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PROFESSIONAL PREPARATION

1993	B.S in Physics with Highest Honors	University of Michigan, Ann Arbor, MI
2000	Ph.D. in Physics	Cornell University, Ithaca, NY
2000-3	Postdoctoral studies in Chemistry	Harvard University, Cambridge, MA

APPOINTMENTS

2012-present	Professor of Materials Science and Engineering
2011-present	Associate Chair of Materials Science and Engineering
2009-2012	Associate Professor of Materials Science and Engineering
2006-2009	Morris E. Fine Junior Professor of Materials and Manufacturing
2003-2009	Assistant Professor Northwestern University, Department of Materials Science and Engineering,
2000-2003	Postdoctoral Fellow Harvard University, Department of Chemistry and Chemical Biology

HONORS AND AWARDS

- Participant, Keck Futures Initiative "Seeing the Future with Imaging Science", 2010.
- German-America Frontiers of Science Participant (NAS Kavli Fellow), 2008.
- Camille Dreyfus Teacher-Scholar, 2008.
- Alfred P. Sloan Research Fellowship, 2007.
- Morris E. Fine Junior Chair in Materials and Manufacturing, 2006.
- Teacher of the Year, Department of Materials Science & Engineering, 2006.
- NSF CAREER Award, 2005.
- Junior Fellow, Searle Center for Teaching Excellence 2004.
- Nottingham Prize of the Physical Electronics Conference, 2000.
- Sigma Pi Sigma National Physics Honor Society, 1992.

SERVICE ACTIVITIES

Program Leadership

- Associate Chair, Department of Materials Science and Engineering (2011-present)
- Co-Director, Applied Physics Graduate Program
- Co-Leader, MRSEC IRG-1 (2007-present)
- Faculty Director, Research Experience for Teachers Program, NU MRSEC (2004-present)
- Director, Hierarchical Materials Cluster Program (2009-2011)

Conference Organization

- Program Chair, Physics and Chemistry of Surfaces and Interfaces 46 (2018-2019)
- Program Development Subcommittee, Materials Research Society (2012-2016).
- Electronic Materials Committee elected member (2015-)
- Organizing Committee, Electronic Materials Conference (affiliated with TMS) (2010, 2011)
- Organizing Committee, Physics and Chemistry of Semiconductor Interfaces (affiliated with American Vacuum Society) (2012-)
- Symposium co-organizer, Materials Research Society Meeting (Fall 2008, Spring 2011, Spring 2012), Program Development Sub-Committee (2011-present)
- Committee Member, Nanoscale Science and Technology Division, American Vacuum Society, Fall 2013-2015.
- Focus Session Co-Organizer for Division of Materials Physics, American Physical Society March Meeting (2011, 2012)

Reviewing and Advisory Activities

- Board of Directors, Materials Research Society (2017-2019)
- Advisory Board, Materials Research Science and Engineering Center, Ohio State University (2016-present)
- Panelist for NSF DMR (2007, 2011, 2014)
- Associate Editor, *Nanoscale Research Letters*, (2006-2011)
- Proposal reviewer for: National Science Foundation, Department of Energy, American Chemical Society Petroleum Research Fund, Foundation for Fundamental Research on Matter (Netherlands), Research Grants Council of Hong Kong, United States-Israel Binational Science Foundation, Molecular Foundry, California Energy Institute.
- Peer reviewer for: Science, Nature Nanotechnology, Nature Materials, Nano Letters, Journal of the American Chemical Society, Advanced Materials, Applied Physics Letters, Chemistry of Materials, Journal of Physical Chemistry, Small, Nanotechnology, Journal of Applied Physics, Journal of Electronic Materials, Journal of Physics: Condensed Matter, IEEE Proceedings, Crystal Growth and Design, Journal of Crystal Growth, Journal of Vacuum Science and Technology, Materials Today.
- Advisory Board, University of Illinois Chicago/Purdue/Colorado School of Mines Concept Inventory Development project (NSF REESE).

Additional Departmental and School Service Activities

- TGS Advisory Council on Academic Affairs (15/16-present)
- Ad Hoc Member, Limited Submission Advisory Committee (14/15-present)
- Promotion and Tenure Committee (16/17, 17/18)
- TGS Funding Council (14/15, 15/16)
- Ad-Hoc Promotion and Tenure Committee (13/14, 15/16, 17/18)
- Director of Graduate Admissions (08/09, 09/10, 10/11)
- Graduate Admissions Committee (03/04, 06/07, 07/08)
- Chair, Undergraduate Recruiting Committee (2004-2008)
- Class of 2008 Academic Advisor (2005-2009)
- McCormick Freshman Advisor (2004)

PATENTS

U.S. Patent No. 20070281156 “Nanoscale wires and related devices”, Charles M. Lieber, Xiangfeng Duan, Yi Cui, Yu Huang, Mark Gudiksen, Lincoln J. Lauhon, Jianfang Wang, Hongkun Park, Qingqiao Wei, Wenjie Liang, David C. Smith, Deli Wang, Zhaohui Zhong.

U.S. Patent No. 9515257 “Gate-Tunable Atomically-Thin Memristors and Methods for Preparing Same and Applications of Same”. Mark C. Hersam, Vinod K. Sangwan, Deep M. Jariwala, In Soo Kim, Tobin J. Marks, Lincoln J. Lauhon.

