lab) Colloquium, UIUC, Feb 2008
11. ISDRS, University of Maryland, College Park, Dec 2007
10. ECE Colloquium, UIUC, Nov 2007
9. USC Dept. of EE Colloquium, Los Angeles, CA, Jun 2007
8. MRS Spring Meeting, San Francisco, CA, Apr 2007
7. **“Electro-Thermal Interaction, Modeling and Measurement in Nanoscale Devices,” *Great Lakes VLSI Symposium (GLSVLSI)*, Lago Maggiore, Italy, March 2007**

6. MSE Colloquium, Stanford University, Dec 2006
5. UIUC Dept. of ECE, Urbana IL, May 2006
4. Northwestern Dept. of EE, Evanston IL, Mar 2006
3. NASA Ames Research Center, Mountain View, CA, Nov 2005
2. HCIS-14 (Hot Carriers in Semiconductors), Chicago, IL, Jul 2005
1. UCLA Dept. of EE, Los Angeles CA, Apr 2005

### Patents and Disclosures

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8. S. Ueda, A. McLeod, A. Kummel, M. Burkland, S. Kilcoyne, E. Chumbles, T. Kazior, E. Pop, M. Chen, C. Perez, M. Rodwell, "Low-Temperature Deposition of High-Quality Aluminum Nitride Films for Heat Spreading Applications," U.S. Patent App. No. 17/169914, Feb 8, 2021
7. A.I. Khan, E. Pop, R. Islam, H.-S.P. Wong, K.E. Goodson, M. Asheghi, H. Kwon, "Low-Power Phase-Change Memory Technology with Interfacial Thermoelectric Heating Enhancement," Provisional App. 63/089776, Oct 9, 2020
6. A. Daus, S. Vaziri, E. Pop, "Multi-layered semiconductive device and methodology with polymer and transition metal dichalcogenide material," App. 62/864232, Jun 6, 2019
5. Y. Kim, C. Ahn, A. Sood, E. Pop, H.-S.P. Wong, K.E. Goodson, S. Fong, S. Lee, C.M. Neumann, M. Asheghi, "Graphene-Inserted Phase Change Memory Device and Method of Fabricating the Same," US Patent 9,583,702, Feb 28, 2017
4. E. Pop, F. Xiong, M.-H. Bae, "Methods for Forming a Nanowire and Apparatus Thereof," US Patent 9,412,442, Aug 9, 2016
3. E. Pop, F. Xiong, A.D. Liao, "Adaptive Resistive Device and Methods Thereof," US Patent No. 9,324,422, Apr 26, 2016
2. E. Pop, "State Changing Device," US Patent No. 8,860,004, issued Oct. 14, 2014
1. E. Pop, "Resistive Changing Device," US Patent No. 8,586,961, issued Nov. 19, 2013

### Students and Post-Docs Supervised

---

<b>Post-Doctoral Researchers</b>		<b>Position after Pop Lab</b>
Alwin Daus	2018–	
Sam Vaziri	2016–20	TSMC
Kevin Brenner	2017–19	Asst. Prof., Southern Methodist Univ. (SMU)
Aditya Sood	2018	Post-doc, SLAC
Miguel Muñoz Rojo	2016–18	Asst. Prof., Univ. Twente
Eilam Yalon	2015–18	Asst. Prof., Technion
Yong Cheol Shin	2015–16	Korea Inst. Sci & Tech Eval & Planning (KISTEP)
Michal Mleczko	2017	Intel
Zuanyi Li	2014–15	ASML
Feng Xiong	2013–16	Asst. Prof., Univ. Pittsburgh
Ashkan Behnam	2010–13	Intel
Myung-Ho Bae	2009–11	Korea Research Institute (KRISS)
<b>Graduate Students Supervised</b>		<b>Position after Pop Lab</b>
Robert Bennett	Ph.D. EE, expected 2026	
Jerry Yang	Ph.D. EE, expected 2025	
Maritha Wang	Ph.D. MSE, expected 2025	
Sumaiya Wahid	Ph.D. EE, expected 2024	
Crystal Nattoo	Ph.D. EE, expected 2024	

