Stanford

Eric Pop

Pease-Ye Professor, Professor of Electrical Engineering and, by courtesy, of Materials Science and Engineering and of Applied Physics

Curriculum Vitae available Online

Bio

BIO

Eric Pop is the Pease-Ye Professor of Electrical Engineering (EE) and Materials Science & Engineering (by courtesy) at Stanford, where he leads the SystemX Heterogeneous Integration focus area. Before Stanford, he spent several years on the faculty of UIUC, and in industry at Intel and IBM. His research interests are at the intersection of electronics, nanomaterials, and energy. He received his PhD in EE from Stanford (2005) and three degrees from MIT (MEng and BS in EE, BS in Physics). His awards include the Presidential Early Career (PECASE) from the White House, the highest honor given by the US government to early-career scientists and engineers, as well as Young Investigator Awards from the Navy, Air Force, NSF CAREER, and DARPA. He is an APS and IEEE Fellow, a Clarivate (Web of Science) Highly Cited Researcher, he was Chair of the IEEE Device Research Conference (DRC) and IEEE NVMTS, and he has also served on program committees of the IEDM, VLSI, MRS, and APS conferences. More information about the Pop Lab can be found online at http://poplab.stanford.edu

ACADEMIC APPOINTMENTS

- Professor, Electrical Engineering
- Professor (By courtesy), Materials Science and Engineering
- Professor (By courtesy), Applied Physics
- Member, Bio-X
- Affiliate, Precourt Institute for Energy

ADMINISTRATIVE APPOINTMENTS

- Lead of EE Culture, Equity, and Inclusion (CEI) Committee, Electrical Engineering, (2019- present)
- Co-Lead of Heterogeneous Integration Focus Area, SystemX Alliance, (2015- present)

HONORS AND AWARDS

- Pease-Ye Professorship, Stanford University (2023)
- Viskanta Fellowship, Purdue University (2023)
- APS Fellow, American Physical Society (2022)
- Intel 2021 Outstanding Researcher Award, Intel (2021)
- IEEE Fellow, IEEE (2021)
- Highly Cited Researcher, Web of Science (2018)
- Golden Reviewers List, IEEE Electron Device Letters (2017, 2013-09)
- Most Cited Researchers List in EE, Elsevier (2016)
- Okawa Foundation Grant, Okawa Foundation (2014)

- Engineering Council Award for Excellence in Advising, UIUC (2013)
- Award for Faculty Research, Xerox/UIUC (2011)
- Center for Advanced Study (CAS) Fellowship, UIUC (2011)
- Outstanding Presentation Award, E\PCOS Symposium (2011)
- Senior Member, IEEE (2011)
- AFOSR Young Investigator Program (YIP) Award, AFOSR (2010)
- CAREER Award, NSF (2010)
- ONR Young Investigator Program (YIP) Award, ONR (2010)
- PECASE (Presidential) Award from the White House, ARO (2010)
- List of Teachers Ranked as Excellent, UIUC (2009)
- DARPA Young Faculty Award (YFA), DARPA (2008)
- Arnold O. Beckman Research Award, UIUC (2007)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Fellow, APS (2022 - present)
- Fellow, IEEE (2021 - present)
- Member, AAAS (2012 - present)
- Member, APS (2011 - present)
- Senior Member, IEEE (2011 - present)
- Member, MRS (2007 - present)

PROGRAM AFFILIATIONS

- Stanford SystemX Alliance

PROFESSIONAL EDUCATION

- Ph.D., Stanford University , Electrical Engineering (2005)
- M.Eng., MIT , EECS (1999)
- B.S., MIT , EECS (1999)
- B.S., MIT , Physics (1999)

LINKS

- Pop Lab Research Website: http://poplab.stanford.edu
- 2D Transistor Benchmarking: http://2d.stanford.edu
- Google Scholar: https://scholar.google.com/citations?user=tRW2V-0AAAAJ
- Twitter: https://twitter.com/profericpop

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Research in the Pop Lab is at the intersection of nanoelectronics and nanoscale energy conversion. Most projects include both fundamental and applied, experimental and computational components. Some recent topics (as of 2013) include:

* Energy-efficient transistors, memory and integrated circuits

* Novel nanomaterials, e.g. graphene, BN, MoS2, carbon nanotubes, GeSbTe, etc.

