




Kenneth Goodson

Davies Family Provostial Professor, Senior Associate Dean for Faculty and Academic Affairs and Professor, by courtesy, of Materials Science and Engineering

Mechanical Engineering

 Curriculum Vitae available Online

CONTACT INFORMATION

• Administrative Contact

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Bio

BIO

Ken Goodson is the Senior Associate Dean for Faculty & Academic Affairs in the School of Engineering. As Mechanical Engineering Chair & Vice Chair (2008-2019), he led two strategic plans and recruited 15 faculty who transformed the department's scholarship and diversity.

Goodson specializes in heat transfer and energy conversion with a track record of translating breakthrough thermal science to companies. He has mentored 50 PhD graduates and received the SRC Aristotle Award. His alumni include professors at MIT, Princeton, UC Berkeley, and Stanford and senior leadership at ARPA-E, Intel, Sandia Labs, and Tesla. He has 35 patents, was elected to the National Academy of Inventors, and co-founded Cooligy, which built heat sinks for Apple and was acquired by Emerson.

Goodson is a member of the National Academy of Engineering and a Fellow with AAAS, ASME, IEEE, and APS. He received the ASME Kraus Medal, the inaugural IEEE Richard Chu Award, the AIChE Kern Award, the THERMI Award, the SIA University Researcher Award, the SRC Technical Excellence Award, and the Heat Transfer Memorial Award.

Goodson moonlights as a baritone oratorio soloist with appearances at Davies Symphony Hall, the Bing Concert Hall, and numerous other Bay Area venues. He held voice fellowships at Tanglewood and Banff and received the Sudler Prize for Arts Achievement at MIT. His wife, Laura Dahl, is a concert pianist with the Stanford music faculty.

ACADEMIC APPOINTMENTS

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

ADMINISTRATIVE APPOINTMENTS

- Senior Associate Dean for Faculty & Academic Affairs, School of Engineering, (2019- present)

- Department Chair, Mechanical Engineering, (2013-2019)
- Vice Department Chair, Mechanical Engineering, (2008-2013)
- Presidential Search Committee, Stanford University, (2015-2016)
- Strategic Planning Co-Chair, Mechanical Engineering, (2009-2010)
- Faculty Search Committee Chair, Mechanical Engineering, (2009-2010)
- Associate Chair for Graduate Admissions, Mechanical Engineering, (2005-2008)
- Faculty Search Committee Chair, Mechanical Engineering, (2004-2005)
- Faculty Search Committee Co-Chair, Mechanical Engineering, (2001-2002)

HONORS AND AWARDS

- Member, National Academy of Engineering (2020)
- Aristotle Award, Semiconductor Research Corporation (2020)
- Fellow, National Academy of Inventors (2020)
- University Researcher Award, Semiconductor International Association (2019)
- Inaugural Richard Chu Achievement Award, IEEE (2018)
- InterPACK Achievement Award, ASME (2017)
- Charles Russ Richards Memorial Award, Pi Tau Sigma & ASME (2016)
- Aisinjiro-Soo Distinguished Lectureship, University of Illinois Urbana-Champaign (2015)
- Donald Q. Kern Heat Transfer Award, AIChE (2015)
- Hawkins Lectureship, Purdue University (2015)
- Rohsenow Lectureship, MIT (2015)
- Heat Transfer Memorial Award for Science, ASME (2014)
- Technical Excellence Award, Semiconductor Research Corporation (2014)
- THERMI Award, IEEE (2013)
- Best/Outstanding Paper, IITHERM, SemiTherm, IEDM (2012, 2001, 1992)
- Elected Fellow: AAAS, ASME, IEEE, APS (2010-2016)
- Golden/Outstanding Reviewer, IEEE, ASME (2010, 1999)
- Dusenberre Lectureship, Penn State University (2010)
- Kraus Thermal Management Medal, ASME (2010)
- Plenary Lectures, IITHERM, PHONONS, InterPACK, ISSCC, Thermionic, SemiTherm (2002-present)
- CAREER Award, National Science Foundation (1996)
- JSPS Visiting Professorship, Tokyo Institute of Technology (1996)
- Young Investigator Award, Office of Naval Research (1996)
- Voice Fellow, Tanglewood Music Festival (1990, 1991)
- Graduate Fellowship, Office of Naval Research (1989-1992)
- Luis Sudler Prize for Arts Achievement, MIT (1989)
- Tau Beta Pi, Phi Beta Kappa, Burchard Scholar, MIT (1988, 1989)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- ASME (Fellow), IEEE (Fellow), APS (Fellow), AAAS (Fellow), NAI (Fellow) (2010 - present)