Mahnaz Islam	Ph.D. EE, expected 2024	
Katie Neilson	Ph.D. EE, expected 2024	
Jung-Soo Ko	Ph.D. EE, expected 2024	
Asir Khan	Ph.D. EE, expected 2023	
Cagil Koroglu	Ph.D. EE, expected 2023	
Ryan Grady	Ph.D. EE, expected 2023	
Kirstin Schauble	Ph.D. EE, expected 2022	
Connor Bailey	Ph.D. EE, expected 2022	
Victoria Chen	Ph.D. EE, expected 2022	
Michelle Chen	Ph.D. MSE, expected 2022	
Alexander Gabourie	Ph.D. EE, 2021	DeepSim, Inc.
Connor McClellan	Ph.D. EE, 2021	DeepSim, Inc.
Isha Datye	Ph.D. EE, 2020	TSMC
Stephanie Bohaichuk	Ph.D. EE, 2020	Univ. Waterloo, QV Ideas Lab
Runjie Lily Xu	Ph.D. EE, 2020	Apple
Christopher Neumann	Ph.D. EE, 2019	Intel
Sanchit Deshmukh	Ph.D. EE, 2019	Apple
Saurabh Suryavanshi	Ph.D. EE, 2018	ARM
Kirby Smithe	Ph.D. EE, 2018	Intel
Ning Wang	Ph.D. EE, 2018	Cirrus Logic
Feifei Lian	Ph.D. EE, 2018	Northrop Grumman
Christopher English	Ph.D. EE, 2017	Apple
Michal Mleczko	Ph.D. EE, 2016	post-doc, Stanford
Zuanyi Li	Ph.D. Physics, 2015	post-doc, Stanford
Sharnali Islam	Ph.D. ECE, 2015	Intel
Enrique Carrion	Ph.D. ECE, 2015	Intel
Andrey Serov	Ph.D. ECE, 2014	SanDisk
Kyle Grosse	Ph.D. MechSE, 2014	Raytheon
Vincent Dorgan	Ph.D. ECE, 2014	Intel
Feng Xiong	Ph.D. ECE, 2014	post-doc, Stanford
Joshua Wood	Ph.D. ECE, 2013	post-doc, Northwestern
David Estrada	Ph.D. ECE, 2013	Asst. Prof., Boise State
Albert Liao	Ph.D. ECE, 2012	Micron
Zhun-Yong Ong	Ph.D. Physics, 2011	IHCP/A*STAR Singapore
Sungduk Hong	2011–13	UIUC MatSE
Austin Lyons	M.S. ECE, 2011	Intel
B. Ramasubramanian	M.S. ECE, 2010	Intel
Massimiliano Bianchi	2013 (visiting from Poli Milano, advisor: R. Sordan)	
Andrea Cappelli	2012–13 (visiting from U. Modena, advisor: C. Jacoboni)	
Ilaria Imperiale	2011–12 (visiting from U. Bologna, advisor: M. Rudan)	
Thierry Tsafack	2009–10 (visiting from U. Bologna, advisor: M. Rudan)	

- **Undergraduate Researchers Supervised (Bachelor's Honors Theses in bold)**

Kamila Thompson (2021), Noor Fakh (2020), Maisy Lam (2020), Sidra Nadeem (2020), Paul Bates Walter (2019), Linsen Li (2018), Bozo Vareskic (2017), **Andrew Yu (2015-17)**, Stephone Christian (2016), Anika Manzo (2016), Aria Tedjarati (2016), Erin Antono (2015-16), Peter Satterthwaite

(2015), Justin Doong (2014-15), Job Nalyanya (2014), Tim Anderson (2014), Yeszar Hadi (2014), **Maryann Tung (2013)**, **Muneeb Ahmed (2013)**, Juan Pablo Llinas (2012-13), **Christopher Neumann (2010-12)**, Alicia Hoag (2011-12), **Yuan Dai (2011-12)**, Akshay Malik (2011-12), Xuanyu Zhong (2011-12), **Sumit Dutta (2009-11)**, Daifeng Guo (2011), Jose Matamoros (2011), Eric Kwan (2011), **Gautam Shine (2011)**, **Feifei Lian (2009-11)**, Dominic Ortigara (2010), Shreya Prakash (2009-10), Chun-Ming Chin (2010), Jen-Chieh Liu (2010), Ryan Pecora (2009-10), **Yang Zhao (2008-09)**, Aidee San Miguel (2009), **I-Ru (Tim) Chen (2008)**, Jerry Lee (2008), **William Wahby (2007)**.