PUBLICATIONS

1. Zhang, Y. Y.; Sun, Z. Y.; Sanchez, A. M.; Ramsteiner, M.; Agesen, M.; Wu, J.; Kim, D.; Jurczak, P.; Huo, S. G.; Lauhon, L. J.; Liu, H. Y. Doping of Self-Catalyzed Nanowires under the Influence of Droplets. *Nano Lett* **2018**, *18*, 81.
2. Sun, Z. Y.; Hazut, O.; Yerushalmi, R.; Lauhon, L. J.; Seidman, D. N. Criteria and considerations for preparing atom-probe tomography specimens of nanomaterials utilizing an encapsulation methodology. *Ultramicroscopy* **2018**, *184*, 225.
3. Stettner, T.; Thurn, A.; Doblinger, M.; Hill, M. O.; Bissinger, J.; Schmiedeke, P.; Matich, S.; Kostenbader, T.; Ruhstorfer, D.; Riedl, H.; Kaniber, M.; Lauhon, L. J.; Finley, J. J.; Koblmuller, G. Tuning Lasing Emission toward Long Wavelengths in GaAs-(In,Al)GaAs Core-Multishell Nanowires. *Nano Lett* **2018**, *18*, 6292.
4. Sangwan, V. K.; Beck, M. E.; Henning, A.; Luo, J. J.; Bergeron, H.; Kang, J. M.; Balla, I.; Inbar, H.; Lauhon, L. J.; Hersam, M. C. Self-Aligned van der Waals Heterojunction Diodes and Transistors. *Nano Lett* **2018**, *18*, 1421.
5. Rose, W.; Haas, H.; Chen, A. Q.; Jeon, N.; Lauhon, L. J.; Cory, D. G.; Budakian, R. High-Resolution Nanoscale Solid-State Nuclear Magnetic Resonance Spectroscopy. *Physical Review X* **2018**, *8*, 011030.
6. Pospel, C.; Becker, J.; Jeon, N.; Doblinger, M.; Stettner, T.; Gottschalk, Y. T.; Loitsch, B.; Matich, S.; Altschner, M.; Holleitner, A. W.; Finley, J. J.; Lauhon, L. J.; Koblmuller, G. He-Ion Microscopy as a High-Resolution Probe for Complex Quantum Heterostructures in Core-Shell Nanowires. *Nano Lett* **2018**, *18*, 3911.
7. Moody, M. J.; Henning, A.; Jurca, T.; Shang, J. Y.; Bergeron, H.; Balla, I.; Olding, J. N.; Weiss, E. A.; Hersam, M. C.; Lohr, T. L.; Marks, T. J.; Lauhon, L. J. Atomic Layer Deposition of Molybdenum Oxides with Tunable Stoichiometry Enables Controllable Doping of MoS₂. *Chemistry of Materials* **2018**, *30*, 3628.
8. Jeon, N.; Ruhstorfer, D.; Doblinger, M.; Matich, S.; Loitsch, B.; Koblmuller, G.; Lauhon, L. Connecting Composition-Driven Faceting with Facet-Driven Composition Modulation in GaAs-AlGaAs Core-Shell Nanowires. *Nano Lett* **2018**, *18*, 5179.
9. Hill, M. O.; Calvo-Almazan, I.; Allain, M.; Holt, M. V.; Ulvestad, A.; Treu, J.; Koblmuller, G.; Huang, C. Y.; Huang, X. J.; Yan, H. F.; Nazaretski, E.; Chu, Y. S.; Stephenson, G. B.; Chamard, V.; Lauhon, L. J.; Hruszkewycz, S. O. Measuring Three-Dimensional Strain and Structural Defects in a Single InGaAs Nanowire Using Coherent X-ray Multiangle Bragg Projection Ptychography. *Nano Lett* **2018**, *18*, 811.
10. Henning, A.; Sangwan, V. K.; Bergeron, H.; Balla, I.; Sun, Z. Y.; Hersam, M. C.; Lauhon, L. J. Charge Separation at Mixed-Dimensional Single and Multilayer MoS₂/Silicon Nanowire Heterojunctions. *Acs Applied Materials & Interfaces* **2018**, *10*, 16760.
11. Friedl, M.; Cerveny, K.; Weigele, P.; Tutuncuoglu, G.; Marti-Sanchez, S.; Huang, C. Y.; Patlatiuk, T.; Potts, H.; Sun, Z. Y.; Hill, M. O.; Guniat, L.; Kim, W.; Zamani, M.; Dubrovskii, V. G.; Arbiol, J.; Lauhon, L. J.; Zumbuhl, D. M.; Morral, A. F. I. Template-Assisted Scalable Nanowire Networks. *Nano Lett* **2018**, *18*, 2666.