- Chief Editor, Nanoscale & Microscale Thermophysical Engineering (2007 - 2012)
- Associate Editor, Journal of Heat Transfer (2008 - 2012)
- Member, Tau Beta Pi, Phi Beta Kappa, Sigma Xi (1989 - present)

PROGRAM AFFILIATIONS

- Stanford SystemX Alliance

PROFESSIONAL EDUCATION

- PhD ME, MIT (1993)
- MSME, MIT. ONR Graduate Fellow (1991)
- BSME, MIT. Tau Beta Pi, Pi Tau Sigma (1989)
- BS Humanities, MIT. Phi Beta Kappa. Sudler Prize (1989)

PATENTS

- "SELECTED PATENTS FROM 35 TOTAL"
- US Patent 9601452 (2017): Barako, Goodson, et al. "High-Conductivity Bonding of Metal Nanowire Arrays", assigned to Northrop Grumman & Stanford
- US Patent 7104312 (2006): Goodson, Upadhy, Zhou, et al. "Method and Apparatus for Achieving Temperature Uniformity and Hot Spot Cooling in a Heat Producing Device", assigned to Cooligy (acquired by Emerson)
- US Patent 5843224 (1998): Zachai, Gutheit, Goodson. "Composite structure comprising a semiconductor layer arranged on a diamond or diamond-like layer and process for its production", assigned to DaimlerBenz
- US Patent 6942018 (2005): Goodson, Santiago, Kenny, et al. "Electroosmotic Microchannel Cooling System", assigned to Stanford, licensed to Cooligy (acquired by Emerson)

LINKS

- Research Lab: <http://nanoheat.stanford.edu>
- Google Scholar: <http://scholar.google.com/citations?user=oUhOkhUAAAAJ&hl=en>
- Web of Science: <http://www.researcherid.com/rid/C-3545-2011>
- Woodworking: <https://www.instagram.com/kgoodson2004/>
- Cycling: <https://www.strava.com/athletes/2453572>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

The Nanoheat Lab studies heat transfer in electronic nanostructures, microfluidic heat sinks, and packaging, with an emphasis on basic transport physics and industrial impact. We work closely with companies on novel cooling strategies for power devices, portables, ASICs, & data centers.

Current projects (see list below) include microfluidic heat sinks and vapor chambers for power electronics and 3D logic chips, also electron and phonon conduction and energy conversion in nanostructures. We collaborate with EE and MatSci experts, and current sponsors include ARPA-E, the NSF POETS Center, SRC ASCENT, Google, Toyota, Ford, Bosch, and Intel.

Historically, the lab pioneered phonon free path measurements using silicon nanolayers and helped IC companies commercialize SOI transistors, PCRAM, low-k dielectric passivation, and other thermally-hard technologies. Professor Goodson has 35 patents including several that launched Cooligy, a startup that built heat sinks for Apple products and was acquired by Emerson.

More recently, the Nanoheat Lab developed a record-breaking heat sink with Raytheon as part of DARPA ICECOOL, achieving low superheat using diamond channels, porous copper inverse opals, and 3D manifolding. We leveraged this progress to help UIUC launch an NSF Center for power electronics (POETS), which is an ongoing, major research catalyst for the lab.

Over the decades, lab sponsorship has been split between government grants and customized corporate contracts and gifts. We tailor our research for the benefit of both companies and our PhD students. Dozens of Goodson's PhD graduates now work at IC and energy companies, and 20+ are Professors at MIT, UC Berkeley, Stanford, UIUC, Purdue, UCLA, and other schools.

PROJECTS

- Exploring the Limits of Cooling for Extreme Heat Flux Applications: Data Centers and Power Electronics (ARPA-E) (1/1/2020)
- Development of a High Performance Microcooler with Minimal Packaging Overhead (NSF POETS) (8/1/2019)
- Nanomaterial-Based Thermal Management Solutions for 3D Monolithic Chips (SRC ASCENT) (7/1/2018)
- Microchannel & 3D Manifold for Power Electronics Cooling Applications (Ford Motor Company) (1/1/2018)
- Interfacial Phase Change Memory: Scaling, Performance, Optimization and Understanding the Physics of Switching (SRC) (7/1/2018)
- Thermal Engineering, Optimization, and Understanding the Physics of Electron & Phonon Conduction at Solid Interfaces (SRC) (1/1/2019)
- Microporous Copper Inverse Opal (CIO) Wick Technology for High Heat Flux Vapor Chamber Application (Bosch) (10/1/2019)
- High Aspect Ratio Vertically Aligned Copper Nano/Micro Wire PDMS Composites for Thermal Interface Materials (Google + Intel) (1/1/2020)
- Nanopatterning and Temporal Control of Phase-Change Materials for High-Bandwidth Devices (NSF) (8/15/2017)