## Collaborators and Former Advisors

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- **Collaborators (last 48 months):**

Zhenan Bao, Mark Brongersma, Wei Cai, Yi Cui, Jonathan Fan, Reinhold Dauskardt, Ian Fisher, David Goldhaber-Gordon, Kenneth Goodson, Tony Heinz, Roger Howe, Aaron Lindenberg, Christian Linder, Nick Melosh, Subhasish Mitra, Yoshio Nishi, Piero Pianetta, Evan Reed, Alberto Salleo, Krishna Saraswat, Debbie Senesky, Z.-X. Shen, H.-S. Philip Wong, Xiaolin Zheng (Stanford), Rashid Bashir, David Cahill, Matthew Gilbert, William King, Xiuling Li, Joseph Lyding, Umberto Ravaioli, Moonsub Shim (UIUC), Deji Akinwande, Alex Demkov (UT Austin), Jonathan Bird (SUNY Buffalo), Amir B. Farimani (CMU), Davide Donadio (UC Davis), Ant Ural (Univ. Florida), Satish Kumar (Georgia Tech), Grace Xing, Debdeep Jena (Cornell), Massimo Fischetti, Robert Wallace (UT Dallas), Steve Koester (Univ. Minnesota), Zhihong Chen, Shriram Ramanathan, Xiulin Ruan (Purdue), Arka Majumdar (Univ. Washington), Irena Knezevic (Wisconsin), AKM Newaz (SFSU), Vikas Varshney, Ajit Roy (AFRL), Andrey Krayev (Horiba Scientific), Suhas Kumar, R. Stanley Williams (HP), Jeong Moon (HRL), Jaewoo Jeong, Mahesh Samant (IBM), Stuart Parkin (IBM & Max Planck), Ilya Karpov (Intel), Sergiy Krylyuk, Albert Davydov, Huairuo Zhang (NIST), Vincent Gambin, Jesse Tice (Northrop Grumman), Mario Pelella (ON Semiconductor), Tapio Ala-Nissilä, Esko Kauppinen (Aalto University), Enrico Piccinini, Massimo Rudan (Univ. Bologna), Natalio Mingo (CEA), Ajay K. Sood (IIS), Daniele Ielmini, Roman Sordan (Poli. Milano), Carlo Jacoboni (Univ. Modena), Yee Kan Koh (NUS), Junichiro Shiomi (Univ. Tokyo), David Esseni (Univ. Udine), Tibor Grasser (TU Wien).

- **Advisors:**

M.Eng. Thesis: Dimitri Antoniadis (MIT) and Peter Cottrell (IBM)  
 Ph.D. Thesis: Kenneth Goodson and Robert Dutton (Stanford)  
 Post-Doctoral: Hongjie Dai and Kenneth Goodson (Stanford)

## Visitors Hosted

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Prof. Matthew Gilbert	2018	University of Illinois Urbana-Champaign
Mr. Luis Ruelas	Summer 2017	Downtown College Prep, Alum Rock
Prof. Xinran Wang	Spring 2017	Nanjing University
Prof. Akiko Ueda	Winter 2017	University of Tsukuba
Takaaki Uno	2015-2017	JSR Corp. Japan
Mr. Henry Fung	Summer 2016	Irvington High School, Fremont
Prof. Davide Donadio	Spring 2015	Max Planck, Mainz
Prof. Daniele Ielmini	Summer 2010	Politecnico di Milano
Prof. Junichiro Shiomi	Summer 2009	University of Tokyo