* Fundamental physical limits of current and heat flow, e.g. ballistic electrons and phonons

* Applications of nanoscale energy transport, conversion and harvesting, e.g. thermoelectrics

For more details see the Pop Lab research website: http://poplab.stanford.edu

Teaching

COURSES

2023-24

- Circuits I: EE 101A (Win)
- Principles and Models of Semiconductor Devices: EE 216 (Aut)

2022-23

- Circuits I: EE 101A (Win)
- Energy in Electronics: EE 323 (Spr)
- Principles and Models of Semiconductor Devices: EE 216 (Aut)

2021-22

- Circuits I: EE 101A (Win)
- Principles and Models of Semiconductor Devices: EE 216 (Aut)

2020-21

- Circuits I: EE 101A (Win)
- Introductory Research Seminar in Electrical Engineering: EE 301 (Aut)

STANFORD ADVISEES

Connor Cremers

Doctoral Dissertation Reader (AC)

Carlo Gilardi, Jung-Soo Ko, Yuya Nishio, Hansen Qiao, Akash Ramdas, Alex Shearer

Postdoctoral Faculty Sponsor

Koosha Nassiri Nazif, Tara Pena, Anton Persson

Doctoral Dissertation Advisor (AC)

Robert Bennett, Lauren Hoang, Mahnaz Islam, Cagil Koroglu, Crystal Nattoo, Katie Neilson, Sumaiya Wahid, Maritha Wang, Xiangjin Wu, Jerry Yang

Master's Program Advisor

Habeeb Ayantayo, Myles Ragins, Jonathan Sharir-Smith, Dhruv Sumathi

Doctoral (Program)

Robert Bennett, Lauren Hoang, Cassandra Huff, Koustav Jana, Katie Neilson, Robert Radway, Haotian Su, Sumaiya Wahid, Jerry Yang

Publications

PUBLICATIONS

- **Novel nanocomposite-superlattices for low energy and high stability nanoscale phase-change memory.** *Nature communications*
  Wu, X., Khan, A. I., Lee, H., Hsu, C. F., Zhang, H., Yu, H., Roy, N., Davydov, A. V., Takeuchi, I., Bao, X., Wong, H. P., Pop, E.

2024; 15 (1): 13

- **Efficiency limit of transition metal dichalcogenide solar cells** *COMMUNICATIONS PHYSICS*
  Nazif, K., Nitta, F. U., Daus, A., Saraswat, K. C., Pop, E.
  2023; 6 (1)

- **High Thermal Conductivity of Submicrometer Aluminum Nitride Thin Films Sputter-Deposited at Low Temperature.** *ACS nano*
  Perez, C., McLeod, A. J., Chen, M. E., Yi, S. I., Vaziri, S., Hood, R., Ueda, S. T., Bao, X., Asheghi, M., Park, W., Talin, A. A., Kumar, S., Pop, et al
  2023

- **Spatially-Resolved Thermometry of Filamentary Nanoscale Hot Spots in TiO2 Resistive Random Access Memories to Address Device Variability.** *ACS applied electronic materials*
  Swoboda, T., Gao, X., Rosário, C. M., Hui, F., Zhu, K., Yuan, Y., Deshmukh, S., Köro#lu, Ç., Pop, E., Lanza, M., Hilgenkamp, H., Rojo, M. M.
  2023; 5 (9): 5025-5031

- **Spatially-Resolved Thermometry of Filamentary Nanoscale Hot Spots in TiO2 Resistive Random Access Memories to Address Device Variability** *ACS APPLIED ELECTRONIC MATERIALS*
  Swoboda, T., Gao, X., Rosario, C. M., Hui, F., Zhu, K., Yuan, Y., Deshmukh, S., Koroglu, C., Pop, E., Lanza, M., Hilgenkamp, H., Rojo, M.
  2023

- **Area-Selective Atomic Layer Deposition for Resistive Random-Access Memory Devices.** *ACS applied materials & interfaces*
  Oh, I. K., Khan, A. I., Qin, S., Lee, Y., Wong, H. P., Pop, E., Bent, S. F.
  2023

