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| Sang M Han, PhD | Chemical Engineering ⎜ Material Science & Engineering ⎜Surface Science |
| Electronic Materials & Devices ⎜ Advanced Mechanics ⎜ Photonics |

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**EDUCATION University of California - Santa Barbara**

Ph.D. Chemical Engineering, 1993 – 1998

**University of California - Berkeley**

B.S. Chemical Engineering with Honors, 1988 – 1992

**PROFESSIONAL EXPERIENCE**

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| 12/15 – present | ***Regents Professor*; University of New Mexico, NM**Honorary title bestowed by the UNM Regents for research and teaching excellence. |
| 10/16 – present | ***Chief Technical Officer of* Osazda Energy and Osazda Materials, Albuquerque, NM**Direct product/process development for Osazda on crack-tolerant metal matrix composites for thin-film solar cells, building/structural coatings for radiative cooling, and efficient light-trapping schemes for thin silicon solar cells. |
| 8/15 – 10/16 | ***Member of* Science and Technology Corporation (STC) Board of Directors; University of New Mexico, NM**Participated portfolio management, technology transfer, finance, and investment for STC. |
| 8/14 – present  | ***Director* of NanoScience and MicroSystems Engineering (NSME); University of New Mexico, NM**Manage the NSME graduate program for curriculum improvement, enrollment increase, raising fellowships, recruiting, admissions, exam administration, and graduation. |
| 8/14 – present | ***Associate Chair* of Chemical & Biological Engineering (CBE) Department; University of New Mexico, NM**Serve the CBE Department for undergraduate program accreditation and improvement as well as graduate program enhancement. |
| 7/12 – present  | ***Professor;* Department of Chemical & Biological Engineering and Electrical & Computer Engineering; University of New Mexico, NM:**Maintain and advance a research program with emphasis on semiconductor materials science and engineering, device fabrication, and technological applications. Current research topics encompass (1) print-and-press quantum structure formation in compound semiconductor films by patterned stress field; (2) heteroepitaxial films on silicon for photovoltaic, electronic, and sensor applications; (3) crack-tolerant metal matrix composites as durable metal contacts on thin-film solar cells; (4) microsphere-based manufacturable coatings for radiative cooling; and (5) thin film processing and nanoscale surface corrugation for enhanced light trapping in photovoltaic devices. |
| 1/10 – 6/12 | ***Associate Professor;* Department of Electrical and Computer Engineering;****University of New Mexico, NM** |
| 7/06 – 6/12 | ***Associate Professor;* Department of Chemical and Nuclear Engineering;****University of New Mexico, NM** |
| 4/00 – 6/06 | ***Assistant Professor*; Department of Chemical and Nuclear Engineering;****University of New Mexico, NM** |
| 11/99 – 4/00 | ***Post-doctoral Researcher* with Dr. Neil Benjamin;****Lam Research Corporation, Fremont, CA:**Engineered prototype hardware to facilitate low-pressure plasma ignition in electronegative discharges. Designed and characterized capacitive divider probes to measure high-frequency plasma potential variations in real time. |
| 11/98 – 10/99 | ***Post-doctoral Researcher* with Dr. Roya Maboudian;****Department of Chemical Engineering; U. C. Berkeley, CA:**Conducted surface passivation studies on Ge for MEMS applications using a variety of ultra-high vacuum (UHV) diagnostics, such as X-ray photoelectron spectroscopy (XPS), high-resolution electron energy loss spectroscopy (HREELS), Auger electron spectroscopy (AES), low energy electron diffraction (LEED), and temperature programmed desorption (TPD). |
| 9/93 – 10/98 | ***Graduate Research Assistant* with Professor Eray Aydil;****Department of Chemical Engineering, U.C. Santa Barbara, CA:**Investigated gas phase and surface chemistry during plasma enhanced chemical vapor deposition (PECVD) of SiO2 and fluorinated SiO2 films, using multiple diagnostics such as attenuated total reflection Fourier transform infrared (ATR-FTIR) spectroscopy, optical emission spectroscopy (OES), Langmuir probe measurements, and mass spectrometry. |
| 8/96 – 10/96 | ***Visiting NSF Scholar* at Seoul National University, Korea:**Studied nitrogen incorporation in GaN films during remote plasma enhanced metal organic chemical vapor deposition (RPE-MOCVD) from TEGa and N2 using OES and Langmuir probe. |
| 6/96 – 8/96 | ***Visiting NSF Scholar* at Tokyo Institute of Technology, Japan:**Developed a continuous thermal process to deposit stacked layers of polycrystalline Si and SiGe films on glass substrate using Si2H6 and GeF4 for thin film transistors (TFT) used in active matrix liquid crystal displays (AMLCD). |
| 6/94 – 8/94 | ***Summer Intern* at Lam Research Corporation, Fremont, CA:**Participated in product development. Performed radio frequency power studies in a transformer coupled plasma (TCP) reactor to assess the impact of ion mass and energy on SiO2 film properties. |
| 12/92 – 9/93 | ***Process Engineer* at Lam Research Corporation, Fremont, CA:**Demonstrated to customers, such as IBM, Motorola, Cypress, and Hyundai, system performance of Rainbow polysilicon plasma etchers. Served as a translator for TCP start-up at Samsung and LG. |

#### PUBLICATIONS – 2064 citations, *h*-index 25, *i10*-index 39

*In preparation*

1. Omar K. Abudayyeh, Cayla Nelson, Geoffrey K. Bradshaw, Steven Whipple, David M. Wilt, and Sang M. Han, “Crack-Tolerant Silver-Carbon-Nanotube Metal Matrix Composites as Photovoltaic Gridlines,” *IEEE J. Photovolt.*
2. Omar K. Abudayyeh, Andre Chavez, John Chavez, Sang M. Han\*, Francesco Zimbardi, Brian Rounsaville, Vijay Upadhyaya, Ajeet Rohatgi, Byron McDanold, and Timothy Silverman, *IEEE J. Photovolt.* \*corresponding author
3. Seok-Jun Han, Swapnadip Ghosh, Omar Abudayyeh, Eric J. Martin, John Grey, Sang M. Han, and Sang Eon Han, “Enhanced Light Absorption in Organic Solar Cells by Symmetry-Breaking Plasmonic Nanostructures,” *ACS Photon.*
4. Swapnadip Ghosh, Talid Sinno, and Sang M. Han, “Device Implications of Achieving Sub-105-cm-2 Dislocation Density by Oxygen Precipitates in Epitaxial Ge on Si,” *J. Appl. Phys.*
5. Louis J. Tribby, Cornelius F. Ivory, Frank von Swol, and Sang M. Han, “Experimental characterization and modeling of aspect-ratio-dependent diffusion of nanocrystals in nanochannels,” *Phys. Rev E*.
6. Youn-Jin Oh, Louis Tribby, Cornelius F. Ivory, and Sang M. Han, “High-Resolution Focusing and Separation of Proteins in Nanofluidic Channels,” *Lab Chip*.

*Submitted*

1. Seung Ho Lee, Sang M. Han, and Sang Eon Han, “Characterizing Randomness in Photonic Glasses Using Autocorrelation Functions of Two-Dimensional Images,” *Phys. Rev. B* submitted (2019).
2. S. E. Han, S. Atiganyanun, S. H. Lee, S. Cheek, and S. M. Han, “Determination of Internal Reflectance for Photonic Glasses,” *Phys. Rev. B* submitted (2019).