12. Becker, J.; Hill, M. O.; Sonner, M.; Treu, J.; Doblinger, M.; Hirler, A.; Riedl, H.; Finley, J. J.; Lauhon, L.; Koblmuller, G. Correlated Chemical and Electrically Active Dopant Analysis in Catalyst-Free Si-Doped InAs Nanowires. *ACS Nano* **2018**, *12*, 1603.
13. Yoon, J. H.; Zhang, J. M.; Ren, X. C.; Wang, Z. R.; Wu, H. Q.; Li, Z. Y.; Barnell, M.; Wu, Q.; Lauhon, L. J.; Xia, Q. F.; Yang, J. J. Truly Electroforming-Free and Low-Energy Memristors with Preconditioned Conductive Tunneling Paths. *Advanced Functional Materials* **2017**, *27*, 1702010.
14. Wang, K. C.; Stanev, T. K.; Valencia, D.; Charles, J.; Henning, A.; Sangwan, V. K.; Lahiri, A.; Mejia, D.; Sarangapani, P.; Povolotskyi, M.; Afzal, A.; Maassen, J.; Klimeck, G.; Hersam, M. C.; Lauhon, L. J.; Stern, N. P.; Kubis, T. Control of interlayer physics in 2H transition metal dichalcogenides. *J Appl Phys* **2017**, *122*, 224302.
15. Sun, Z. Y.; Tzaguy, A.; Hazut, O.; Lauhon, L. J.; Yerushalmi, R.; Seidman, D. N. 1-D Metal Nanobead Arrays within Encapsulated Nanowires via a Red-Ox-Induced Dewetting: Mechanism Study by Atom-Probe Tomography. *Nano Lett* **2017**, *17*, 7478.
16. Sun, Z. Y.; Seidman, D. N.; Lauhon, L. J. Nanowire Kinking Modulates Doping Profiles by Reshaping the Liquid-Solid Growth Interface. *Nano Lett* **2017**, *17*, 4518.
17. Palacios, E.; Park, S.; Lauhon, L.; Aydin, K. Identifying Excitation and Emission Rate Contributions to Plasmon-Enhanced Photoluminescence from Monolayer MoS₂ Using a Tapered Gold Nanoantenna. *ACS Photonics* **2017**, *4*, 1602.
18. Palacios, E.; Park, S.; Butun, S.; Lauhon, L.; Aydin, K. Enhanced radiative emission from monolayer MoS₂ films using a single plasmonic dimer nanoantenna. *Appl Phys Lett* **2017**, *111*, 031101.
19. Jurca, T.; Moody, M. J.; Henning, A.; Emery, J. D.; Wang, B. H.; Tan, J. M.; Lohr, T. L.; Lauhon, L. J.; Marks, T. J. Low-Temperature Atomic Layer Deposition of MoS₂ Films. *Angewandte Chemie-International Edition* **2017**, *56*, 4991.
20. Irber, D. M.; Seidl, J.; Carrad, D. J.; Becker, J.; Jeon, N.; Loitsch, B.; Winnerl, J.; Matich, S.; Doblinger, M.; Tang, Y.; Morkotter, S.; Abstreiter, G.; Finley, J. J.; Grayson, M.; Lauhon, L. J.; Koblmuller, G. Quantum Transport and Sub-Band Structure of Modulation-Doped GaAs/AlAs Core-Superlattice Nanowires. *Nano Lett* **2017**, *17*, 4886.
21. Hu, J. T.; Ren, X. C.; Reed, A. N.; Reese, T.; Rhee, D.; Howe, B.; Lauhon, L. J.; Urbas, A. M.; Odom, T. W. Evolutionary Design and Prototyping of Single Crystalline Titanium Nitride Lattice Optics. *ACS Photonics* **2017**, *4*, 606.
22. Yoon, K.; Lee, J. H.; Kang, J.; Kang, J.; Moody, M. J.; Hersam, M. C.; Lauhon, L. J. Metal-Free Carbon-Based Nanomaterial Coatings Protect Silicon Photoanodes in Solar Water-Splitting. *Nano Lett* **2016**, *16*, 7370.
23. Sun, Z. Y.; Hazut, O.; Huang, B. C.; Chiu, Y. P.; Chang, C. S.; Yerushalmi, R.; Lauhon, L. J.; Seidman, D. N. Dopant Diffusion and Activation in Silicon Nanowires Fabricated by ex Situ Doping: A Correlative Study via Atom-Probe Tomography and Scanning Tunneling Spectroscopy. *Nano Lett* **2016**, *16*, 4490.
24. Ren, X. C.; Singh, A. K.; Fang, L.; Kanatzidis, M. G.; Tavazza, F.; Davydov, A. V.; Lauhon, L. J. Atom Probe Tomography Analysis of Ag Doping in 2D Layered Material (PbSe)₅(Bi₂Se₃)₃. *Nano Lett* **2016**, *16*, 6064.
25. Loitsch, B.; Jeon, N.; Doblinger, M.; Winnerl, J.; Parzinger, E.; Matich, S.; Wurstbauer, U.; Riedl, H.; Abstreiter, G.; Finley, J. J.; Lauhon, L. J.; Koblmuller, G. Suppression of alloy fluctuations in GaAs-AlGaAs core-shell nanowires. *Appl Phys Lett* **2016**, *109*, 093105.
26. Jariwala, D.; Howell, S. L.; Chen, K. S.; Kang, J. M.; Sangwan, V. K.; Filippone, S. A.; Turrisi, R.; Marks, T. J.; Lauhon, L. J.; Hersam, M. C. Hybrid, Gate-Tunable, van der Waals p-n Heterojunctions from Pentacene and MoS₂. *Nano Lett* **2016**, *16*, 497.
27. Hu, J. T.; Liu, C. H.; Ren, X. C.; Lauhon, L. J.; Odom, T. W. Plasmonic Lattice Lenses for Multiwavelength Achromatic Focusing. *ACS Nano* **2016**, *10*, 10275.