- **Thiol-based defect healing of WSe2 and WS2** *NPJ 2D MATERIALS AND APPLICATIONS*
  Schwarz, A., Alon-Yehezkel, H., Levi, A., Yadav, R., Majhi, K., Tzuriel, Y., Hoang, L., Bailey, C. S., Brumme, T., Mannix, A. J., Cohen, H., Yalon, E., Heine, et al
  2023; 7 (1)

- **Imaging the electron charge density in monolayer MoS2 at the Ångstrom scale.** *Nature communications*
  Martis, J., Susarla, S., Rayabharam, A., Su, C., Paule, T., Pelz, P., Huff, C., Xu, X., Li, H. K., Jaikissoon, M., Chen, V., Pop, E., Saraswat, et al
  2023; 14 (1): 4363

- **A Purcell-enabled monolayer semiconductor free-space optical modulator** *NATURE PHOTONICS*
  Li, Q., Song, J., Xu, F., van de Groep, J., Hong, J., Daus, A., Lee, Y., Johnson, A. C., Pop, E., Liu, F., Brongersma, M. L.
  2023

- **Effect of Top-Gate Dielectric Deposition on the Performance of Indium Tin Oxide Transistors** *IEEE ELECTRON DEVICE LETTERS*
  Wahid, S., Daus, A., Kwon, J., Qin, S., Ko, J., Wong, H., Pop, E.
  2023; 44 (6): 951-954

- **Probing the Melting Transitions in Phase-Change Superlattices via Thin Film Nanocalorimetry.** *Nano letters*
  Zhao, J., Khan, A. I., Efremov, M. Y., Ye, Z., Wu, X., Kim, K., Lee, Z., Wong, H. P., Pop, E., Allen, L. H.
  2023

- **Ambipolar Thickness-Dependent Thermoelectric Measurements of WSe2.** *Nano letters*
  Chen, V., Lee, H. R., Köro#lu, Ç., McClellan, C. J., Daus, A., Pop, E.
  2023

- **Uncovering the Different Components of Contact Resistance to Atomically Thin Semiconductors** *ADVANCED ELECTRONIC MATERIALS*
  Ber, E., Grady, R. W., Pop, E., Yalon, E.
  2023

- **Intrinsic and Extrinsic Factors Influencing the Dynamics of VO2 Mott Oscillators** *PHYSICAL REVIEW APPLIED*
  Bohaichuk, S. M., Kumar, S., Islam, M., Rojo, M., Williams, R., Pitner, G., Jeong, J., Samant, M. G., Parkin, S. P., Pop, E.
  2023; 19 (4)

- **Nanoscale temperature sensing of electronic devices with calibrated scanning thermal microscopy.** *Nanoscale*
  Swoboda, T., Wainstein, N., Deshmukh, S., Koroglu, C., Gao, X., Lanza, M., Hilgenkamp, H., Pop, E., Yalon, E., Munoz Rojo, M.
  2023

- **Semimetal-Monolayer Transition Metal Dichalcogenides Photodetectors for Wafer-Scale Broadband Photonics** *ADVANCED PHOTONICS RESEARCH*
  Sinn, H., Kumar, A., Pop, E., Newaz, A.
  2023

- **High Thermal Conductivity Insulators for Thermal Management in 3D Integrated Circuits** *IEEE ELECTRON DEVICE LETTERS*
  Koroglu, C., Pop, E.
  2023; 44 (3): 496-499

- **High Number of Transport Modes: A Requirement for Contact Resistance Reduction to Atomically Thin Semiconductors** *IEEE TRANSACTIONS ON ELECTRON DEVICES*
  Ber, E., Grady, R. W., Pop, E., Yalon, E.
  2023

- **How Do Quantum Effects Influence the Capacitance and Carrier Density of Monolayer MoS2 Transistors?** *Nano letters*
  Bennett, R. K., Pop, E.
  2023

- **Energy Efficient Neuro-inspired Phase Change Memory Based on Ge4 Sb6 Te7 as a Novel Epitaxial Nanocomposite.** *Advanced materials (Deerfield Beach, Fla.)*
  Khan, A. I., Yu, H., Zhang, H., Goggin, J. R., Kwon, H., Wu, X., Perez, C., Neilson, K. M., Asheghi, M., Goodson, K. E., Vora, P. M., Davydov, A., Takeuchi, et al
  2023: e2300107