*Published*

1. Joseph D. Alden, Sarun Atiganyanun, Robert Vanderburg, Seung Ho Lee, John B. Plumley, Omar K. Abudayyeh, Sang M. Han, and Sang Eon Han, “Radiative Cooling by Silicone-Based Coating with Randomly Distributed Microbubble Inclusions,” *J. Photon. Energy* **9**(3), 032705-1:10 (2019).
2. Sarun Atiganyanun, John Plumley, Kevin Hsu, Jacob Cytrynbaum, Thomas L. Peng, Sang M. Han, and Sang Eon Han, “Effective Radiative Cooling by Paint-Format Microsphere-Based Photonic Random Media,” *ACS Photon.* **5**(4), 1181-1187 (2018).
3. John B. Plumley, Adam W. Cook, Christopher A. Larsen, Kateryna Artyushkova, Sang M. Han, Thomas Peng, and Richard A. Kemp, “Crystallization of electrically conductive visibly transparent ITO thin films by wavelength-range-specific pulsed Xe arc lamp annealing,” *J. Mater. Sci.* **53**(18), 12949-12960 (2018).
4. Daniel Kaiser, Sang M. Han, and Talid Sinno, “Parametric Analysis of Mechanically Driven Compositional Patterning in SiGe Substrates,” *J. Appl.* *Phys*. **121**(6), 065303-1:11 (2017).
5. Sarun Atiganyanun, Mi Zhou, Omar K. Abudayyeh, Sang M. Han, and Sang Eon Han, “Control of Randomness in Microsphere-Based Photonic Crystals Assembled by Langmuir-Blodgett Process,” *Langmuir* **33**(48), 13783-13789 (2017).
6. Seok-Jun Han, Swapnadip Ghosh, Omar Abudayyeh, Brittany R. Hoard, Ethan C. Culler, Jose Bonilla, Sang M. Han, and Sang Eon Han, “Symmetry-Breaking Nanostructures on Crystalline Silicon for Enhanced Light-Trapping in Thin Film Solar Cells,” *Opt. Express* **24**(26), A1586-A1596 (2016).
7. Daniel Kaiser, Swapnadip Ghosh, Sang M. Han, and Talid Sinno “Modeling and Simulation of Compositional Engineering in SiGe Films using Patterned Stress Fields,” *Mol. Syst. Des. Eng.* **1**(1), 74-85 (2016).
8. Omar K. Abudayyeh, Nathan D. Gapp, Cayla Nelson, David M. Wilt, and Sang M. Han, “Silver-Carbon-Nanotube Metal Matrix Composites for Metal Contacts on Space Photovoltaics,” *IEEE J. Photovolt.* **PP**(99), 1-6 (2015) and **6**(1), 337-342 (2016).
9. Claire Y. Chuang, Sang M. Han, Luis A. Zepeda-Ruiz, and Talid Sinno, “On Course Projective Integration for Atomic Deposition in Amorphous Systems,” *J. Chem. Phys.* **143**(13), 134703 (2015).
10. Swapnadip Ghosh, Daniel Kaiser, Jose Bonilla, Talid Sinno, and Sang M. Han, “Stress-Directed Compositional Patterning of SiGe Substrates for Lateral Quantum Barrier Manipulation,” *Appl. Phys. Lett.* **107** 072106:1-5 (2015).
11. Swapnadip Ghosh, Seok-Jun Han, Brittany R. Hoard, Ethan C. Culler, Jose E. Bonilla, Eric J. Martin, John Grey, Sang M. Han, and Sang Eon Han, “Symmetry-Breaking Nanostructures for Enhanced Light-Trapping in Thin Film Solar Cells,” *Proc. 42nd IEEE PVSC* 1-3 (2015). DOI: 10.1109/PVSC.2015.7356305
12. Nicholas Shoop, Louis J. Tribby, and Sang M. Han, “Modeling of Kinetically Limited Growth Rate for Solution-Synthesized Germanium Nanocrystals,” *Mater. Res. Express* **2** 085007 (2015).
13. Claire Y. Chuang, Louis Zepeda-Ruiz, Sang M. Han, and Talid Sinno, “Direct Molecular Dynamics Simulation of Ge Deposition on Amorphous SiO2 at Experimentally Relevant Conditions,” *Surf. Sci*. **641** 112-120 (2015).
14. Swapnadip Ghosh and Sang M. Han, “High-Carrier-Mobility p- and n-Type MOSFETs Fabricated on Wafer-Scale Planar Ge Film Epitaxially Grown on Si,” *IEEE Electr. Device L.* **35**(9) 900-902 (2014).
15. Swapnadip Ghosh, Darin Leonhardt, and Sang M. Han, “Effect of threading dislocation density and dielectric layer on temperature-dependent dc characteristics of metal semiconductor field effect transistors fabricated on epitaxially grown Ge on Si substrates,” *J. Appl. Phys.* **115**(9), 094507 (2014).
16. Josephine J. Sheng, Darin Leonhardt, Sang M. Han, Steven W. Johnston, Jeffrey G. Cederberg, and Malcolm S. Carroll, “Empirical Correlation for Minority Carrier Lifetime to Defect Density Profile in Germanium on Silicon Grown by Nanoscale Interfacial Engineering,” *J. Vac. Sci. Technol. B* **31**, 051201(2013).
17. W. C. T. Lee, N. Bishop, D. L. Thompson, K. Xue, G. Scappucci, J. G. Cederberg, J. K. Gray, S. M. Han, G. K. Celler, M. S. Carroll, and M. Y. Simmons, “Thermal processing of strained silicon-on-insulator for atomically precise silicon device fabrication,” *Appl. Surf. Sci.* **265**, 833-838 (2013).
18. Claire Y. Chuang, Qiming Li, Darin Leonhardt, Sang M. Han, and Talid Sinno, “Atomistic Analysis of Ge on Amorphous SiO2 using an Empirical Interatomic Potential,” *Surf. Sci*. **609**, 221-229 (2013).
19. Swapnadip Ghosh, Darin Leonhardt, and Sang M. Han, “Investigations on Thermal Stress Relief Mechanism Using Air-Gapped SiO2 Nanotemplates during Epitaxial Growth of Ge on Si and Corresponding Hole Mobility Improvement,” *ECS Trans*. **45**(4), 111-114 (2012). DOI: 10.1149/1.3700459
20. Darin Leonhardt and Sang M. Han, “New Method to Produce High-Quality Epitaxial Ge on Si Using SiO2-Lined Etch Pits and Epitaxial Lateral Overgrowth for III-V Integration,” *ECS Trans.* **45**(4), 147-149 (2012). DOI: 10.1149/1.3700464
21. Josephine J. Sheng, David C. Chapman, David M. Wilt, Stephen J. Polly, Christopher G. Kerestes, Seth M. Hubbard, and Sang M. Han, “Temperature Dependent Characterization of Imbedded InAs Quantum Dots in GaAs Superlattice Solar Cells Structures by High Resolution X-ray Diffraction,” MRS Proc. **1432** (2012). DOI: http://dx.doi.org/10.1557/opl.2012.1139
22. Swapnadip Ghosh, Darin Leonhardt, and Sang M. Han, “Experimental and theoretical investigation of stress relief during epitaxial growth of Ge on Si using air-gapped SiO2 nanotemplates,” *Appl. Phys. Lett.* **99**(18), 181911 (2011) and *Virtual Journal of Nanoscale Science & Technology* (November 21, 2011). DOI: 10.1063/1.3659320
23. Darin Leonhardt, Swapnadip Ghosh, and Sang M. Han, “Defects in Ge Growth in Trench Patterned SiO2 on Si and Ge substrates,” *J. Cryst. Growth* **335**(1), 62-65 (2011). DOI: 10.1016/j.jcrysgro.2011.09.022
24. Darin Leonhardt and Sang M. Han, “Dislocation Reduction in Heteroepitaxial Ge on Si Using SiO2 Lined Etch Pits and Epitaxial Lateral Overgrowth,” *Appl. Phys. Lett.* **99**(11), 111911 (2011). DOI: 10.1063/1.3632113
25. Darin Leonhardt, Swapnadip Ghosh, and Sang M. Han, “Origin and Removal of Stacking Faults in Ge Islands Nucleated on Si within Nanoscale Openings in SiO2,” *J. Appl. Phys.* **110**, 073516 (2011) and *Virtual Journal of Nanoscale Science & Technology* (October 24, 2011). DOI: 10.1063/1.3643003
26. Darin Leonhardt, Josephine J. Sheng, Jeffrey G. Cederberg, Malcolm S. Carroll, Qiming Li, Manual J. Romero, Darius Kuciauskas, Daniel J. Friedman, and Sang M. Han, “Removal of Stacking Faults in Ge Grown on Si Through Nanoscale Openings in Chemical SiO2,” *Thin Solid Films* **519**(22), 7664-7671 (2011). DOI: 10.1016/j.tsf.2011.05.044
27. Darin Leonhardt, Josephine Sheng, Jeffrey G. Cederberg, Malcolm S. Carroll, and Sang M. Han, “Nanoscale Interfacial Engineering to Grow Ge on Si as Virtual Substrates and Subsequent Integration of GaAs,” *Thin Solid Films* **518**(21), 5920-5927 (2010). DOI: 10.1016/j.tsf2010.05.085
28. Jeffrey G. Cederberg, Darin Leonhardt, Josephine J. Sheng, Qiming Li, Malcolm S. Carroll, and Sang M. Han, “GaAs/Si epitaxial integration utilizing a two-step, selectively grown Ge intermediate layer,” *J. Cryst. Growth* **312**(8), 1291-1296 (2010). DOI: 10.1016/j.jcrysgro.2009.10.061
29. Timothy J. Boyle, Louis J. Tribby, Leigh Anna M. Ottley, and Sang M. Han, “Synthesis and Characterization of Germanium(II) Coordination Compounds for the Production of Germanium Nanomaterials,” *Eur. J. Inorg. Chem.* **2009**(36), 5550-5560 (2009).