28. Amit, I.; Jeon, N.; Lauhon, L. J.; Rosenwaks, Y. Impact of Dopant Compensation on Graded p-n Junctions in Si Nanowires. *Acs Applied Materials & Interfaces* **2016**, *8*, 128.
29. van't Erve, O. M. J.; Friedman, A. L.; Li, C. H.; Robinson, J. T.; Connell, J.; Lauhon, L. J.; Jonker, B. T. Spin transport and Hanle effect in silicon nanowires using graphene tunnel barriers. *Nat Commun* **2015**, *6*, 8541.
30. Sangwan, V. K.; Jariwala, D.; Kim, I. S.; Chen, K. S.; Marks, T. J.; Lauhon, L. J.; Hersam, M. C. Gate-tunable memristive phenomena mediated by grain boundaries in single-layer MoS₂. *Nat Nanotechnol* **2015**, *10*, 403.
31. Ren, X. C.; Riley, J. R.; Koleske, D. D.; Lauhon, L. J. Correlated high-resolution x-ray diffraction, photoluminescence, and atom probe tomography analysis of continuous and discontinuous In_xGa_{1-x}N quantum wells. *Appl Phys Lett* **2015**, *107*, 022107.
32. Morkotter, S.; Jeon, N.; Rudolph, D.; Loitsch, B.; Spirkoska, D.; Hoffmann, E.; Doblinger, M.; Matich, S.; Finley, J. J.; Lauhon, L. J.; Abstreiter, G.; Koblmuller, G. Demonstration of Confined Electron Gas and Steep-Slope Behavior in Delta-Doped GaAs-AlGaAs Core-Shell Nanowire Transistors. *Nano Lett* **2015**, *15*, 3295.
33. Liu, C. H.; Kim, I. S.; Lauhon, L. J. Optical Control of Mechanical Mode-Coupling within a MoS₂ Resonator in the Strong-Coupling Regime. *Nano Lett* **2015**, *15*, 6727.
34. Jeon, N.; Loitsch, B.; Morkotter, S.; Abstreiter, G.; Finley, J.; Krenner, H. J.; Koblmuller, G.; Lauhon, L. J. Alloy Fluctuations Act as Quantum Dot-like Emitters in GaAs-AlGaAs Core-Shell Nanowires. *Acs Nano* **2015**, *9*, 8335.
35. Jeon, N.; Lauhon, L. J., in *Semiconductor Nanowires I: Growth and Theory*, edited by A. F. I. Morral, S. A. Dayeh, and C. Jagadish (2015), Vol. 93, pp. 249.
36. Jariwala, D.; Sangwan, V. K.; Seo, J. W. T.; Xu, W. C.; Smith, J.; Kim, C. H.; Lauhon, L. J.; Marks, T. J.; Hersam, M. C. Large-Area, Low-Voltage, Antiamipolar Heterojunctions from Solution-Processed Semiconductors. *Nano Lett* **2015**, *15*, 416.
37. Howell, S. L.; Jariwala, D.; Wu, C. C.; Chen, K. S.; Sangwan, V. K.; Kang, J. M.; Marks, T. J.; Hersam, M. C.; Lauhon, L. J. Investigation of Band-Offsets at Monolayer-Multilayer MoS₂ Junctions by Scanning Photocurrent Microscopy. *Nano Lett* **2015**, *15*, 2278.
38. Wood, J. D.; Wells, S. A.; Jariwala, D.; Chen, K. S.; Cho, E.; Sangwan, V. K.; Liu, X. L.; Lauhon, L. J.; Marks, T. J.; Hersam, M. C. Effective Passivation of Exfoliated Black Phosphorus Transistors against Ambient Degradation. *Nano Lett* **2014**, *14*, 6964.
39. Sangwan, V. K.; Jariwala, D.; Everaerts, K.; McMorrow, J. J.; He, J. T.; Grayson, M.; Lauhon, L. J.; Marks, T. J.; Hersam, M. C. Wafer-scale solution-derived molecular gate dielectrics for low-voltage graphene electronics. *Appl Phys Lett* **2014**, *104*, 083503.
40. Riley, J. R.; Detchprohm, T.; Wetzel, C.; Lauhon, L. J. On the reliable analysis of indium mole fraction within In_xGa_{1-x}N quantum wells using atom probe tomography. *Appl Phys Lett* **2014**, *104*, 152102.
41. Padalkar, S.; Riley, J. R.; Li, Q. M.; Wang, G. T.; Lauhon, L. J. Lift-out procedures for atom probe tomography targeting nanoscale features in core-shell nanowire heterostructures. *Phys Status Solidi C* **2014**, *11*, 656.
42. Kim, I. S.; Sangwan, V. K.; Jariwala, D.; Wood, J. D.; Park, S.; Chen, K. S.; Shi, F. Y.; Ruiz-Zepeda, F.; Ponce, A.; Jose-Yacaman, M.; Draid, V. P.; Marks, T. J.; Hersam, M. C.; Lauhon, L. J. Influence of Stoichiometry on the Optical and Electrical Properties of Chemical Vapor Deposition Derived MoS₂. *Acs Nano* **2014**, *8*, 10551.
43. Jariwala, D.; Sangwan, V. K.; Lauhon, L. J.; Marks, T. J.; Hersam, M. C. Emerging Device Applications for Semiconducting Two-Dimensional Transition Metal Dichalcogenides. *Acs Nano* **2014**, *8*, 1102.
44. Hyun, J. K.; Park, J.; Kim, E.; Lauhon, L. J.; Jeon, S. Rational Control of Diffraction and Interference from Conformal Phase Gratings: Toward High-Resolution 3D Nanopatterning. *Adv Opt Mater* **2014**, *2*, 1213.

45. Huntington, M. D.; Lauhon, L. J.; Odom, T. W. Subwavelength Lattice Optics by Evolutionary Design. *Nano Lett* **2014**, *14*, 7195.
46. Holsteen, A.; Kim, I. S.; Lauhon, L. J. Extraordinary Dynamic Mechanical Response of Vanadium Dioxide Nanowires around the Insulator to Metal Phase Transition. *Nano Lett* **2014**, *14*, 1898.
47. Coltrin, M. E.; Armstrong, A. M.; Brener, I.; Chow, W. W.; Crawford, M. H.; Fischer, A. J.; Kelley, D. F.; Koleske, D. D.; Lauhon, L. J.; Martin, J. E.; Nyman, M.; Schubert, E. F.; Shea-Rohwer, L. E.; Subramania, G.; Tsao, J. Y.; Wang, G. T.; Wierer, J. J.; Wright, J. B. Energy Frontier Research Center for Solid-State Lighting Science: Exploring New Materials Architectures and Light Emission Phenomena. *J Phys Chem C* **2014**, *118*, 13330.
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51. Wu, C.-C.; Jariwala, D.; Sangwan, V. K.; Marks, T. J.; Hersam, M. C.; Lauhon, L. J. Elucidating the Photoresponse of Ultrathin MoS₂ Field-Effect Transistors by Scanning Photocurrent Microscopy. *J Phys Chem Lett* **2013**, *4*, 2508.
52. Wang, Z.; Gu, M.; Zhou, Y.; Zu, X.; Connell, J. G.; Xiao, J.; Perea, D.; Lauhon, L. J.; Bang, J.; Zhang, S.; Wang, C.; Gao, F. Electron-Rich Driven Electrochemical Solid-State Amorphization in Li-Si Alloys. *Nano Lett* **2013**, *13*, 4511.
53. Tselev, A.; Sangwan, V. K.; Jariwala, D.; Marks, T. J.; Lauhon, L. J.; Hersam, M. C.; Kalinin, S. V. Near-field microwave microscopy of high-kappa oxides grown on graphene with an organic seeding layer. *Appl Phys Lett* **2013**, *103*.
54. Shastry, T. A.; Seo, J. W. T.; Lopez, J. J.; Arnold, H. N.; Kelter, J. Z.; Sangwan, V. K.; Lauhon, L. J.; Marks, T. J.; Hersam, M. C. Large-Area, Electronically Monodisperse, Aligned Single-Walled Carbon Nanotube Thin Films Fabricated by Evaporation-Driven Self-Assembly. *Small* **2013**, *9*, 45.
55. Sczygelski, E.; Sangwan, V. K.; Wu, C. C.; Arnold, H. N.; Everaerts, K.; Marks, T. J.; Hersam, M. C.; Lauhon, L. J. Extrinsic and intrinsic photoresponse in monodisperse carbon nanotube thin film transistors. *Appl Phys Lett* **2013**, *102*, 083104.
56. Sangwan, V. K.; Jariwala, D.; Filippone, S. A.; Karmel, H. J.; Johns, J. E.; Alaboson, J. M. P.; Marks, T. J.; Lauhon, L. J.; Hersam, M. C. Quantitatively Enhanced Reliability and Uniformity of High-kappa Dielectrics on Graphene Enabled by Self-Assembled Seeding Layers. *Nano Lett* **2013**, *13*, 1162.
57. Sangwan, V. K.; Arnold, H. N.; Jariwala, D.; Marks, T. J.; Lauhon, L. J.; Hersam, M. C. Low-Frequency Electronic Noise in Single-Layer MoS₂ Transistors. *Nano Lett* **2013**, *13*, 4351.
58. Riley, J. R.; Padalkar, S.; Li, Q.; Lu, P.; Koleske, D. D.; Wierer, J. J.; Wang, G. T.; Lauhon, L. J. Three-Dimensional Mapping of Quantum Wells in a GaN/InGaN Core-Shell Nanowire Light-Emitting Diode Array. *Nano Lett* **2013**, *13*, 4317.
59. Nichol, J. M.; Naibert, T. R.; Hemesath, E. R.; Lauhon, L. J.; Budakian, R. Nanoscale Fourier-Transform Magnetic Resonance Imaging. *Physical Review X* **2013**, *3*.
60. Jeon, N.; Dayeh, S. A.; Lauhon, L. J. Origin of Polytype Formation in VLS-Grown Ge Nanowires through Defect Generation and Nanowire Kinking. *Nano Lett* **2013**, *13*, 3947.
61. Jariwala, D.; Sangwan, V. K.; Wu, C.-C.; Prabhumirashi, P. L.; Geier, M. L.; Marks, T. J.; Lauhon, L. J.; Hersam, M. C. Gate-tunable carbon nanotube-MoS₂ heterojunction p-n diode. *Proceedings of the National Academy of Sciences of the United States of America* **2013**, *110*, 18076.