- **Approaching the quantum limit in two-dimensional semiconductor contacts.** *Nature*
  Li, W., Gong, X., Yu, Z., Ma, L., Sun, W., Gao, S., Köro#lu, Ç., Wang, W., Liu, L., Li, T., Ning, H., Fan, D., Xu, et al
  2023; 613 (7943): 274-279

- **Stateful Logic Using Phase Change Memory** *IEEE JOURNAL ON EXPLORATORY SOLID-STATE COMPUTATIONAL DEVICES AND CIRCUITS*
  Hoffer, B., Wainstein, N., Neumann, C. M., Pop, E., Yalon, E., Kvatinsky, S.
  2022; 8 (2): 77-83

- **Strain-Enhanced Mobility of Monolayer MoS2.** *Nano letters*
  Datye, I. M., Daus, A., Grady, R. W., Brenner, K., Vaziri, S., Pop, E.
  2022

- **Understanding Interface-Controlled Resistance Drift in Superlattice Phase Change Memory** *IEEE ELECTRON DEVICE LETTERS*
  Wu, X., Khan, A., Ramesh, P., Perez, C., Kim, K., Lee, Z., Saraswat, K., Goodson, K. E., Wong, H., Pop, E.
  2022; 43 (10): 1669-1672

- **Electro-thermal Characterization of Dynamical VO2 Memristors via Local Activity Modeling.** *Advanced materials (Deerfield Beach, Fla.)*
  Brown, T. D., Bohaichuk, S. M., Islam, M., Kumar, S., Pop, E., Williams, R. S.
  2022: e2205451

- **How to report and benchmark emerging field-effect transistors (July, 10.1038/s41928-022-00798-8, 2022)** *NATURE ELECTRONICS*
  Cheng, Z., Pang, C., Wang, P., Le, S. T., Wu, Y., Shahrjerdi, D., Radu, I., Lemme, M. C., Peng, L., Duan, X., Chen, Z., Appenzeller, J., Koester, et al
  2022

- **Improved gradual resistive switching range and 1000x on/off ratio in HfOx PRAM achieved with a Ge2Sb2Te5 thermal barrier** *APPLIED PHYSICS LETTERS*
  Islam, R., Qin, S., Deshmukh, S., Yu, Z., Koroglu, C., Khan, A. I., Schauble, K., Saraswat, K. C., Pop, E., Wong, H. P.
  2022; 121 (8)

- **Fast-Response Flexible Temperature Sensors with Atomically Thin Molybdenum Disulfide.** *Nano letters*
  Daus, A., Jaikissoon, M., Khan, A. I., Kumar, A., Grady, R. W., Saraswat, K. C., Pop, E.
  2022

- **Unveiling the Effect of Superlattice Interfaces and Intermixing on Phase Change Memory Performance.** *Nano letters*
  Khan, A. I., Wu, X., Perez, C., Won, B., Kim, K., Ramesh, P., Kwon, H., Tung, M. C., Lee, Z., Oh, I., Saraswat, K., Asheghi, M., Goodson, et al
  2022

- **Extended Scale Length Theory for Low-Dimensional Field-Effect Transistors** *IEEE TRANSACTIONS ON ELECTRON DEVICES*

Gilardi, C., Bennett, R. A., Yoon, Y., Pop, E., Wong, H., Mitra, S.
2022

- **Ultra-low-energy programmable non-volatile silicon photonics based on phase-change materials with graphene heaters** *NATURE NANOTECHNOLOGY*
  Fang, Z., Chen, R., Zheng, J., Khan, A., Neilson, K. M., Geiger, S. J., Callahan, D. M., Moebius, M. G., Saxena, A., Chen, M. E., Rios, C., Hu, J., Pop, et al
  2022

- **How to report and benchmark emerging field-effect transistors** *NATURE ELECTRONICS*
  Cheng, Z., Pang, C., Wang, P., Le, S. T., Wu, Y., Shahrjerdi, D., Radu, I., Lemme, M. C., Peng, L., Duan, X., Chen, Z., Appenzeller, J., Koester, et al
  2022; 5 (7): 416-423