30. Darin Leonhardt and Sang M. Han, “Energetics of Ge Nucleation on SiO2 and Implications for Selective Epitaxial Growth,” *Surf. Sci.* **603**, 2624-2629 (2009).
31. Youn-Jin Oh, Danny Bottenus, Cornelius F. Ivory, and Sang M. Han, “Impact of Leakage Current and Electrolysis on FET Flow Control and pH Changes in Nanofluidic Channels,” *Lab Chip* **9**(11), 1609-1617 (2009).
32. Youn-Jin Oh, Anthony L. Garcia, Dimiter N. Petsev, Gabriel P. Lopez, Steven R. J. Brueck, Cornelius F. Ivory, and Sang M. Han, “Effect of wall-molecule interactions on electrokinetic transport of charged molecules in nanofluidic channels during FET flow control,” *Lab Chip* **9**(11), 1601-1608 (2009).
33. Danny Bottenus, Youn-Jin Oh, Sang M. Han, and Cornelius F. Ivory, “Experimentally and Theoretically Observed Native pH Shifts in a Nanochannel Array,” *Lab Chip* **9**(2), 219-231 (2009). Selected as a hot LOC article.
34. Youn-Jin Oh, Thomas C. Gamble, Darin Leonhardt, Dimiter N. Petsev, Cornelius F. Ivory, Chan-Hwa Chung, Steven R. J. Brueck, Gabriel P. Lopez, and Sang M. Han, “Monitoring FET Flow Control and Wall Adsorption of Charged Fluorescent Dye Molecules in Nanochannels Integrated into a Multiple Internal Reflection Infrared Waveguide,” *Lab Chip* **8**, 251-258 (2008).
35. Timothy N. Lambert, Nicholas L. Andrews, Henry Gerung, Timothy J. Boyle, Janet M. Oliver, Bridget S. Wilson, and Sang M. Han, “Water-soluble germanium(0) nanocrystals: Cell recognition and near-infrared photothermal conversion properties,” *Small* **3**(4), 691-699 (2007).
36. Qiming Li, Joshua L. Krauss, Stephen Hersee, and Sang M. Han, “Understanding the Interaction of Ge with Chemical and Thermal SiO2 for Selective Growth of Ge on Si by Molecular Beam Epitaxy,” *J. Phys. Chem.* C **111**, 779-786 (2007).
37. Kyle J. Solis, Lance R. Williams, Brian S. Swartzentruber, and Sang M. Han, “Adatom Pair Chain Structures: Metastable Precursors to Island Formation on SiGe 2xN Alloy,” *Surf. Sci.* **601**(1), 172-177 (2006).
38. Henry Gerung, Yanrui Zhao, Ravi Jain, Timothy J. Boyle, C. Jeffrey Brinker, and Sang M. Han, “Nonlinear Optical Response of Solution Synthesized Ge Nanocrystals,” *Appl. Phys. Lett.* **89**, 111107 (2006); *Virtual Journal of Nanoscale Science & Technology*, September 25 (2006); and *Virtual Journal of Ultrafast Science*, October (2006).
39. Qiming Li and Sang M. Han, “Formation of Epitaxial Ge Nanorings on Si by Self-assembled SiO2 Particles and Touchdown of Ge Through a Thin Layer of SiO2,” *MRS Proc.* **921**, 0921-T02-04 (2006).
40. Henry Gerung, Timothy J. Boyle, Louis J. Tribby, Scott D. Bunge, C. Jeffrey Brinker, and Sang M. Han, “Solution Synthesis of Germanium Nanowires Using a Ge+2 Alkoxide Precursor,” *J. Am. Chem. Soc.* **128**(15), 5244-5250 (2006).
41. Madhava Kosuri, Henry Gerung, Qiming Li, Sang M. Han, Paulo Herrera, and Jason Weaver “Vapor‑Phase Adsorption Kinetics of 1‑Decene on Hydrogenated Si(111),” *Surf. Sci.* **596**, 21-38 (2005).
42. Qiming Li, Belliappa Pattada, Steve R. J. Brueck, Stephen Hersee, and Sang M. Han, “Morphological Evolution and Strain Relaxation of Ge Islands Grown on Chemically Oxidized Si(100) by Molecular Beam Epitaxy,” *J. Appl. Phys.* **98**(7), 073504 (2005).
43. Qiming Li, Ying-Bing Jiang, Joshua L. Krauss, Huifang Xu, Steven R. J. Brueck, Stephen Hersee, and Sang M. Han, “Heteroepitaxy of high-quality Ge on Si by nanoscale seed pads grown through a SiO2 interlayer,” *Proc. SPIE – Int. Soc. Opt. Eng.* **5734**, 75-82 (2005).
44. Henry Gerung, Scott D. Bunge, Timothy J. Boyle, C. Jeffrey Brinker, and Sang M. Han, “Anhydrous Solution Synthesis of High-Quality Ge Nanocrystals from the Germanium (II) Precursor Ge[N(SiMe3)2]2,” *Chem. Commun*. **14**, 1914-1916 (2005).
45. Henry Gerung, C. Jeffrey Brinker, Steve R. J. Brueck, and Sang M. Han, “*In situ* real-time monitoring of profile evolution during plasma etching of mesoporous low-dielectric-constant SiO2,” *J. Vac. Sci. Technol. A* **23**(2), 347 (2005).
46. Qiming Li, Ying-Bing Jiang, Huifang Xu, Steve Hersee, and Sang M. Han “Heteroepitaxy of high quality Ge on Si by nanoscale Ge seeds grown through a thin layer of SiO2,” *Appl. Phys. Lett.* **85**(11), 1928-1930 (2004) and *Virtual Journal of Nanoscale Science & Technology*, October 4 (2004).
47. Madhava R. Kosuri, Roya Cone, Qiming Li, Sang M. Han, Bruce C. Bunker, and Thomas M. Mayer, “Adsorption Kinetics of Alkanethiol Self-Assembly on Ge(111),” *Langmuir* **20**(3), 835 (2004).
48. Qiming Li, Sang M. Han\*, Steven R. J. Brueck, Stephen Hersee, Ying-Bing Jiang, and Huifang Xu, “Selective growth of Ge on Si(100) through vias of SiO2 nanotemplate using solid source molecular beam epitaxy,” *Appl. Phys. Lett.* **83**(24), 5032-5034 (2003). \*corresponding author
49. Madhava R. Kosuri, Henry Gerung, Sang M. Han, Bruce C. Bunker, and Thomas M. Mayer, “Vapor-phase Adsorption Kinetics of 1‑Decene on H-terminated Si(100),” *Langmuir* **19**(22), 9315 (2003).
50. Dhaval A. Doshi, Alain Gibaud, Valerie Goletto, Mengcheng Lu, Henry Gerung, Benjamin Ocko, Sang M. Han, and C. Jeffrey Brinker, “Peering into the self-assembly of surfactant templated thin-film silica mesophases,” *J. Am. Chem. Soc.* **125**, 11646 (2003).
51. Sang M. Han, Joseph L. Cecchi, and John J. Russell “HIGH PERFORMANCE ENGINES: FAST CARS ACCELERATE LEARNING,” *Chem. Eng. Educ.* **37**(3), 208 (2003).
52. Sang M. Han, W. Robert Ashurst, Carlo Carraro, and Roya Maboudian, “Formation of Alkanethiol Monolayer on Ge(111),” *J. Am. Chem. Soc.* **123**, 2422 (2001).
53. S. M. Han and E. S. Aydil, “Reasons for lower dielectric constant of fluorinated SiO2 films,” *J. Appl. Phys.* **83**, 2172 (1998).
54. E. Meeks, R. S. Larson, P. Ho, C. Apblett, S. M. Han, E. Edelberg, and E. Aydil, “Modeling of SiO2 deposition in high density plasma reactors and comparisons of model predictions with experimental measurements,” *J. Vac. Sci. Technol. A* **16**, 544 (1998).
55. S. M. Han and E. S. Aydil, “Structure and chemical composition of fluorinated SiO2 films deposited using SiF4/O2 plasmas,” *J. Vac. Sci. Technol. A* **15**, 2893 (1997).
56. S. M. Han and E. S. Aydil, “Silanol concentration depth profiling during plasma deposition of SiO2 using multiple internal reflection infrared spectroscopy,” *J. Electrochem. Soc.* **144**, 3963 (1997).
57. S. M. Han and E. S. Aydil, “Detection of combinative infrared absorption bands in thin silicon dioxide films,” *Appl. Phys. Lett.* **70**, 3269 (1997).
58. S. M. Han and E. S. Aydil, “Plasma and surface diagnostics during plasma-enhanced chemical vapor deposition of SiO2 from SiH4/O2/Ar discharges,” *Thin Solid Films* **290 - 291**, 427 (1996).
59. S. M. Han and E. S. Aydil, “Study of surface reactions during plasma enhanced chemical vapor deposition of SiO2 from SiH4, O2, and Ar,” *J. Vac. Sci. Technol. A* **14**, 2062 (1996).
60. Alex P. Sassi, Anita J. Shaw, Sang M. Han, Harvey W. Blanch, and John M. Prausnitz, “Partitioning of proteins and small biomolecules in temperature- and pH-sensitive hydrogels,” *Polymer*, **37**(11), 2151-2164 (1996).
61. E. Meeks, R. S. Larson, P. Ho, C. Apblett, S. M. Han, E. Edelberg, and E. Aydil, “Modeling high-density-plasma deposition of SiO2 in SiH4/O2/Ar.” Sandia National Laboratories Report SAND97-8241 (1997).
62. E. S. Aydil and S. M. Han, “Progress in *in situ* monitoring of surfaces during plasma processing,” Proceedings of the 7th International Symposium on Laser-Aided Plasma Diagnostics, Fukuoka, Japan, 172 (1995).