62. Jariwala, D.; Sangwan, V. K.; Lauhon, L. J.; Marks, T. J.; Hersam, M. C. Carbon nanomaterials for electronics, optoelectronics, photovoltaics, and sensing. *Chem Soc Rev* **2013**, *42*, 2824.
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64. Howell, S. L.; Padalkar, S.; Yoon, K.; Li, Q.; Koleske, D. D.; Wierer, J. J.; Wang, G. T.; Lauhon, L. J. Spatial Mapping of Efficiency of GaN/InGaN Nanowire Array Solar Cells Using Scanning Photocurrent Microscopy. *Nano Lett* **2013**.
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INVITED TECHNICAL PRESENTATIONS

Academic Seminars and Colloquia

- “Non-Planar Mixed-Dimensional Heterostructures for Conventional and Unconventional Computing”, Fudan University, Shanghai, China, August 31, 2018
- “Non-Planar Mixed-Dimensional Heterostructures for Conventional and Unconventional Computing”, Nanjing University, Nanjing, China, August 30, 2018
- “Non-Planar Mixed-Dimensional Heterostructures for Conventional and Unconventional Computing”, Wuhan University of Technology, Wuhan, China, August 28, 2018
- “Total Tomography of Nonplanar Heterostructures”, Yonsei University, Department of Materials Science and Engineering, Seoul, Korea, July 12, 2017.
- “Novel behaviors in mixed dimensional heterojunctions”, Yonsei University, Department of Physics, Seoul, Korea, July 12, 2017.
- “Novel behaviors in mixed dimensional heterojunctions”, NIST, Gaithersburg, February 22, 2017.
- “Structural and Functional Imaging of Low-Dimensional Materials and Heterostructures”, Chemistry Seminar, Colorado State University, Ft. Collins, February 3, 2017.
- “Novel Behaviors in Low-Dimensional Materials and Heterostructures”, Walter Schottky Institute Seminar, TU Munich, Garching, Germany, August 31, 2016.
- “Novel Behaviors in Low-Dimensional Materials and Heterostructures”, Paul Drude Institute Seminar, Berlin, Germany, August 29, 2016.
- “Novel behaviors in low-dimensional materials and heterostructures,” MIE Department Seminar University of Illinois Chicago, Chicago, IL, March 1, 2016.

“Novel behaviors in 2-D materials and devices”, Colloquium, Center for Nanophysics and Advanced Materials, University of Maryland, College Park, Maryland, November 12, 2015.

“Novel behaviors in 2-D materials and devices”, Colloquium, Department of Physics, University of South Florida, Tampa, Florida, October 9, 2015.

“Novel attributes of non-planar heterojunctions in low-dimensional materials,” Yonsei University, Seoul, Korea, September 2, 2015.

“Novel attributes of non-planar heterojunctions in low-dimensional materials,” Ewha Womans University, Seoul, Korea, September 1, 2015.

“Novel attributes of non-planar heterojunctions in low-dimensional materials,” Sungkyunkwan University, Suwon, Korea, August 31, 2015.

“Novel attributes of non-planar heterojunctions in low-dimensional materials,” Lund University, Physics Colloquium, Sweden, May 28, 2015.

“Optomechanical studies of VO₂ nanowires and MoS₂ membranes,” Niels Bohr Institute, University of Copenhagen, Denmark, May 27, 2015.

“Functional Imaging of Low-Dimensional Materials and Devices,” Materials Science Division Colloquium, Argonne National Laboratory, December 18, 2014.

University of Texas at Austin, CNM Seminar, October 29, 2014.

Ohio State University, Materials Science and Engineering Colloquium, January 31, 2014.

Walter Schottky Institute, TU Munich, Seminar, June 18, 2013.