Teaching

COURSES

2022-23

- Heat Transfer: ME 131 (Win)

2021-22

- Heat Transfer: ME 131 (Win)

2020-21

- Heat Transfer: ME 131 (Win)

2019-20

- Fundamentals of Heat Conduction: ME 352B (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Chris Perez

Postdoctoral Faculty Sponsor

Heungdong Kwon

Doctoral Dissertation Advisor (AC)

Jillian Anderson, Sougata Hazra, Katherine Jiang, Sri Lingamneni, Hansen Qiao, Qianying Wu

Doctoral Dissertation Co-Advisor (AC)

ZHENGLIANG BIAN

Doctoral (Program)

Katherine Jiang, Naomi Lutz, Joseph Schaadt, Carson Tucker

Publications

PUBLICATIONS

- **Publication Overview: 250 Journal Articles, 330 Conference Papers, 36 Patents, 13 Book Chapters, 2 Books.** 42000+ Citations, H = 97 (Google Scholar). 23000+ Citations, H = 70 (Web of Science)
Goodson, K. E.
2023
- **Dominant Energy Carrier Transitions and Thermal Anisotropy in Epitaxial Iridium Thin Films** *ADVANCED FUNCTIONAL MATERIALS*
Perez, C., Jog, A., Kwon, H., Gall, D., Asheghi, M., Kumar, S., Park, W., Goodson, K. E.
2022
- **An electrochemical thermal transistor** *NATURE COMMUNICATIONS*
Sood, A., Xiong, F., Chen, S., Wang, H., Selli, D., Zhang, J., McClellan, C. J., Sun, J., Donadio, D., Cui, Y., Pop, E., Goodson, K. E.
2018; 9
- **Enhanced Capillary-Fed Boiling in Copper Inverse Opals via Template Sintering** *ADVANCED FUNCTIONAL MATERIALS*
Zhang, C., Palko, J. W., Barako, M. T., Asheghi, M., Santiago, J. G., Goodson, K. E.
2018; 28 (41)
- **Extreme Two-Phase Cooling from Laser-Etched Diamond and Conformal, Template-Fabricated Microporous Copper** *ADVANCED FUNCTIONAL MATERIALS*
Palko, J. W., Lee, H., Zhang, C., Dusseault, T. J., Maitra, T., Won, Y., Agonafer, D. D., Moss, J., Houshmand, F., Rong, G., Wilbur, J. D., Rockosi, D., Mykyta, et al
2017; 27 (45)
- **Modulation of thermal and thermoelectric transport in individual carbon nanotubes by fullerene encapsulation** *NATURE MATERIALS*
Kodama, T., Ohnishi, M., Park, W., Shiga, T., Park, J., Shimada, T., Shinohara, H., Shiomi, J., Goodson, K. E.
2017; 16 (9): 892-+
- **Thermal transport: Cool electronics.** *Nature materials*
Cho, J., Goodson, K. E.
2015; 14 (2): 136-137
- **Ordering up the Minimum Thermal Conductivity of Solids** *SCIENCE*
Goodson, K. E.
2007; 315: 342-343
- **Heat generation and transport in nanometer-scale transistors** *PROCEEDINGS OF THE IEEE*
Pop, E., Sinha, S., Goodson, K. E.
2006; 94 (8): 1587-1601
- **Linking Interfacial Bonding and Thermal Conductivity in Molecularly-Confined Polymer-Glass Nanocomposites with Ultra-High Interfacial Density.** *Small (Weinheim an der Bergstrasse, Germany)*
Wang, Y., Collinson, D. W., Kwon, H., Miller, R. D., Lioni, K., Goodson, K. E., Dauskardt, R. H.
2023; e2301383
- **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
- **Techno-economic feasibility analysis of an extreme heat flux micro-cooler.** *iScience*
Dede, E. M., Zhang, C., Wu, Q., Seyedhassantehrani, N., Shattique, M., Roy, S., Palko, J. W., Narumanchi, S., Kekelia, B., Hazra, S., Goodson, K. E., Giglio, R., Asheghi, et al
2023; 26 (1): 105812