**INVITED/CONTRIBUTED PAPERS**

*Invited*

1. Sang M. Han, “Materials Engineering Solutions to Solar Module Reliability and Passive Cooling: Durability and Conservation in Tandem,” Case Western Reserve University, Cleveland, OH (November 15, 2018).
2. Brian Rummel, Michael Rimada, Sadhvikas Addamane, Ganesh Balakrishnan, Daniel Kaiser, Talid Sinno, and Sang M. Han, “Imaging Stress-Induced Lateral Quantum Barrier Manipulation of InGaAs Quantum Wells, Using Micro-Photoluminescence Spectroscopy,” iPlasmaNano-IX 2018, New Buffalo, MI (August 27, 2018).
3. Sang M. Han, “From Materials Engineering to Device Applications: Testing Our Understanding of Nature,” University of Virginia, Charlottesville, VA (April 12, 2017).
4. Sang M. Han, “From Nanoscale Materials Engineering to Advanced Devices Based on Germanium and Silicon,” Materials Science & Technology 2012 Conference & Exhibition, Pittsburg, PA (October 8, 2012).
5. Sang M. Han, “Nanoscale Interfacial Engineering to Grow Ge on Si as Virtual Substrates and Subsequent Integration of GaAs,” University of Texas – Austin (September 27, 2011).
6. Sang M. Han, “Nanoscale Interfacial Engineering to Grow Ge on Si as Virtual Substrates and Subsequent Integration of GaAs,” Stanford University (March 7, 2011).
7. Youn-Jin Oh, Danny Bottenus, Thomas C. Gamble, Anthony Garcia, Dimiter N. Petsev, Cornelius F. Ivory, Steven R. J. Brueck, Gabriel P. Lopez, and Sang M. Han\*, “Control and Separation of Proteins in a Nanofluidic FET Device, using pH Gradient and Valence Charge,” Annual AIChE Meeting, Philadelphia, PA (November 18, 2008).
8. Sang M. Han, “Nanoscale Heterojunction Engineering and Understanding of Surface Phenomena Responsible for the Selective Growth of Ge on Si over SiO2 During Molecular Beam Epitaxy,” Auburn University (April 9, 2007).
9. Sang M. Han, “Nanoscale Heterojunction Engineering and Selective Growth of High-Quality Ge on Si by Molecular Beam Epitaxy,” Annual TMS Meeting, New Orleans, LA (March 11, 2008).
10. Sang M. Han, “Nanoscale Heterojunction Engineering and Understanding of Surface Phenomena Responsible for the Selective Growth of Ge on Si over SiO2 During Molecular Beam Epitaxy,” University of Pennsylvania (September 26, 2007).
11. Gabriel P. Lopez, Steven R. J. Brueck, Sang M. Han, Cornelius F. Ivory, Dimiter N. Petsev, and Scott S. Sibbett, “Materials Processing Methods and Issues in the Development of Nanofluidic Systems for Biomolecular Analysis,” Spring MRS Meeting, San Francisco, CA (April 12, 2007).
12. Sang M. Han, “Understanding of Surface Phenomena Responsible for the Selective Growth of Ge on Si over SiO2 During Molecular Beam Epitaxy,” University of California – Riverside, CA (April 21, 2006).
13. Sang M. Han, “Understanding of Surface Phenomena Responsible for the Selective Growth of Ge on Si over SiO2 During Molecular Beam Epitaxy,” Colorado School of Mines, Golden, CO (February 3, 2006).
14. Sang M. Han, “Understanding of Surface Phenomena Responsible for the Selective Growth of Ge on Si over SiO2 During Molecular Beam Epitaxy,” Washington State University, Pullman, WA (October 10, 2005).
15. Sang M. Han, “*In Situ* Real-Time Monitoring of Evaporation Induced Self-Assembly of Mesoporous Low-Dielectric Constant SiO2 and Its Profile Evolution During Plasma Etching,” Northern California Chapter of the American Vacuum Society PEUG/TFUG Annual Symposium, San Jose, CA (October 2005).
16. Sang M. Han, “Understanding of Surface Phenomena Responsible for the Selective Growth of Ge on Si over SiO2 During Molecular Beam Epitaxy,” Rensselaer Polytechnic Institute (September 2005).
17. Sang M. Han, “Micro to Atomic Scale Interfacial Science and Engineering on Si and Ge Based Systems,” University of Massachusetts – Amherst, MA (March 1, 2005).
18. Sang M. Han, “Molecular beam epitaxy of high-quality Ge on Si by self-directed “touchdown” of nanoscale seed pads through a thin SiO2,” SPIE Photonics West 2005, San Jose, CA (January 24, 2005).
19. Sang M. Han, “Micro to Atomic Scale Surface Science and Engineering on Si and Ge Based Systems,” Los Alamos National Laboratory (June 28, 2004).
20. Sang M. Han, “Micro to Atomic Scale Surface Science and Engineering on Si and Ge Based Systems,” University of Florida, Gainesville, FL (April 19, 2004).
21. Sang M. Han, “Micro to Atomic Scale Surface Science and Engineering on Si and Ge Based Systems,” University of California Santa Barbara, Santa Barbara, CA (April 1, 2004).
22. Sang M. Han, “Micro to Atomic Scale Surface Science and Engineering on Si and Ge Based Systems,” University of California Los Angeles, Los Angeles, CA (February 27, 2004).
23. Sang M. Han, “Micro to Atomic Scale Surface Science and Engineering on Si and Ge Based Systems,” Sandia National Laboratories, Albuquerque, NM (February 12, 2004).
24. Sang M. Han, “Micro to Atomic Scale Surface Science and Engineering on Si and Ge Based Systems,” Center for High Technology Materials, University of New Mexico, Albuquerque, NM (February 6, 2004).
25. Sang M. Han, “Micro to Atomic Scale Surface Science and Engineering on Si and Ge Based Systems,” Drexel University, Philadelphia, PA (November 24, 2003).
26. Sang M. Han, “Micro to Atomic Scale Surface Science and Engineering on Si and Ge Based Systems,” Lam Research Corporation, Fremont, CA (November 20, 2003).
27. Sang M. Han, “Micro to Atomic Scale Surface Science and Engineering on Si and Ge Based Systems,” Seoul National University, Seoul, Korea (May 15, 2003).
28. Sang M. Han, “Micro to Atomic Scale Surface Science and Engineering on Si and Ge Based Systems,” Seung-Kyun-Kwan University, Suwon, Korea (May 14, 2003).
29. Sang M. Han, “Fundamental Plasma Physics and Chemistry to Real Life Plasma Tools,” Intel Annual Lecture Series, Intel Corporation, Rio Rancho, NM (November 27, 2001).
30. Sang M. Han, “Plasma enhanced chemical vapor deposition of SiO2 and fluorinated SiO2 films,” University of New Mexico, Albuquerque, NM (February 4, 1999).
31. Sang M. Han, “Plasma enhanced chemical vapor deposition of SiO2 and fluorinated SiO2 films,” Reunión de Invierno “*New Horizons in Materials Science*” sponsored by Universidad Nacional Autónoma de México, Querétaro, Mexico (January 18, 1999).
32. Sang M. Han, “Plasma enhanced chemical vapor deposition of SiO2 and fluorinated SiO2 films,” National Institute of Standards and Technology, Gaithersburg, MD (March 27, 1998).
33. Sang M. Han, “Plasma enhanced chemical vapor deposition of SiO2 and fluorinated SiO2 films,” Lucent Technologies – Bell Labs, Murray Hill, NJ (March 26, 1998).
34. Sang M. Han, “Plasma enhanced chemical vapor deposition of SiO2 and fluorinated SiO2 films,” Stanford University, Stanford, CA (February 4, 1998).
35. S. M. Han (speaker) and E. S. Aydil, “Gas phase and surface diagnostics during plasma enhanced chemical vapor deposition of SiO2 through SiH4/O2/Ar discharges,” Hitachi Central Research Center, Japan (August 1996).