- **Substrate-dependence of monolayer MoS2 thermal conductivity and thermal boundary conductance** *JOURNAL OF APPLIED PHYSICS*
  Gabourie, A. J., Koroglu, C., Pop, E.
  2022; 131 (19)

- **Nonequilibrium Phonon Thermal Resistance at MoS2/Oxide and Graphene/Oxide Interfaces.** *ACS applied materials & interfaces*
  Zheng, W., McClellan, C. J., Pop, E., Koh, Y. K.
  2022

- **Direct measurement of nanoscale filamentary hot spots in resistive memory devices.** *Science advances*
  Deshmukh, S., Rojo, M. M., Yalon, E., Vaziri, S., Koroglu, C., Islam, R., Iglesias, R. A., Saraswat, K., Pop, E.
  2022; 8 (13): eabk1514

- **Electrically driven reprogrammable phase-change metasurface reaching 80% efficiency.** *Nature communications*
  Abdollahramezani, S., Hemmatyar, O., Taghinejad, M., Taghinejad, H., Krasnok, A., Eftekhar, A. A., Teichrib, C., Deshmukh, S., El-Sayed, M. A., Pop, E., Wuttig, M., Alo, A., Cai, et al
  2022; 13 (1): 1696

- **<p>Temperature-dependent thermal resistance of phase change memory</p>** *APPLIED PHYSICS LETTERS*
  Stern, K., Keller, Y., Neumann, C. M., Pop, E., Yalon, E.
  2022; 120 (11)

- **Electro-Thermal Confinement Enables Improved Superlattice Phase Change Memory** *IEEE ELECTRON DEVICE LETTERS*
  Khan, A., Kwon, H., Chen, M. E., Asheghi, M., Wong, H., Goodson, K. E., Pop, E.
  2022; 43 (2): 204-207

- **Nanoscale Phase Change Memory Arrays Patterned by Block Copolymer Directed Self-Assembly**
  Tung, M. C., Khan, A., Kwon, H., Asheghi, M., Goodson, K. E., Pop, E., Wong, H., Panning, E. M., Liddle, J. A.
  SPIE-INT SOC OPTICAL ENGINEERING.2022

- **First Demonstration of Dual-Gated Indium Tin Oxide Transistors with Record Drive Current similar to 2.3 mA/mu m at L approximate to 60 nm and V-DS=1 V**
  Wahid, S., Daus, A., Kumar, A., Wong, H., Pop, E., IEEE
  IEEE.2022

- **Ultra-low energy programmable non-volatile silicon photonics based on phase-change materials with graphene heaters**
  Fang, Z., Chen, R., Zheng, J., Khan, A., Neilson, K. M., Geiger, S. J., Callahan, D. M., Moebius, M. G., Saxena, A., Chen, M. E., Rios, C., Hu, J., Pop, et al
  SPIE-INT SOC OPTICAL ENGINEERING.2022

- **High-specific-power flexible transition metal dichalcogenide solar cells.** *Nature communications*
  Nassiri Nazif, K., Daus, A., Hong, J., Lee, N., Vaziri, S., Kumar, A., Nitta, F., Chen, M. E., Kananian, S., Islam, R., Kim, K., Park, J., Poon, et al
  2021; 12 (1): 7034

- **Lateral electrical transport and field-effect characteristics of sputtered p-type chalcogenide thin films** *APPLIED PHYSICS LETTERS*
  Wahid, S., Daus, A., Khan, A., Chen, V., Neilson, K. M., Islam, M., Chen, M. E., Pop, E.
  2021; 119 (23)

- **Transistors based on two-dimensional materials for future integrated circuits** *NATURE ELECTRONICS*
  Das, S., Sebastian, A., Pop, E., McClellan, C. J., Franklin, A. D., Grasser, T., Knobloch, T., Illarionov, Y., Penumatcha, A. V., Appenzeller, J., Chen, Z., Zhu, W., Asselberghs, et al
  2021; 4 (11): 786-799