- **Parametric design analysis of a multi-level 3D manifolded microchannel cooler via reduced order numerical modeling** *INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER*
Hazra, S., Wei, T., Lin, Y., Asheghi, M., Goodson, K., Gupta, M., Degner, M.
2022; 197
- **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
- **A machine learning approach for predicting heat transfer characteristics in micro-pin fin heat sinks** *INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER*
Kim, K., Lee, H., Kang, M., Lee, G., Jung, K., Kharangate, C. R., Asheghi, M., Goodson, K. E., Lee, H.
2022; 194
- **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
- **A novel hardmask-to-substrate pattern transfer method for creating 3D, multi-level, hierarchical, high aspect-ratio structures for applications in microfluidics and cooling technologies.** *Scientific reports*
Hazra, S., Zhang, C., Wu, Q., Asheghi, M., Goodson, K., Dede, E. M., Palko, J., Narumanchi, S.
2022; 12 (1): 12180
- **Heat Conductor-Insulator Transition in Electrochemically Controlled Hybrid Superlattices.** *Nano letters*
Zhou, J., Wu, Y., Kwon, H., Li, Y., Xiao, X., Ye, Y., Ma, Y., Goodson, K. E., Hwang, H. Y., Cui, Y.
2022
- **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
- **Multiobjective Optimization of Graded, Hybrid Micropillar Wicks for Capillary-Fed Evaporation.** *Langmuir : the ACS journal of surfaces and colloids*
Liu, T., Asheghi, M., Goodson, K. E.
1800
- **Non-Contact Mass Density and Thermal Conductivity Measurements of Organic Thin Films Using Frequency-Domain Thermoreflectance** *ADVANCED MATERIALS INTERFACES*
Perez, C., Knepper, R., Marquez, M. P., Forrest, E. C., Tappan, A. S., Asheghi, M., Goodson, K. E., Ziade, E. O.
2021
- **Thermal Characterization of Metal-Oxide Interfaces Using Time-Domain Thermoreflectance with Nanograting Transducers.** *ACS applied materials & interfaces*
Kwon, H., Perez, C., Park, W., Asheghi, M., Goodson, K. E.
2021
- **Integrated cooling (i-Cool) textile of heat conduction and sweat transportation for personal perspiration management.** *Nature communications*
Peng, Y., Li, W., Liu, B., Jin, W., Schaadt, J., Tang, J., Zhou, G., Wang, G., Zhou, J., Zhang, C., Zhu, Y., Huang, W., Wu, et al
2021; 12 (1): 6122
- **The ICECool Fundamentals Effort on Evaporative Cooling of Microelectronics** *IEEE TRANSACTIONS ON COMPONENTS PACKAGING AND MANUFACTURING TECHNOLOGY*
Bar-Cohen, A., Asheghi, M., Chainer, T. J., Garimella, S., Goodson, K., Gorle, C., Mandel, R., Maurer, J. J., Ohadi, M., Palko, J. W., Parida, P. R., Peles, Y., Plawsky, et al
2021; 11 (10): 1546-1564
- **Thermal design and management of micro-pin fin heat sinks for energy-efficient three-dimensional stacked integrated circuits** *INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER*