*Contributed*

1. Sarun Atiganyanun, John Plumley, Kevin Hsu, Jacob Cytrynbaum, Thomas L. Peng, Sang M. Han†, and Sang Eon Han, “Disordered Microsphere-Based Coatings for Effective Radiative Cooling under Direct Sunlight,” AVS 65th International Symposium & Exhibition, Long Beach, CA (October 25, 2018). †speaker
2. Brian Rummel, Michael David Henry, and Sang M. Han, “Characterization and Imaging of Surface Acoustic Waves on GaAs with Raman Spectroscopy,” AVS 65th International Symposium & Exhibition, Long Beach, CA (October 23, 2018).
3. Cayla Nelson, Omar K. Abudayyeh, Yu-Lin Shen, and Sang M. Han, “Use of Carbon Nanotube-Silver Matrix Composite Thin Films to Enhance Mechanical Properties of Grid Fingers and Busbars on Photovoltaic Cells,” AVS 65th International Symposium & Exhibition, Long Beach, CA (October 23, 2018).
4. Sarun Atiganyanun, John Plumley, Kevin Hsu, Jacob Cytrynbaum, Thomas Peng, Sang M. Han, and Sang Eon Han, “Effective radiative cooling by paint-format microsphere-based photonic random media,” 2018 Annual AIChE Meeting, Pittsburgh, PA (October 28 – November 2, 2018).
5. Sarun Atiganyanun, John Plumley, Kevin Hsu, Jacob Cytrynbaum, Thomas Peng, Sang M. Han, and Sang Eon Han, “Effective radiative cooling by paint-format microsphere-based photonic random media,” SPIE Optics + Photonics Nanoscience + Engineering, San Diego, CA (August 19-23, 2018).
6. Omar K. Abudayyeh, Cayla Nelson, Andre Chavez, John Chavez, Yu-Lin Shen, Francesco Zimbardi, Brian Rounsaville, Vijaykumar Upadhyaya, Ajeet Rohatgi, Byron McDanold, Timothy Silverman, and Sang M. Han, “Development of Low-Cost, Crack-Tolerant Metallization for Solar Cells,” IEEE PVSC 45 and IEEE 7th World Conference on Photovoltaic Energy Conversion (WCPEC), Best Poster Award in Area 9 Field Studies, Waikoloa, HI (June 10, 2018).
7. Sarun Atiganyanun, John Plumley, Kevin Hsu, Jacob Cytrynbaum, Thomas Peng, Sang M. Han, and Sang Eon Han, “Disordered Microsphere-Based Coatings for Effective Radiative Cooling under Direct Sunlight,” MRS Spring Meeting and Exhibit, Phoenix, AZ (April 6, 2018).
8. Sarun Atiganyanun, John Plumley, Kevin Hsu, Jacob Cytrynbaum, Thomas Peng, Sang M. Han, and Sang Eon Han, “Microsphere-Based Disordered Coating for Effective Radiative Cooling,” AVS 64th International Symposium and Exhibition, Tampa, FL (November 2, 2017).
9. Seok-Jun Han, Sang M. Han, and Sang Eon Han, “Silicon-Based Infrared Photodetectors Enabled by Hot Electrons,” 64th International Symposium and Exhibition, Tampa, FL (November 2, 2017).
10. Brian Rummel, Michael Rimada-Menasco, Sadhvikas Addamne, Ganesh Balakrishnan, Talid Sinno, and Sang M. Han, “Imaging Stress-Induced Lateral Quantum Barrier Manipulation of Indium Gallium Arsenide Quantum Wells, using Micro-Photoluminescence Spectroscopy,” 64th International Symposium and Exhibition, Tampa, FL (November 2, 2017).
11. Seok Jun Han, Sang M. Han, and Sang Eon Han, “Silicon-based infrared photodetectors enabled by hot electrons,” SPIE Optical Engineering + Applications Conferences, San Diego, CA (August 8, 2017).
12. Omar K. Abudayyeh, Geoffrey K. Bradshaw, Steven Whipple, David M. Wilt, and Sang M. Han, “Integration of Crack-Tolerant Composite Gridlines on Triple Junction Photovoltaic Cells,” 44th IEEE Photovoltaic Specialist Conference, Washington D.C. (June 26, 2017).
13. Brian Rummel and Sang M. Han, “Stress-Directed Compositional Patterning of Compound Semiconductors to Create 2D Quantum Dot Arrays – Path to Mechanically Triggered Circuits,” MRS Spring Meeting and Exhibit, Phoenix, AZ (April 19, 2017).
14. Brian Rummel and Sang M. Han, “Imaging Stress-Directed Compositional Patterning in Silicon Germanium with μ-Raman Spectroscopy,” AVS 63rd International Symposium and Exhibition, Nashville, TN (November 9, 2016).
15. Omar K. Abudayyeh, Nathan D. Gapp, Geoffrey K. Bradshaw, David M. Wilt, and Sang M. Han, “Spray-Coated Carbon-Nanotubes for Crack-Tolerant Metal Matrix Composites for Photovoltaic Gridlines,” AVS 63rd International Symposium and Exhibition, Nashville, TN (November 8, 2016).
16. Sarun Atiganyanun, Sang Eon Han, and Sang M. Han, “Fabrication of Nanosphere-Based Disordered Coatings for Radiative Cooling Under Direct Sunlight,” AVS 63rd International Symposium and Exhibition, Nashville, TN (November 7, 2016).
17. Seok Jun Han, Swapnadip Ghosh, Omar K. Abudayyeh, Brittany R. Hoard, Ethan C. Culler, Jose E. Bonilla, Sang M. Han, and Sang Eon Han, “Symmetry-Breaking Nanostructures on Crystalline Silicon for Enhanced Light Trapping in Thin Film Solar Cells,” AVS 63rd International Symposium and Exhibition, Nashville, TN (November 7, 2016).
18. Lyle A. Menk, Christian Arrington, Todd Bauer, Matthew Blain, Jason Dominguez, Isaac Dyer, Ron Goeke, Sang M. Han, Edwin Heller, Andrew Hollowell, Robert Jarecki, Rebecca Loviza, Jaime McClain, Jamin Pillars, Paul Resnick, Christopher St. John, and Robert Timon, “ALD Platinum Surface Preparation and Copper Electrodeposition in Blind Mesoscale Through-Silicon Vias,” ECS PRiME 2016, Honolulu, HI (October 2 – 7, 2016).
19. Omar Abudayyeh, Cayla Nelson, Steven Whipple, Geoffrey K. Bradshaw, David M. Wilt, and Sang M. Han, “Crack-Tolerant Metal Composite Engineering for Space Photovoltaics,” NASA 24th Space Photovoltaic Research and Technology (SPRAT), Cleveland, OH (October 20 – 22, 2016).
20. Brian Rummel, Michael Rimada, Travis Jensen, John K. Grey, and Sang M. Han, “Imaging Stress-Directed Compositional Patterning in Silicon Germanium with μ-Raman Spectroscopy,” 26th Rio Grande Symposium on Advanced Materials, Albuquerque, NM (October 3, 2016).
21. Seok Jun Han, Swapnadip Ghosh, Omar K. Abudayyeh, Brittany R. Hoard, Ethan C. Culler, Jose E. Bonilla, Sang M. Han, and Sang Eon Han, “Symmetry-Breaking Nanostructures on Crystalline Silicon for Enhanced Light Trapping in Thin Film Solar Cells,” 26th Rio Grande Symposium on Advanced Materials, Albuquerque, NM (October 3, 2016).
22. Seok Jun Han, Sang Eon Han, and Sang M. Han, “Symmetry Breaking of Nanostructures on Crystalline Silicon for Enhanced Light Trapping in Thin Film Solar Cells,” New Mexico AVS Symposium, Albuquerque, NM (May 24, 2016).
23. Omar Abudayyeh, Nathan D. Gapp, Geoffrey K. Bradshaw, David M. Wilt, and Sang M. Han, “Spray-Coated Carbon-Nanotubes for Crack-Tolerant Metal Matrix Composites as Photovoltaic Gridlines,” New Mexico AVS Symposium, Albuquerque, NM (May 24, 2016).
24. Sarun Atiganyanun, Sang Eon Han, and Sang M. Han, “Fabrication of Nanosphere-Based Disordered Coatings for Radiative Cooling under Direct Sunlight,” New Mexico AVS Symposium, Albuquerque, NM (May 24, 2016).
25. Cayla Nelson, Omar Abudayyeh, and Sang M. Han, “Mechanical and Electrical Modeling of CNT/Ag Metal Matrix Composites: Relating Microstructure to Material Properties,” 26th Rio Grande Symposium on Advanced Materials, Albuquerque, NM (October 3, 2016).
26. Sang Eon Han, Seok Jun Han, Swapnadip Ghosh, Tianhao Cai, Brittany Hoard, and Sang M. Han “Symmetry-Breaking in Light-Trapping Nanostructures on Silicon,” AVS 62nd International Symposium and Exhibition, San Jose, CA (October 22, 2015).
27. Seok Jun Han, Swapnadip Ghosh, Omar K. Abudayyeh, Eric J. Martin, John Grey, Sang M. Han, and Sang Eon Han, “Symmetry-Breaking in Periodic Nanostructures for Enhanced Light Trapping in Organic Solar Cells,” AVS 62nd International Symposium and Exhibition, San Jose, CA (October 22, 2015).
28. Sarun Atiganyanun, Mi Zhou, Sang Eon Han, and Sang M. Han, “Development of an Analytical Model for Langmuir-Blodgett Silica Microsphere Assembly and Investigation of Ge Back Filling of the Opal Template by Polymer-Assisted Deposition,” AVS 62nd International Symposium and Exhibition, San Jose, CA (October 22, 2015).
29. Swapnadip Ghosh, Daniel Kaiser, Jose Bonilla, Talid Sinno, and Sang M. Han, “Stress-Directed Compositional Patterning of SiGe Substrates for Lateral Quantum Barrier Manipulation,” AVS 62nd International Symposium and Exhibition, San Jose, CA (October 20, 2015).
30. Omar K. Abudayyeh, Cayla Nelson, Sang M. Han, Nathan Gapp, and David M. Wilt, “Silver-Carbon-Nanotube Metal Matrix Composites for Metal Contacts on Space Photovoltaic Cells,” AVS 62nd International Symposium and Exhibition, San Jose, CA (October 19, 2015).
31. Omar K. Abudayyeh, Cayla Nelson, Sang M. Han, Nathan Gapp, and David M. Wilt, “Silver-Carbon-Nanotube Metal Matrix Composites for Metal Contacts on Space Photovoltaic Cells,” 228th Electrochemical Society Meeting, Phoenix, AZ (October 11 – 16, 2015).
32. Omar K. Abudayyeh, Cayla Nelson, Sang M. Han, Nathan Gapp, and David M. Wilt, “Silver-Carbon-Nanotube Metal Matrix Composites for Metal Contacts on Space Photovoltaic Cells,” IEEE Photovoltaic Specialist Conference 42, New Orleans, LA (June 18, 2015).
33. Swapnadip Ghosh, Seok Jun Han, Brittany R. Hoard, Ethan C. Culler, Jose E. Bonilla, Eric J. Martin, John Grey, Sang M. Han, and Sang Eon Han, “Symmetry-Breaking Nanostructures for Enhanced Light-Trapping in Thin Film Solar Cells,” IEEE Photovoltaic Specialist Conference 42, New Orleans, LA (June 16, 2015).