- **Vibrational Properties of a Naturally Occurring Semiconducting van der Waals Heterostructure** *JOURNAL OF PHYSICAL CHEMISTRY C*
  Costa, V., Liang, L., Vaziri, S., Miller, A., Pop, E., Newaz, A. M.
  2021; 125 (39): 21607-21613
- **Application-driven synthesis and characterization of hexagonal boron nitride deposited on metals and carbon nanotubes** *2D MATERIALS*
  Chen, V., Shin, Y., Mikheev, E., Lin, Q., Martis, J., Zhang, Z., Chatterjee, S., Majumdar, A., Wong, H., Goldhaber-Gordon, D., Pop, E.
  2021; 8 (4)
- **Field-effect at electrical contacts to two-dimensional materials (Jul, 10.1007/s12274-021-3670-y, 2021)** *NANO RESEARCH*
  Guo, Y., Sun, Y., Tang, A., Wang, C., Zhao, Y., Bai, M., Xu, S., Xu, Z., Tang, T., Wang, S., Qiu, C., Xu, K., Peng, et al
  2021
- **Sub-Nanosecond Pulses Enable Partial Reset for Analog Phase Change Memory** *IEEE ELECTRON DEVICE LETTERS*
  Stern, K., Wainstein, N., Keller, Y., Neumann, C. M., Pop, E., Kvatinsky, S., Yalon, E.
  2021; 42 (9): 1291-1294
- **Toward Low-Temperature Solid-Source Synthesis of Monolayer MoS2.** *ACS applied materials & interfaces*
  Tang, A., Kumar, A., Jaikissoon, M., Saraswat, K., Wong, H. P., Pop, E.
  2021
- **Field-effect at electrical contacts to two-dimensional materials.** *Nano research*
  Guo, Y., Sun, Y., Tang, A., Wang, C., Zhao, Y., Bai, M., Xu, S., Xu, Z., Tang, T., Wang, S., Qiu, C., Xu, K., Peng, et al
  2021: 1-7
- **A Comprehensive Study of WSe2 Crystals Using Correlated Raman, Photoluminescence (PL), Second Harmonic Generation (SHG), and Atomic Force Microscopy (AFM) Imaging** *SPECTROSCOPY*
  Schmidt, U., Bailey, C. S., Englert, J., Yalon, E., Ankonina, G., Pop, E., Hollricher, O., Dieing, T.
  2021; 36 (7): 23-30
- **Graphene-based electromechanical thermal switches** *2D MATERIALS*
  Chen, M. E., Rojo, M., Lian, F., Koeln, J., Sood, A., Bohaichuk, S. M., Neumann, C. M., Garrow, S. G., Goodson, K. E., Alleyne, A. G., Pop, E.
  2021; 8 (3)
- **High-performance flexible nanoscale transistors based on transition metal dichalcogenides** *NATURE ELECTRONICS*
  Daus, A., Vaziri, S., Chen, V., Koroglu, C., Grady, R. W., Bailey, C. S., Lee, H., Schauble, K., Brenner, K., Pop, E.
  2021
- **Uncovering Phase Change Memory Energy Limits by Sub-Nanosecond Probing of Power Dissipation Dynamics** *ADVANCED ELECTRONIC MATERIALS*
  Stern, K., Wainstein, N., Keller, Y., Neumann, C. M., Pop, E., Kvatinsky, S., Yalon, E.
  2021
- **Spectral decomposition of thermal conductivity: Comparing velocity decomposition methods in homogeneous molecular dynamics simulations** *PHYSICAL REVIEW B*
  Gabourie, A. J., Fan, Z., Ala-Nissila, T., Pop, E.
  2021; 103 (20)
- **Ultrathin Three-Monolayer Tunneling Memory Selectors.** *ACS nano*
  Wang, C., Chen, V., McClellan, C. J., Tang, A., Vaziri, S., Li, L., Chen, M. E., Pop, E., Wong, H. P.
  2021
- **Carbon nanotube thermoelectric devices by direct printing: Toward wearable energy converters** *APPLIED PHYSICS LETTERS*
  Lee, H., Furukawa, N., Ricco, A. J., Pop, E., Cui, Y., Nishi, Y.
  2021; 118 (17)
- **High-Performance p-n Junction Transition Metal Dichalcogenide Photovoltaic Cells Enabled by MoOx Doping and Passivation.** *Nano letters*
  Nassiri Nazif, K., Kumar, A., Hong, J., Lee, N., Islam, R., McClellan, C. J., Karni, O., van de Groep, J., Heinz, T. F., Pop, E., Brongersma, M. L., Saraswat, K. C.
  2021
- **High Current Density in Monolayer MoS2 Doped by AlOx.** *ACS nano*
  McClellan, C. J., Yalon, E., Smithe, K. K., Suryavanshi, S. V., Pop, E.