ETH Zurich, Institute of Process Engineering Seminar, June 7, 2013.

University of Michigan, EFRC Seminar, November 15, 2012.

Washington State University, Physics Colloquium, November 6, 2012.

University of California Santa Barbara, Materials Science and Engineering Colloquium, June 1, 2012.

University of California Irvine, Condensed Matter Physics Seminar, May 30, 2012.

University of Southern California, Distinguished Lecture in Chemical Engineering and Materials Science, October 13, 2011.

Tel Aviv University, Electrical Engineering Seminar, June 12, 2011.

Weitzman Institute of Science, Department of Materials and Interfaces Seminar, June 9, 2011.

NIST Center for Nanoscale Science and Technology, May 19, 2011.

Drexel University, Materials Science and Engineering Seminar, May 4, 2011.

Cornell University, Center for Nanoscale Systems Seminar, April 5, 2011.

Case Western Reserve University, Condensed Matter Seminar, April 26, 2010.

Purdue University, Physical Chemistry Seminar, West Lafayette, December 9, 2009.

Brown University, Engineering Seminar, Providence, May 4, 2009.

Ohio State University, Condensed Matter Seminar, Columbus, April 30, 2009.

Yale University, Nanoscience Seminar, New Haven, December 5, 2008.

Pennsylvania State University, Materials Science and Engineering Seminar, University Park, November 13, 2008.

Stanford University, Materials Science and Engineering Colloquium, Palo Alto, October 24, 2008.

U. of Maryland, Materials Science and Engineering Seminar, May 9, 2008.

U. of Wisconsin, Materials Science Seminar, Madison, May 1, 2008.

Northwestern University, Engineering Sciences and Applied Mathematics Colloquium, November 26, 2007.

U. of California Los Angeles, Materials Science and Engineering Seminar, November 9, 2007.

Seoul National University, Department of Physics Seminar, Korea, August 30, 2007.

SKKU Advanced Institute of Nanotechnology, Materials Science and Engineering Seminar, Sungkyunkwan University, Korea, August 29, 2007.

Yonsei University, Materials Science and Engineering Colloquium, Korea, August 28, 2007.

Korean Institute of Science and Technology, Seoul, August 28, 2007.

U. of California Berkeley, Berkeley Nanosciences and Nanoengineering Institute Seminar, April 13, 2007.

Lund University, Solid State Physics Seminar, Sweden, March 20, 2007.

University of Copenhagen, Department of Physics Seminar, Denmark, March 19, 2007.

Tsinghua University, Tsinghua-Foxconn Nanotechnology Center Seminar, June 12, 2006.

U. of North Carolina Chapel Hill, Condensed Matter Physics Seminar, March 7, 2006.

North Carolina State University, Physics Colloquium, March 6, 2006.

Argonne National Laboratory, Materials Science Division Colloquium, December, 2004.

Northwestern University, Condensed Matter Physics Seminar, February 26, 2004.

Society Meetings

“Studies of Carrier Generation, Separation, and Transport in Mixed-Dimensional Heterojunctions by Scanning Photocurrent Microscopy”, Materials Research Society Fall Meeting, Boston, November 26, 2018.

“Variable Doping of MoS₂ by Atomic Layer Deposition of Molybdenum Oxides of Controlled Stoichiometry”, AiMES/Electrochemical Society Joint Meeting, Cancun, Mexico, October 2, 2018

“Total Tomography of Nonplanar Heterostructures: Doping and Confinement Potentials”, Joint Meeting of European Physical Society/German Physical Society Condensed Matter Divisions, Berlin, Germany, March 13, 2018.

“Novel behaviors in mixed-dimensional heterostructures”, Nano Korea 2017, Seoul, July 13, 2017.

“Chemical and Functional Imaging of 2D Materials and Devices”, Materials Research Society Spring Meeting, San Francisco, April 19, 2017.

“Optomechanical studies of VO₂ nanowires and MoS₂ membranes”, American Vacuum Society Meeting, Nashville, November 10, 2016.

11th International Conference of Pacific Rim Ceramic Societies, Jeju Island, Korea, September 3, 2015.

Materials Research Society Spring Meeting, San Francisco, April 7, 2015.

Materials Research Society Spring Meeting, San Francisco, April 22, 2014.

Materials Research Society Fall Meeting, Boston, December 5, 2013.

American Vacuum Society Meeting, Long Beach, October 30, 2013.

Electrochemical Society Meeting 224, San Francisco, October 28, 2013.

SPIE Optics + Photonics 2013, San Diego, August 26, 2013.

American Vacuum Society Meeting, Tampa, November 1, 2012.

Materials Research Society Sprint Meeting, San Francisco, April 11, 2012

TMS Annual Meeting. Orlando, March 12, 2012.
International Conference on Solid State Devices and Materials, Nagoya, September 29, 2011.
International Conference on Materials for Advanced Technologies, Singapore, June 29, 2011.
PacifiChem, Honolulu, December 17, 2010.
Materials Research Society Fall Meeting, Boston, November 30, 2010.
European Materials Research Society Meeting, Warsaw, September 13, 2010.
Nano Korea 2010, Nanowire Satellite Session, Seoul, August 20, 2010.
IEEE NANO 2010, Seoul, August 18, 2010.
SPIE Optics and Photonics Meeting, San Diego, August 2, 2010.
Materials Research Society Fall Meeting, Boston, December 2, 2009.
Materials Research Society Spring Meeting, San Francisco, April, 2009.
SPIE Optics East, Boston, September 12, 2007.
Nano Korea 2007, Nanowire Satellite Session, Seoul, August 31, 2007.
Foundations of Nanoscience 2007, Snowbird, April 18, 2007.
Materials Research Society Spring Meeting, San Francisco, April 12, 2007.
American Chemical Society Meeting, Chicago, March 27, 2007.
SPIE Photonics West, San Jose, January 22, 2007.
Gordon Research Conference on Nanofabrication, discussion leader for "Nanowire Electronics", Tilton, July 17, 2006.
Federation of Analytical Chemistry and Spectroscopy Societies Annual Meeting, Quebec City, Quebec, October 11th, 2005.
Royal Society Discussion Meeting "Organising Atoms: Manipulation of Matter on the Sub-10 Nanometre Scale." London, England, October 15th, 2003.
15th American Conference on Crystal Growth and Epitaxy, Keystone, Colorado, July 22nd, 2003.
American Vacuum Society New England Symposium, Burlington, Massachusetts, June, 2003.