34. Seok Jun Han, Swapnadip Ghosh, Omar K Abudayyeh, Eric J. Martin, John Grey, Sang M. Han, and Sang Eon Han, “Symmetry-Breaking in Periodic Structures for Enhanced Light Trapping in Organic Solar Cells,” New Mexico AVS Symposium (May 19, 2015).
35. Omar K. Abudayyeh, Cayla Nelson, Sang M. Han, Nathan Gapp, and David M. Wilt, “Development of Silver-Carbon-Nanotube Metal Matrix Composites for Metal Contacts on Space Photovoltaics,” New Mexico AVS Symposium (May 19, 2015).
36. Swapnadip Ghosh and Sang M. Han, “From Large-Area, Wafer-Scale Ge-Based Epitaxy to Creating a Responsive SiGe Substrate to Form a 2D Array of Ge Quantum Dots as a Basis for Future Transistor Architecture,” MRS Spring Meeting and Exhibit, San Francisco, CA (April 9, 2015).
37. Sarun Atiganyanun, Mi Zhou, Sang Eon Han, and Sang M. Han, “Fabrication of Opal Structures by Langmuir-Blodgett Silica Microsphere Assembly and Development of an Analytical Model to Predictably Manipulate the Crystalline Domain Size,” MRS Spring Meeting and Exhibit, San Francisco, CA (April 7, 2015).
38. Swapnadip Ghosh, Daniel Kaiser, Talid R. Sinno, and Sang M. Han, “Creating a Responsive SiGe Substrate to Form 2D Array of Ge Quantum Dots Using Stress-induced Near-surface Compositional Redistribution,” AVS 61st International Symposium and Exhibition, Baltimore, MD (November 13, 2014).
39. Daniel Kaiser, Swapnadip Ghosh, Sang M. Han, and Talid R. Sinno, “Computational Analysis of Interdiffusion in Silicon-Germanium Alloy Films Subject to Patterned Stress Fields,” AVS 61st International Symposium and Exhibition, Baltimore, MD (November 13, 2014).
40. Sang Eon Han, Swapnadip Ghosh, T. Cai, Brittany R. Hoard, and Sang M. Han, “Symmetry-Breaking in Light Trapping Nanostructures on Silicon for Solar Photovoltaics,” AVS 61st International Symposium and Exhibition, Baltimore, MD (November 13, 2014).
41. Claire Y. Chuang, Sang M. Han, and Talid Sinno, “Molecular Dynamics Simulation of Ge Deposition and Islanding on Amorphous Silica Substrates,” AVS 61st International Symposium and Exhibition, Baltimore, MD (November 12, 2014).
42. Mi Zhou, Sarun Atiganyanun, Swapnadip Ghosh, James Chavez, Sang Eon Han, and Sang M. Han,” Fabrication of Inverse Opal Structures by Langmuir-Blodgett Silica Microsphere Assembly and Germanium Back Filling by Molecular Beam Epitaxy,” AVS 61st International Symposium and Exhibition, Baltimore, MD (November 11, 2014).
43. Swapnadip Ghosh and Sang M. Han, “Structural, Electrical, and Optical Characterization of Impurity-Dependent, Ultra-Low-Dislocation-Density Ge Epitaxially Grown on Si,” AVS 61st International Symposium and Exhibition, Baltimore, MD (November 11, 2014).
44. Swapnadip Ghosh, Daniel Kaiser, Talid R. Sinno, and Sang M. Han, “Characterization of Large-Area, Wafer-Scale Ge-Based Epitaxy, Devices, and 2D Array of Ge Quantum Dots on Si/SiGe Platform,” The 26th Rio Grand Symposium (October 6, 2014).
45. Swapnadip Ghosh, Daniel Kaiser, Talid R. Sinno, and Sang M. Han, “Creating a Responsive SiGe Substrate to Form 2D Array of Ge Quantum Dots Using Stress-Induced Near-Surface Compositional Redistribution,” New Mexico AVS Symposium and Surface Analysis 2014 (June 3, 2014).
46. Swapnadip Ghosh and Sang M. Han, “High-Carrier-Mobility p- and n-Type Field Effect Transistors Grown on Si,” MRS Spring Meeting and Exhibit, San Francisco, CA (April 24, 2014).
47. Brittany R. Hoard, Swapnadip Ghosh, Ethan C. Culler, Michael Orrill, Sang M. Han, and Sang Eon Han, “Symmetry-Breaking in Light-Trapping Nanostructures on Silicon,” MRS Spring Meeting and Exhibit, San Francisco, CA (April 23, 2014).
48. Swapnadip Ghosh, Jose Bonilla, Daniel Kaiser, and Talid Sinno, “Experimental and Theoretical Investigation of Stress-Induced Near-Surface Compositional Redistribution of Si0.8Ge0.2 Substrates for 2D Array Growth of Ge Quantum Dots,” MRS Spring Meeting and Exhibit, San Francisco, CA (April 23, 2014).
49. Swapnadip Ghosh, Jose Bonilla, Daniel Kaiser, and Talid Sinno, “Experimental and Theoretical Investigation of Stress-Induced Near-Surface Compositional Redistribution of Si0.8Ge0.2 Substrates for 2D Array Growth of Ge Quantum Dots,” AVS 60th International Symposium and Exhibition, Long Beach, CA (October 29, 2013).
50. Swapnadip Ghosh and Sang M. Han, “High-Carrier-Mobility p- and n-Type Field Effect Transistors Fabricated on Large-Area Wafer-Scale Ge Film Epitaxially Grown on Si,” AVS 60th International Symposium and Exhibition, Long Beach, CA (October 28, 2013).
51. Swapnadip Ghosh, Jose Bonilla, Daniel Kaiser, Talid R. Sinno, and Sang M. Han, “Experimental and Theoretical Investigation of Stress-induced Near-surface Compositional Redistribution on Si0.8Ge0.2 Substrates for 2D Array Growth of Ge Quantum Dots,” The 25th Rio Grande Symposium on Advanced Materials (October 7, 2013).
52. Swapnadip Gosh and Sang M. Han, “High-Carrier-Mobility p- and n-Type Field Effect Transistors Fabricated on Large-Area Wafer-Scale Ge Film Epitaxially Grown on Si,” New Mexico AVS Symposium (May 21, 2013).
53. Swapnadip Gosh and Sang M. Han, “Impact of Threading Dislocation Density and Dielectric Layer on Device Characteristics of p-MESFETs Fabricated on Ge-on-Si Substrates,” MRS Spring Meeting and Exhibit, San Francisco, CA (April 3, 2013).
54. Swapnadip Gosh and Sang M. Han, “Implantation-Free, High-Hole-Mobility p-MOSFETs Fabricated on Wafer-Scale Epitaxial Ge on Si,” MRS Spring Meeting and Exhibit, San Francisco, CA (April 3, 2013).
55. Nicholas Shoop, Louis J. Tribby, and Sang M. Han, “Modeling of Kinetically Limited Growth Rate for Solution-Synthesized Germanium Nanocrystals,” MRS Spring Meeting and Exhibit, San Francisco, CA (April 4, 2013).
56. Claire Y. Chuang, Qiming Li, Darin Leonhardt, Sang M. Han, and Talid Sinno, “Atomistic Analysis of Ge on a-SiO2 using an Empirical Interatomic Potential to Describe Selective Epitaxial Growth,” AVS 59th International Symposium and Exhibition, Tampa, FL (November 1, 2012).
57. Swapnadip Ghosh and Sang M. Han, “Impact of Threading Dislocation Density and Dielectric Layer on I-V Characteristics of Schottky Diodes Fabricated from Ti and Epitaxially Grown p-Type Ge on Si,” AVS 59th International Symposium and Exhibition, Tampa, FL (November 1, 2012).
58. Josephine Sheng, David C. Chapman, David M. Wilt, Stephen J. Polly, Christopher G. Bailey, Christopher G. Kerestes, Seth M. Hubbard, and Sang M. Han, “Temperature Dependent Characterization of Imbedded InAs Quantum Dots in GaAs Superlattice Solar Cells Structures by High Resolution X-ray Diffraction,” AVS 59th International Symposium and Exhibition, Tampa, FL (October 29, 2012).
59. Darin Leonhardt and Sang M. Han, “New Method to Produce High-Quality Epitaxial Ge on Si Using SiO2-Lined Etch Pits and Epitaxial Lateral Overgrowth for III-V Integration,” 221st ECS Meeting, Seattle, WA (May 9, 2012).
60. Swapnadip Gosh, Darin Leonhardt, and Sang M. Han, “Investigations on Thermal Stress Relief Mechanism Using Air-Gapped SiO2 Nanotemplates during Epitaxial Growth of Ge on Si and Corresponding Hole Mobility Improvement,” 221st ECS Meeting, Seattle, WA (May 8, 2012).
61. Josephine J. Sheng, David C. Chapman, David M. Wilt, Stephen J. Polly, Christopher G. Kerestes, Seth M. Hubbard, and Sang M. Han, “Temperature Dependent Characterization of Imbedded InAs Quantum Dots in GaAs Superlattice Solar Cells Structures by High Resolution X-ray Diffraction,” Spring MRS Meeting, San Francisco, CA (April 13, 2012).
62. Swapnadip Ghosh, Darin Leonhardt, Sang M. Han, “Experimental and Theoretical Investigations Using SiO2 Nanotemplates to Relieve Stress Caused by Thermal Expansion Coefficient Mismatch in Epitaxial Germanium on Silicon,” AVS 58th International Symposium and Exhibition, Nashville, TN (November 3, 2011).
63. Darin Leonhardt and Sang M. Han, “New Method to Produce High-Quality Epitaxial Ge on Si Using SiO2-Lined Etch Pits and Epitaxial Lateral Overgrowth for III-V Multijunction Solar Cells,” AVS 58th International Symposium and Exhibition, Nashville, TN (October 31, 2011).
64. Louis Tribby, Frank van Swol, Cornelius F. Ivory, and Sang M. Han, “Transport Properties of Proteins and Quantum Dots in Nanochannels in Multi-Gated Field Effect Transistor Configuration,” AVS 58th International Symposium and Exhibition, Nashville, TN (October 31, 2011).
65. Louis J. Tribby, Cornelius F. Ivory, Frank van Swol, and Sang M. Han, “Transport Properties of Proteins and Quantum Dots in Nanochannels in Multi-gated Field-Effect-Transistor Configuration,” New Mexico AVS Symposium (May 24, 2011).
66. Darin Leonhardt and Sang M. Han, “New Method to Produce High-Quality Epitaxial Ge on Si Using SiO2-Lined Etch Pits and Epitaxial Lateral Overgrowth for III-V Multijunction Solar Cells,” New Mexico AVS Symposium (May 24, 2011).