- Jung, D., Lee, H., Kong, D., Cho, E., Jung, K., Kharangate, C. R., Iyengar, M., Malone, C., Asheghi, M., Goodson, K. E., Lee, H.
2021; 175
- **An artificial neural network model for predicting frictional pressure drop in micro-pin fin heat sink** *APPLIED THERMAL ENGINEERING*
Lee, H., Kang, M., Jung, K., Kharangate, C. R., Lee, S., Iyengar, M., Malone, C., Asheghi, M., Goodson, K. E., Lee, H.
2021; 194
 - **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)
 - **Design and optimization of well-ordered microporous copper structure for high heat flux cooling applications** *INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER*
Zhang, C., Palko, J. W., Barako, M. T., Asheghi, M., Goodson, K. E.
2021; 173
 - **Simultaneous thickness and thermal conductivity measurements of thinned silicon from 100nm to 17 μ m** *APPLIED PHYSICS LETTERS*
Scott, E. A., Perez, C., Saltonstall, C., Adams, D. P., Hodges, V., Asheghi, M., Goodson, K. E., Hopkins, P. E., Leonhardt, D., Ziade, E.
2021; 118 (20)
 - **Thermal expansion characterization of thin films using harmonic Joule heating combined with atomic force microscopy** *APPLIED PHYSICS LETTERS*
Chaikasetsin, S., Kodama, T., Bae, K., Jung, J., Shin, J., Lee, B., Kim, B. Y., Seo, J., Sim, U., Prinz, F. B., Goodson, K. E., Park, W.
2021; 118 (19)
 - **Thermal Interface Enhancement via Inclusion of an Adhesive Layer Using Plasma-Enhanced Atomic Layer Deposition.** *ACS applied materials & interfaces*
Kwon, H., Perez, C., Kim, H. K., Asheghi, M., Park, W., Goodson, K. E.
2021
 - **Direct Quantification of Heat Generation Due to Inelastic Scattering of Electrons Using a Nanocalorimeter.** *Advanced science (Weinheim, Baden-Wuerttemberg, Germany)*
Park, J., Bae, K., Kim, T. R., Perez, C., Sood, A., Asheghi, M., Goodson, K. E., Park, W.
2021; 8 (3): 2002876
 - **Achieving High Thermoelectric Performance and Metallic Transport in Solvent-Sheared PEDOT:PSS** *ADVANCED ELECTRONIC MATERIALS*
Hinckley, A. C., Andrews, S. C., Dunham, M. T., Sood, A., Barako, M. T., Schneider, S., Toney, M. F., Goodson, K. E., Bao, Z.
2021
 - **Deposition and Fabrication of Sputtered Bismuth Telluride and Antimony Telluride for Microscale Thermoelectric Energy Harvesters** *THIN SOLID FILMS*
Haidar, S. A., Gao, Y., He, Y., Cornett, J. E., Chen, B., Coburn, N. J., Glynn, C., Dunham, M. T., Goodson, K. E., Sun, N.
2021; 717
 - **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
 - **A HYBRID MICROPOROUS COPPER STRUCTURE FOR HIGH PEROFMRANCE CAPILLARY-DRIVEN**
Soroush, F., Liu, T., Wu, Q., Zhang, C., Asheghi, M., Goodson, K. E., Marco, L., Christian, E., Martin, R., Amer Soc Mech Engineers
AMER SOC MECHANICAL ENGINEERS.2021
 - **CONTACT ANGLE TUNING OF COPPER MICROPOROUS STRUCTURES**
Soroush, F., Liu, T., Wu, Q., Asheghi, M., Goodson, K. E., Marco, L., Christian, E., Martin, R., Amer Soc Mech Engineers
AMER SOC MECHANICAL ENGINEERS.2021
 - **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
 - **Performance and Manufacturing of Silicon-Based Vapor Chambers** *APPLIED MECHANICS REVIEWS*
Liu, T., Asheghi, M., Goodson, K. E.
2021; 73 (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
- **Bicontinuous Mesoporous Metal Foams with Enhanced Conductivity and Tunable Pore Size and Porosity via Electrodeposition for Electrochemical and Thermal Systems** *ACS APPLIED NANO MATERIALS*
Katz, J. S., Zhang, C., Barako, M. T., Kim, H. K., Asheghi, M., Kenny, T. W., Goodson, K. E.
2020; 3 (12): 12408–15
- **Direct Quantification of Heat Generation Due to Inelastic Scattering of Electrons Using a Nanocalorimeter** *ADVANCED SCIENCE*
Park, J., Bae, K., Kim, T., Perez, C., Sood, A., Asheghi, M., Goodson, K. E., Park, W.
2020
- **Steady-State Parametric Optimization and Transient Characterization of Heat Flow Regulation With Binary Diffusion** *IEEE TRANSACTIONS ON COMPONENTS PACKAGING AND MANUFACTURING TECHNOLOGY*
Liu, T., Palko, J. W., Katz, J. S., Zhou, F., Dede, E. M., Asheghi, M., Goodson, K. E.
2020; 10 (12): 1996–2007
- **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
- **Low Offset and Noise in High Biased GaN 2DEG Hall-Effect Plates Investigated With Infrared Microscopy** *JOURNAL OF MICROELECTROMECHANICAL SYSTEMS*
Dowling, K. M., Liu, T., Alpert, H. S., Chapin, C. A., Eisner, S. R., Yalamarthy, A., Satterthwaite, P. F., Kock, H., Ausserlechner, U., Asheghi, M., Goodson, K. E., Senesky, D. G.
2020; 29 (5): 669–76
- **Thermal and Manufacturing Design Considerations for Silicon-Based Embedded Microchannel-3D Manifold Coolers (EMMCs): Part 1-Experimental Study of Single-Phase Cooling Performance With R-245fa**
Jung, K., Cho, E., Lee, H., Kharangate, C., Zhou, F., Asheghi, M., Dede, E. M., Goodson, K. E.
ASME.2020
- **Thermal and Manufacturing Design Considerations for Silicon-Based Embedded Microchannel-Three-Dimensional Manifold Coolers-Part 2: Parametric Study of EMMC for High Heat Flux (similar to 1kW/cm²) Power Electronics Cooling**
Jung, K., Hazra, S., Kwon, H., Piazza, A., Jih, E., Asheghi, M., Gupta, M., Degner, M., Goodson, K. E.
ASME.2020
- **Thermal and Manufacturing Design Considerations for Silicon-Based Embedded Microchannel Three-Dimensional-Manifold Coolers (EMMC)-Part 3: Addressing Challenges in Laser Micromachining-Based Manufacturing of Three-Dimensional-Manifolded Microcooler Devices**
Hazra, S., Jung, K., Iyengar, M., Malone, C., Asheghi, M., Goodson, K. E.
ASME.2020
- **Effect of Adventitious Carbon on Pit Formation of Monolayer MoS₂.** *Advanced materials (Deerfield Beach, Fla.)*
Park, S., Siahrostami, S., Park, J., Mostaghimi, A. H., Kim, T. R., Vallez, L., Gill, T. M., Park, W., Goodson, K. E., Sinclair, R., Zheng, X.
2020: e2003020
- **Characterization and thermal modeling of a miniature silicon vapor chamber for die-level heat redistribution** *INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER*
Liu, T., Dunham, M. T., Jung, K., Chen, B., Asheghi, M., Goodson, K. E.
2020; 152
- **Tungsten-doped Ge₂Sb₂Te₅ phase change material for high-speed optical switching devices** *APPLIED PHYSICS LETTERS*
Guo, P., Burrow, J. A., Sevison, G. A., Kwon, H., Perez, C., Hendrickson, J. R., Smith, E. M., Asheghi, M., Goodson, K. E., Agha, I., Sarangan, A. M.
2020; 116 (13)
- **Investigation of 3D manifold architecture heat sinks in air-cooled condensers** *APPLIED THERMAL ENGINEERING*
Kharangate, C. R., Libeer, W., Palko, J., Lee, H., Shi, J., Asheghi, M., Goodson, K. E.
2020; 167