2021

- **Dynamic Hybrid Metasurfaces.** *Nano letters*
  Abdollahramezani, S. n., Hemmatyar, O. n., Taghinejad, M. n., Taghinejad, H. n., Kiarashinejad, Y. n., Zandehshahvar, M. n., Fan, T. n., Deshmukh, S. n., Eftekhar, A. A., Cai, W. n., Pop, E. n., El-Sayed, M. A., Adibi, et al
  2021
- **Advanced Data Encryption using 2D Materials.** *Advanced materials (Deerfield Beach, Fla.)*
  Wen, C., Li, X., Zanotti, T., Puglisi, F. M., Shi, Y., Saiz, F., Antidormi, A., Roche, S., Zheng, W., Liang, X., Hu, J., Duhm, S., Roldan, et al
  2021: e2100185
- **Engineering Thermal Transport across Layered Graphene-MoS2 Superlattices.** *ACS nano*
  Sood, A., Sievers, C., Shin, Y. C., Chen, V., Chen, S., Smithe, K. K., Chatterjee, S., Donadio, D., Goodson, K. E., Pop, E.
  2021
- **Diamond Integration on GaN for Channel Temperature Reduction**
  Malakoutian, M., Xu, R., Ren, C., Pasayat, S., Sayed, I., Pop, E., Chowdhury, S., IEEE
  IEEE.2021: 70-74
- **Sub-200 Omega.mu m Alloyed Contacts to Synthetic Monolayer MoS2**
  Kumar, A., Schauble, K., Neilson, K. M., Tang, A., Ramesh, P., Wong, H., Pop, E., Saraswat, K., IEEE
  IEEE.2021
- **Ultralow-switching current density multilevel phase-change memory on a flexible substrate.** *Science (New York, N.Y.)*
  Khan, A. I., Daus, A., Islam, R., Neilson, K. M., Lee, H. R., Wong, H. P., Pop, E.
  2021; 373 (6560): 1243-1247
- **Uncovering Thermal and Electrical Properties of Sb2Te3/GeTe Superlattice Films.** *Nano letters*
  Kwon, H., Khan, A. I., Perez, C., Asheghi, M., Pop, E., Goodson, K. E.
  2021
- **Reduced thermal conductivity of supported and encased monolayer and bilayer MoS2** *2D MATERIALS*
  Gabourie, A. J., Suryavanshi, S., Farimani, A., Pop, E.
  2021; 8 (1)
- **Tuning electrical and interfacial thermal properties of bilayer MoS2 via electrochemical intercalation.** *Nanotechnology*
  Xiong, F. n., Yalon, E. n., McClellan, C. n., Zhang, J. n., Aslan, O. B., Sood, A. n., Sun, J. n., Andolina, C. M., Al-Saidi, W. A., Goodson, K. E., Heinz, T. n., Cui, Y. n., Pop, et al
  2021
- **Two-Fold Reduction of Switching Current Density in Phase Change Memory Using Bi2Te3 Thermoelectric Interfacial Layer** *IEEE ELECTRON DEVICE LETTERS*
  Khan, A., Kwon, H., Islam, R., Perez, C., Chen, M. E., Asheghi, M., Goodson, K. E., Wong, H., Pop, E.
  2020; 41 (11): 1657–60
- **Ultrahigh Doping of Graphene Using Flame-Deposited MoO3** *IEEE ELECTRON DEVICE LETTERS*
  Vaziri, S., Chen, V., Cai, L., Jiang, Y., Chen, M. E., Grady, R. W., Zheng, X., Pop, E.
  2020; 41 (10): 1592–95
- **Visualizing Energy Transfer at Buried Interfaces in Layered Materials Using Picosecond X-Rays** *ADVANCED FUNCTIONAL MATERIALS*
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