67. Swapnadip Ghosh, Darin Leonhardt, and Sang M. Han, “Experimental and Theoretical Investigations Using SiO2 Nanotemplates to Relieve Stress Caused by Thermal Expansion Coefficient Mismatch in Epitaxial Germanium Grown on Silicon,” New Mexico AVS Symposium (May 24, 2011).
68. Josephine J. Sheng, Darin Leonhardt, Jeffery G. Cederberg, Malcolm S. Carroll, Qiming Li, Manuel K. Romero, Steve Johnston, and Sang M. Han, “Minority Carrier Lifetime in Epitaxially Grown Ge Film on Si by Nanoscale Interfacial Engineering,” New Mexico AVS Symposium (May 24, 2011).
69. Louis J. Tribby, Cornelius F. Ivory, Frank van Swol, and Sang M. Han, “Experimental and Theoretical Comparison of Aspect-ratio-dependent Diffusion of CdSe Nanocrystals through Nanochannels,” Spring MRS Meeting, San Francisco, CA (April 28, 2011).
70. Josephine J. Sheng, Darin Leonhardt, Jeffery G. Cederberg, Malcolm S. Carroll, Qiming Li, Manuel J. Romero, Steve Johnston, and Sang M. Han, “Minority Carrier Lifetime in Ge Film Epitaxially Grown on Si by Nanoscale Interfacial Engineering,” Spring MRS Meeting, San Francisco, CA (April 28, 2011).
71. Louis J. Tribby, Cornelius F. Ivory, Frank van Swol, and Sang M. Han, “Transport Properties of Proteins and Quantum Dots in Nanochannels in Multi-gated Field-Effect-Transistor Configuration,” Spring MRS Meeting, San Francisco, CA (April 27, 2011).
72. Swapnadip Ghosh, Darin Leonhardt, and Sang M. Han, “Use of SiO2 Templates for Relieving thermally Induced Stress During Epitaxial Growth of Ge on Si for III-V Photovoltaic Applications,” Spring MRS Meeting, San Francisco, CA (April 26, 2011).
73. Josephine J. Sheng, Darin Leonhardt, Jeffrey G. Cederberg, Malcolm Carroll, Manuel J. Romero, Steve Johnston, and Sang M. Han, “Characterization of Minority Carrier Lifetime in Ge Films Epitaxially Grown on Si by Nanoscale Interfacial Engineering,” AVS 57th International Symposium and Exhibition, Albuquerque, NM (October 21, 2010).
74. Darin Leonhardt, Josephine J. Sheng, Jeffrey G. Cederberg, Malcolm Carroll, Manuel J. Romero, and Sang M. Han, “Growing Low-Dislocation-Density Ge on Si Through Nanometer Sized Voids in Chemical Oxide and Subsequent Integration of III-V Films for Multijunction Solar Cells,” AVS 57th International Symposium and Exhibition, Albuquerque, NM (October 19, 2010).
75. Josephine Sheng, Darin Leonhardt, Malcolm S. Carroll, Jeffrey G. Cederberg, and Sang M. Han, “Characterization of Carrier Lifetime in Ge Films Epitaxially Grown on Si by Nanoscale Heterojunction Engineering,” Spring MRS Meeting, San Francisco, CA (April 7, 2010).
76. Louis L. Tribby, Cornelius F. Ivory, Frank van Swol, and Sang M. Han, “Experimental and Theoretical Comparison of Aspect-Ratio-Dependent Diffusion of CdSe Nanocrystals Through Nanochannels,” Spring MRS Meeting, San Francisco, CA (April 7, 2010).
77. Darin Leonhardt, Josephine J. Sheng, Jeffrey G. Cederberg, Malcolm S. Carroll, Manuel J. Romero, and Sang M. Han, “Study of Surface Reactions and Defect Reduction by Scalable Ge-on-Si Nanoscale Heterojunction Engineering and GaAs Integration for III-V Photovoltaics,” Spring MRS Meeting, San Francisco, CA (April 6, 2010).
78. Josephine Sheng, Darin Leonhardt, Jeffrey G. Cederberg, Malcolm S. Carroll, and Sang M. Han, “Lifetime and defect characterization of engineered germanium-on-silicon wafers for III-V photovoltaics,” AVS 56th International Symposium and Exhibition, San Jose, CA (November 10, 2009).
79. Darin Leonhardt, Josephine Sheng, Jeffrey G. Cederberg, Malcolm S. Carroll, and Sang M. Han, GaAs Integration on High-Quality Ge on Si for Multijunction Solar Cells,” AVS 56th International Symposium and Exhibition, San Jose, CA (November 10, 2009).
80. Louis L. Tribby, Cornelius F. Ivory, Frank van Swol, and Sang M. Han, “Experimental and theoretical comparison of aspect-ratio-dependent diffusion of CdSe nanocrystals through nanochannels,” Annual AIChE Meeting, Nashville, TN (November 10, 2009).
81. Darin Leonhardt, Josephine Sheng, Jeffrey G. Cederberg, Malcolm S. Carroll, and Sang M. Han, “GaAs Integration on High-Quality Ge on Si for Multijunction Solar Cells,” Annual AIChE Meeting, Nashville, TN (November 9, 2009).
82. Jeffrey G. Cederberg, Darrell L. Alliman, Darin Leonhardt, Josephine J. Sheng, Qiming Li, Karen Cross, Malcolm S. Carroll, and Sang M. Han, “Epitaxial integration of GaAs on Si using strain-relaxed Ge intermediate layer – challenges and progress,” The 17th American Conference on Crystal Growth and Epitaxy, Lake Geneva, WI (August 9 – 14, 2009).
83. Josephine Sheng, Darin Leonhardt, Jeffrey G. Cederberg, Malcolm S. Carroll, and Sang M. Han, “Slurry-Free Chemical Mechanical Planarization of Engineered Ge-on-Si Wafers for GaAs Integration,” Spring MRS Meeting, San Francisco, CA (April 15, 2009).
84. Younjin Oh, Danny Bottenus, Cornelius F. Ivory, and Sang M. Han, “High-Resolution Protein Separations in a Nanofluidic FET Device, using pH and Potential Gradient,” Spring MRS Meeting, San Francisco, CA (April 14, 2009).
85. Darin Leonhardt, Josephine Sheng, Thomas E. Vandervelde, Jeffrey G. Cederberg, Malcolm S. Carroll, and Sang M. Han, “Nanoscale Heterojunction Engineering to Grow High-Quality Ge on Si and Subsequent GaAs Integration for Multijunction Solar Cells,” Spring MRS Meeting, San Francisco, CA (April 14, 2009).
86. Darin Leonhardt, Josephine Sheng, Thomas Vandervelde, Jeffrey Cederberg, Malcolm Carroll, Sang M. Han, “Nanoscale Heterojunction Engineering to Grow High-Quality Ge on Si for Multijunction Solar Cells,” Annual AIChE Meeting, Philadelphia, PA (November 20, 2008).
87. Youn-Jin Oh, Danny Bottenus, Cornelius F. Ivory, and Sang M. Han, “Field Effect Transistor Flow Control and Separation of Proteins in Nanofluidic Devices,” Annual AIChE Meeting, Philadelphia, PA (November 20, 2008).
88. Danny Bottenus, Youn-Jin Oh, Sang M. Han, and Cornelius F. Ivory, “Experimentally and Theoretically Observed Native pH Shifts in a Nanochannel Array,” Annual AIChE Meeting, Philadelphia, PA (November 18, 2008).
89. Youn-Jin Oh, Danny Bottenus, Cornelius F. Ivory, and Sang M. Han, “Control and Separation of Proteins in a Nanofluidic FET Device, using pH Gradient and Valence Charge,” AVS 55th International Symposium and Exhibition, Boston, MA (October 23, 2008).
90. Darin Leonhardt, Josephine Sheng, Thomas E. Vandervelde, Jeffrey G. Cederberg, Malcolm S. Carroll, and Sang M. Han, “Nanoscale Heterojunction Engineering to Grow High-Quality Ge on Si for Multijunction Solar Cells,” AVS 55th International Symposium and Exhibition, Boston, MA (October 21, 2008).
91. M. Carroll, E. Nordberg, K. Eng, D. Kluskiewicz, G. Ten Eyck, K. Childs, J. Wendt, J. Stevens, T. Lemp, J. Sheng, J. Grey, S. Han, M. Lilly, and M. Eriksson, “Si and SiGe based double top gated accumulation mode single electron transistors for quantum bits,” Electrochemical Society Pacific Rim Meeting on Electrochemical and Solid State Science, Honolulu, HI (October 13, 2008).
92. Qiming Li, Darin Leonhardt, Josephine Sheng, Thomas E. Vandervelde, Jeffrey G. Cederberg, Malcolm S. Carroll, and Sang M. Han, “Nanoscale Heterojunction Engineering to Grow High-Quality Ge on Si for Multijunction Solar Cells,” 44th New Mexico AVS Symposium (May 20, 2008).
93. Youn-Jin Oh, Danny Bottenus, Cornelius F. Ivory, and Sang M. Han, “Isoelectric Focusing and Separation of Proteins by pH and Potential Gradient in a Nanofluidic Field Effect Transistor Device,” Spring MRS Meeting, San Francisco, CA (March 27, 2008).
94. Darin Leonhardt and Sang M. Han, “Probing Effect of Interaction and Thermal Expansion Mismatch between Ge and Templated Mask on Defects during Selective Molecular Beam Epitaxy of Ge on Si,” Spring MRS Meeting, San Francisco, CA (March 27, 2008).
95. Louis J. Tribby, Youn-Jin Oh, Timothy J. Boyle, and Sang M. Han, “Probing Differential Ligand Surface Passivation on Nanowire by Electric-Field-Induced Alignment in Nanochannels Integrated into a Multiple Internal Reflection Infrared Waveguide,” Spring MRS Meeting, San Francisco, CA (March 26, 2008).
96. Youn-Jin Oh, Danny Bottenus, Dimiter N. Petsev, Cornelius F. Ivory, Steven R. J. Brueck, Gabriel P. Lopez, Sang M. Han, “Study of FET Flow Control and Separation of Proteins in Nanofluidic Channels,” **54th International American Vacuum Society Symposium, Seattle, WA (October 17, 2007).**
97. Qiming Li, Darin Leonhardt, and Sang M. Han, “**Probing the Effect of Ge Island Coalescence over a Templated Mask on Defect Formation during Selective Molecular Beam Epitaxy of Ge on Si,” 54th International American Vacuum Society Symposium, Seattle, WA (October 17, 2007).**
98. Qiming Li, Darin Leonhardt, Keith Gallow, and Sang M. Han, “Dislocation Density Reduction in Ge Epilayers on Si by Low-Temperature Deposition and Insulator-Capped Post-Growth Annealing for Subsequent Integration of III-V on Ge/Si,” 25th North American Conference on Molecular Beam Epitaxy, Albuquerque, NM (September 26, 2007).