Other Conferences and Workshops

"Non-Planar Mixed-Dimensional Heterostructures for Conventional and Unconventional Computing", 4th International Advances in Functional Materials Conference, Nanjing, China, August 27, 2018.
"Total Tomography of Nonplanar InGaAs Quantum Wells on GaAs Nanowires", Compound Semiconductor Week, Boston, June 1, 2018.
"Synthesis and Characterization of Mixed-Dimensional Heterostructures", EU-US Workshop on 2D Materials, Heterostructures and Devices, Arlington, VA, October 24, 2017.
Discussion leader, van der Waals materials group, Electronic and Photonic Materials Program workshop, NSF, Alexandria, VA, September 25, 2017.
"Kinking induced dopant modulation in VLS grown silicon nanowires", Nanowire Week, Lund, Sweden, May 29, 2017.
"Towards Total Tomography: Correlation of Nanoscale Strain and Composition in Nonplanar Heterostructures", Advanced Photon Source User Workshop, Argonne, May 5, 2017.
"Atom Probe Tomography of Low-Dimensional Materials: III-As Nanowire Heterostructures and Doped Layered Chalcogenides", Physics and Chemistry of Surfaces and Interfaces, Santa Fe, January 16, 2017.

“Chemical and Functional Imaging of 2D Materials and Mixed Dimensional Heterojunctions”, Graphene EU-US Workshop on 2D Materials, Heterostructures and Devices, Manchester, UK, October 11, 2016.

“Structure-property Correlations in 1D-nanowires using Atom Probe Tomography” CIMTEC 2016, Perugia, Italy, June 7, 2016.

“Novel Device Behaviors at Low-Dimensional Heterojunctions in 2-D Materials” U.S.-Korea Nano Forum, Arlington, Virginia, October 5, 2015.

“Atom Probe Tomography of Core-Shell Nanowire Heterostructures,” Center for Quantum Devices Nanowire Workshop, University of Copenhagen, Denmark, May 26, 2015.

“Novel Structure and Function in Low-Dimensional Non-Planar Heterostructures of III-V and TMDC Materials,” 9th International Conference On Silicon Epitaxy & Heterostructures, Montréal, Canada, May 19, 2015.

Workshop on Semiconductors, Electronic Materials, Thin Film, and Photonic Materials, Tel Aviv, Israel, February 23, 2015.

SPM on SPM 2014, Toronto, Canada, Sept. 3, 2014.

Physics at the Falls, SUNY Buffalo, May 22, 2014.

Nanowires 13, Rehovot, Israel, November 13, 2013.

North American Molecular Beam Association Workshop, Banff, Canada, October 10, 2013.

SemiconNano 2013, Lake Arrowhead, CA, Sept. 30, 2013.

Gordon Research Conference on Clusters, Nanocrystals & Nanostructures, Mount Holyoke, August 6, 2013.

Gordon Research Conference on Thin Film & Crystal Growth Mechanisms, Biddeford, July 10, 2013.

CECAM Workshop on “Theory, Simulation and Modeling of SiGe Nanostructures: from Nanoelectronics to Renewable Energy” Lausanne, Switzerland, June 5, 2013.

Nanoscale Imaging for Energy Applications workshop, Oak Ridge National Laboratory, September 13, 2012.

9th International Workshop on Epitaxial Semiconductors on Patterned Substrates and Novel Index Surfaces. Eindhoven Technical University, May 7, 2012.

International Conference on 3rd Generation Photovoltaics. Erlangen, Germany, December 12-14, 2011.

Nanowires 2011, Plomari, Greece, June 13, 2011.

Trends in Nanotechnology 2010, Braga, Portugal, September 8, 2010.

Transport in Nanomaterials, Molecular Foundry (LBNL), Berkeley, April 2, 2010.

Physics and Chemistry of Semiconductor Interfaces, Santa Fe, January 11, 2010.

International Conference on One-Dimensional Nanomaterials, Atlanta, December 7, 2009.

US-France Nanoscience Workshop, Paris, France, November 16, 2009.

Symposium on Undergraduate Nano-Education, SUNY-Albany, August 5, 2009.

Gordon Research Conference on Clusters, Nanocrystals, and Nanostructures, Mt. Holyoke, July 23, 2009.

CECAM Workshop on “Nanowire Doping,” Lausanne, Switzerland, July 7, 2009.

NSF-MEXT Young Researchers Exchange Program Workshop, Osaka University, October 11, 2008.

NSF-MEXT Young Researchers Exchange Program Symposium, National Institute of Materials Science, Japan, October 8, 2008.

CECAM-ENS Workshop on “Structural, electronic, and transport properties of quantum wires,” Lyon, France, June 10, 2008.

Nanomaterials for Defense Applications Symposium, Crystal City, April 22, 2008.
Northwestern University- Jawaharlal Nehru Center for Advanced Research Joint Symposium,
Northwestern University, March 31, 2008.
NSF-MEXT Young Researchers Exchange Program Symposium, Northwestern University, March 11, 2008.
Center for Integrated Nanotechnologies User Workshop, Sandia National Laboratories, Albuquerque,
January 9, 2008.
Nanotechnology Conference and Workshop, University of Minnesota, November 13, 2007.
Gordon Research Conference on the Chemistry of Electronic Materials, Mt. Holyoke, July 24, 2007.
Midwest Workshop on Quantum Transport and Magnetics, Northwestern University, March 27, 2006.
1st International Workshop on Doping Semiconductor Nanostructures, Naval Research Laboratory,
Washington, D.C., January 11th, 2006.
Center for Nanoscale Materials User Meeting, Argonne National Laboratory, May, 2005.
2nd Annual Workshop on the Evolution and Self-Assembly of Quantum Dots. Northwestern University,
Evanston, Illinois; August 27th, 2003.