- **Lithography and Etching-Free Microfabrication of Silicon Carbide on Insulator Using Direct UV Laser Ablation** *ADVANCED ENGINEERING MATERIALS*
Tuan-Khoa Nguyen, Hoang-Phuong Phan, Dowling, K. M., Yalamarthy, A., Toan Dinh, Balakrishnan, V., Liu, T., Chapin, C. A., Quoc-Dung Truong, Van Thanh Dau, Goodson, K. E., Senesky, D. G., Dzung Viet Dao, Nam-Trung Nguyen
2020
- **Phase Change Dynamics and Two-Dimensional 4-Bit Memory in Ge₂Sb₂Te₅ via Telecom-Band Encoding** *ACS PHOTONICS*
Sevison, G. A., Farzinazar, S., Burrow, J. A., Perez, C., Kwon, H., Lee, J., Asheghi, M., Goodson, K. E., Sarangan, A., Hendrickson, J. R., Agha, I.
2020; 7 (2): 480–87
- **Tunable Dielectric and Thermal Properties of Oxide Dielectrics via Substrate Biasing in Plasma-Enhanced Atomic Layer Deposition.** *ACS applied materials & interfaces*
Kim, Y. n., Kwon, H. n., Han, H. S., Kim, H. J., Kim, B. S., Lee, B. C., Lee, J. n., Asheghi, M. n., Prinz, F. B., Goodson, K. E., Lim, J. n., Sim, U. n., Park, et al
2020
- **Mechanical Design and Reliability of Gold-Tin Eutectic Bonding for Silicon-based Thermal Management Devices**
Soroush, F., Jung, K., Iyengar, M., Malone, C., Asheghi, M., Goodson, K., IEEE
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PRESENTATIONS

- Hawkins Lectureship, Purdue University (2015) - Purdue University
- Aisinjoro-Soo Lectureship, University of Illinois Urbana-Champaign (2015)
- Rohsenow Lectureship, MIT (2015)
- Dusenberre Lectureship, Penn State (2012)
- Conference Plenaries, InterPACK (2002, 2017)
- Conference Plenaries, IITHERM (2004, 2018)
- Conference Plenary, THERMINIC (2004)
- Opening Conference Plenary, PHONONS (2012)