STUDENTS AND POSTDOCS SUPERVISED

Postdoctoral Scholars Sponsored

Dr. Yi Gu (2004-2007) (Asst. Prof. of Physics, Washington State University)
Dr. Shixiong Zhang (2008-2011) (Asst. Prof. of Physics, Indiana University)
Dr. Jerome Hyun (2009-2011) (Asst. Prof. Ewha Womans University, South Korea)
Dr. Sonal Padalkar (2010-2013) (Asst. Prof., Iowa State University)
Dr. Chung-Chiang Wu (2012-2013) (TSMC)
Dr. Chang-Hua Liu (2014-2015) (Asst. Prof., National Tsing Hua University, Taiwan)
Dr. Alex Henning (2016-2018)
Dr. Alex Chang (2017-)
Dr. Joon-Seok Kim (2018-)

Northwestern Graduate Advisees (Ph.D. and M.S., completed Ph.D.s in bold)

1. **Jonathan Allen** (2003-December 2008): Post-doc, Brookhaven National Laboratory
Thesis title: "Scanning probe studies of charge carrier transport in nanowire devices."
2. **Jessica Lensch-Falk** (2003- December 2008): Post-doc, Sandia National Laboratory
Thesis title: "Highly anisotropic crystal growth mediated by metal-semiconductor interfaces."
3. **Daniel Perea** (2004- Sept. 2009): Director's Fellowship, Los Alamos National Laboratory
Thesis title: "Dopant mapping in semiconductor nanostructures using atom probe tomography."
4. **Hanwei Gao** (2004- June 2009), joint with Prof. Teri Odom: Post-doc with Peidong Yang.
Thesis title: "Tunable resonances in plasmonic crystals."
5. Dinna Ramlan (2004-2005) B.S./M.S.: Consultant, McKinsey Malaysia
Thesis title: "Magnetic force microscopy studies of indium arsenide/manganese arsenide nanostructures."
6. Jung Yen Chou (2005- Dec 2008) B.S./M.S.: Taiwan Semiconductor
Thesis Title: "Growth and characterization of vanadium oxide nanowires"
7. **Eric Hemesath** (2005-2010): Intel
Thesis title: "Electron microscopy studies of defect structure and correlated impurity incorporation in Si an Ge nanowires."

8. John David (2005-2006) M.S. in Electrical Engineering: graduate school, U. Texas Austin
Thesis title: "Nanowire Schottky Diode I-V Parameter Characterization"
10. **Praneet Adsumilli** (2006-11), joint with David Seidman, MSE: IBM
Thesis title: "An Atom-Probe Tomographic Study of Transition Metal Alloyed Nickel Silicide Thin-Films."
11. **Francisco Lopez** (2006-2011): post-doctoral fellow at University of Oregon
Thesis title: "Correlated Raman and Electron Microscopy Studies of Silicon Nanowire Polytypes: Structure, Formation Mechanism and Electronic Properties."
12. **Ruth Schlitz** (2006-2012): post-doctoral fellow at UCSB
Thesis title: "Characterizing electronic inhomogeneities of nanoscale materials for printable electronics."
13. Erik Sczygelski (2008-2013) M.S.
14. **Justin Connell** (2008-2013): postdoctoral fellow at Argonne National Lab
Thesis Title: "Influence of Au-Cu Alloy Catalyst Composition on Crystal Growth and Dopant Distribution in Si and Ge Nanowires."
15. **James Riley** (2009-2014): process engineer, Intel
16. **In Soo Kim** (2009-2014): postdoctoral fellow at Argonne National Lab
17. **KunHo Yoon** (2010-2015): process engineer, Intel
18. **Sarah Howell** (2011-2016)
19. **Nari Jeon** (2011-2016): postdoctoral fellow at Argonne National Lab
20. **Xiaochen Ren** (2012-2017): metrologist, Intel
21. **Zhiyuan Sun** (2013-2018): Apple
21. Megan Hill (2015-)
22. Jack Olding (2015-)
23. Michael Moody (2015-)
24. Chunyi Huan (2016-)
25. Ju Ying Shang (2016-)
26. Zhehao Zhu (2017-)

Northwestern Undergraduate Thesis Advisees

Loren Darling '04 (2003-2004), B.S.
 Dinna Ramlan '05 (2004-2005), B.S./M.S. (McKinsey Malaysia)
 John Romankiewicz '06 (2004-2006), B.S. (Fulbright Scholar China)
 Kevin Chou '08 (June 2005-Dec. 2008), B.S./M.S. (Taiwan Semiconductor)
 Philip Barton '09 (September 2007- June 2009), B.S. (PhD program, UCSB)
 Sean Tseng '09, (MS Program in Computer Science, Northwestern)
 KunHo Yoon '10 (PhD program, Northwestern)
 Rongrong Cheacharoen '12 (2009-2012), B.S. (PhD program, Stanford)
 Aaron Holsteen '12 (2009-2012), B.S. (PhD program, Stanford)
 Spencer Park '17 (2013-2016)
 Sarah Rappaport '17 (2014-17)
 Jason Dong (2016-)

NSF Research Experience for Undergraduates Advisees

Daniel Brunner '08, Rose Hulman (PhD program, MIT)
 Jonathon Milam '06 (Summer 2004, 2005) Minority Intern in Nanotechnology
 James Riley '09, Boston College (PhD program, Northwestern Univ. MSE)
 Phillip Barton '09, Northwestern University (PhD program, UC Santa Barbara)

Sara Renfrew, Caltech '11

Zakaria Al Balushi, Penn State '11 (PhD program, Penn State)

Kyle Johnson, Stanford '12 (PhD program, U. Michigan)

Andrew Mannix, University of Illinois at Urbana-Champaign, '12(PhD program, Northwestern Univ. MSE)

Lawrence Crosby, Stanford '12 (PhD program, Northwestern Univ. MSE)

Jenna Doran, Rochester Institute of Technology

Vineetha Bheemarasetty, Carnegie Mellon