99. M. Jeong, C. Chung, N. Kulyk, Y. Oh, S. Han, S. Baek, J. Kang and S. Ham, "Separation of Nanoparticles in Nanochannels Using Electroosmotic Force," the 212th Meeting of the Electrochemical Society, Washington DC (October 2007).
100. Qiming Li, Keith Gallow, Darin Leonhardt, and Sang M. Han, “Dislocation Density Reduction in Ge Epilayers on Si by Low-Temperature Deposition and Insulator-Capped Post-Growth Annealing,” 43rd Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 22, 2007).
101. Darin Leonhardt, Qiming Li, and Sang M. Han, “Effect of Interdistance of Nanoscale Windows in W Templates on Coalescence and Defect Density during Selective Molecular Beam Epitaxy of Ge on Si,” 43rd Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 22, 2007).
102. Louis J. Tribby, Youn-Jin Oh, Timothy J. Boyle, Timothy N. Lambert, and Sang M. Han, “Nanofluidic Size Focusing of Functionalized CdSe Quantum Dots,” 43rd Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 22, 2007).
103. Youn-Jin Oh, Danny Bottenus, Dimiter N. Petsev, Cornelius F. Ivory, Steven R. J. Brueck, Gabriel P. Lopez, and Sang M. Han, “Study of Field Effect Transistor Flow Control of Proteins and pH Changes in Nanochannels,” 43rd Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 21, 2007).
104. Timothy N. Lambert, Nicholas L. Andrews, Bernadette A. Hernandez-Sanchez, Henry Gerung, Timothy J. Boyle, Paul Rotella, Janet M. Oliver, Sang M. Han, Bridget S. Wilson, and Sanjay Krishna, “Near-Infrared Photothermal Conversion Properties and Cell Recognition of Biocompatible Germanium(0) Nanocrystals,” Spring MRS Meeting, San Francisco, CA (April 10, 2007).
105. Louis J. Tribby, Youn-Jin Oh, Timothy N. Lambert, Timothy J. Boyle, and Sang M. Han, “Nanofluidic Size Focusing of Charge Functionalized CdSe Quantum Dots,” Spring MRS Meeting, San Francisco, CA (April 10, 2007).
106. Youn-Jin Oh, Danny Bottenus, Yi Zhang, Dimiter N. Petsev, Cornelius F. Ivory, Steven R. J. Brueck, Gabriel P. Lopez, and Sang M. Han, “Study of FET Flow Control of Proteins and pH Changes in Nanochannels Using Scanning Laser Confocal Fluorescence Microscopy and Multiple Internal Reflection Fourier Transform Infrared Spectroscopy,” Spring MRS Meeting, San Francisco, CA (April 12, 2007).
107. Qiming Li Darin Leonhardt, Keith Gallow, and Sang M. Han, “Dislocation Density Reduction in Ge Epilayers on Si by Low-Temperature Deposition and Insulator-Capped Post-Growth Annealing and Subsequent Integration of III-V on Ge/Si,” Spring MRS Meeting, San Francisco, CA (April 12, 2007).
108. Darin Leonhardt, Qiming Li, and Sang M. Han, “Effect of Interdistance of Nanoscale Windows in W Templates on Coalescence and Defect Density During Selective Molecular Beam Epitaxy of Ge on Si,” Spring MRS Meeting, San Francisco, CA (April 12, 2007).
109. Qiming Li, Joshua L. Krauss, Stephen Hersee, and Sang M. Han, “Probing Interactions of Ge with Chemical and Thermal SiO2 to Understand Selective Growth of Ge on Si during Molecular Beam Epitaxy,” AVS 53rd International Symposium & Exhibition and Annual AIChE Meeting (2006).
110. Henry Gerung, Louis J. Tribby, Timothy N. Lambert, Nicholas Andrews, Timothy J. Boyle, C. Jeffrey Brinker, Janet M. Oliver, and Sang M. Han, “Germanium Nanocrystals and Nanowires: Morphological Control, Surface Characterization, and Applications,” AVS 53rd International Symposium & Exhibition and Annual AIChE Meeting (2006).
111. Youn-Jin Oh, Dimiter N. Petsev, Cornelius F. Ivory, Chan-Hwa Chung, Steven R. J. Brueck, Gabriel P. Lopez, Sang M. Han, “Study of FET Flow Control and Electrostatic Response of Charged Molecules in Nanofluidic Channels,” AVS 53rd International Symposium & Exhibition and Annual AIChE Meeting (2006).
112. Qiming Li, Darin Leonhardt, Joshua L. Krauss, Stephen Hersee, and Sang M. Han, “Selective Molecular Beam Epitaxy of High-Quality Ge on Si Covered with SiO2,” European Materials Research Society 2006 Spring Meeting, Nice, France (May 29, 2006).
113. Youn-Jin Oh, Dimiter N. Petsev, Cornelius F. Ivory, Chan-Hwa Chung, Steve R. J. Brueck, Gabriel P. Lopez, and Sang M. Han, “Study of Molecular Transport in Nanofluidic Channels by Integrated Multiple Internal Reflection Infrared Waveguide,” 42nd Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 22, 2006).
114. Qiming Li, Joshua L. Krauss, Stephen Hersee, and Sang M. Han, “Probing Interactions of Ge with Chemical and Thermal SiO2 to Understand Selective Growth of Ge on Si during Molecular Beam Epitaxy,” 42nd Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 23, 2006).
115. Keith Gallow, Sang M. Han, and Qiming Li, “Growth of Vertically Aligned Diamond Nanorods,” 42nd Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 23, 2006).
116. Louis Tribby, Henry Gerung, Timothy J. Boyle, and Sang M. Han, “Sterically Varied Germanium Alkoxides/Silanols/Thiols for Solution Synthesis of Nanocrystals and Nanowires,” Spring MRS Meeting, San Francisco, CA (April 20, 2006).
117. Younjin Oh, Thomas C. Gamble, Anthony Garcia, Alexander Neumann, Chan-Hwa Chung, Dimiter N. Petsev, Cornelius F. Ivory, Steven R. J. Brueck, and Sang M. Han, “Study of Molecular Transport in Nanofluidic Channels by Integrated Multiple Internal Reflection Infrared Waveguide,” Spring MRS Meeting, San Francisco, CA (April 19, 2006).
118. Steve Hersee, Sang Han, Xinyu Sun, and Xin Wang, “Nanoheteroepitaxy for Efficient GaN LEDs on Silicon,” Spring MRS Meeting, San Francisco, CA (April 19, 2006).
119. Qiming Li and Sang M. Han, “Formation of Epitaxial Ge Nanorings on Si by Self-assembled SiO2 Particles and Touchdown of Ge Through a Thin Layer of SiO2,” Spring MRS Meeting, San Francisco, CA (April 18, 2006).
120. Qiming Li and Sang M. Han, “Formation of Epitaxial Ge Nanorings on Si by Self-assembled SiO2 Particles and Touchdown of Ge Through a Thin Layer of SiO2,” AVS 52nd International Symposium & Exhibition and Annual AIChE Meeting (2005).
121. Thomas C. Gamble, Youn-Jin Oh, Anthony Garcia, Alexander Neumann, Dimiter N. Petsev, Cornelius F. Ivory, Chan-Hwa Chung, Steven R. J. Brueck, Gabriel P. Lopez, and Sang M. Han, “Study of Molecular Transport in Nanofluidic Channels by Integrated Multiple Internal Reflection Infrared Waveguide,” AVS 52nd International Symposium & Exhibition and Annual AIChE Meeting (2005).
122. Henry Gerung, Timothy N. Lambert, Timothy J. Boyle, Louis J. Tribby, Nicholas Andrews, Janet M. Oliver, C. Jeffrey Brinker, and Sang M. Han, “Control of Germanium Nanocrystal Morphology and Surface Functionalization,” AVS 52nd International Symposium & Exhibition and Annual AIChE Meeting (2005).
123. Kyle J. Solis, Lance R. Williams, Brian S. Swartzentruber, and Sang M. Han, “Adatom-Pair Chain Structures: Metastable Precursors to Island Formation on the Ge-Si(100) 2xN Alloyed Surface,” AVS 52nd International Symposium & Exhibition and Annual AIChE Meeting (2005).
124. Madhava R. Kosuri, Henry Gerung, Qiming Li, Sang M. Han, Paulo E. Herrera-Morales, and Jason F. Weaver, “Mechanism and Kinetics of Alky Monolayer Formation on Hydrogenated Si(111),” Annual AIChE Meeting, Cincinnati, OH (October 31, 2005)
125. Henry Gerung, Louis J. Tribby, Timothy J. Boyle, C. Jeffrey Brinker, and Sang M. Han, “Germanium Nanocrystal and Nanowire Synthesis Via Molecularly Designed Ge+2 Precursors,” 17th Annual Rio Grande Symposium on Advanced Materials, Albuquerque, NM (October 11, 2005).
126. Henry Gerung, Scott D. Bunge, Timothy J. Boyle, C. Jeffrey Brinker, and Sang M. Han, “Control of Germanium Nanocrystal Morphology via Precursor Modification,” 41st Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 24, 2005).
127. Qiming Li and Sang M. Han, “Formation of Epitaxial Ge Nanorings on Si by Self-Assembled SiO2 Particles and Touchdown of Ge Through a Thin Layer of SiO2,” 41st Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 24, 2005).
128. Thomas C. Gamble, Youn-Jin Oh, Dimiter N. Petsev, Cornelius F. Ivory, Chan-Hwa Chung, Steven R. J. Brueck, Gabriel P. Lopez, and Sang M. Han, “Study of Molecular Transport in Nanofluidic Channels by Integrated Multiple Internal Reflection Infrared Waveguide,” 41st Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 23, 2005).
129. Kyle J. Solis, Lance R. Williams, Brian S. Swartzentruber, and Sang M. Han, “Adatom-Pair Chain Structures: Metastable Precursors to Island Formation on the Ge-Si(100) 2xN Alloyed Surface,” 41st Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 23, 2005).
130. Stephen Hersee, Sang M. Han, Xin Yu Sun, Xin Wang, and Qiming Li, “Nanoheteroepitaxy: The Use of Compliant Nanostructures to Accommodate Large Lattice Mismatch in Semiconductor Heterostructures,” The 11th European Workshop on Metalorganic Vapor Phase Epitaxy, Lausanne, Switzerland (June 5th-8th, 2005).
131. Qiming Li, Joshua L. Krauss, Stephen Hersee, and Sang M. Han, “Understanding of Surface Phenomena Responsible for the Selective Growth of Ge on Si over SiO2 During Molecular Beam Epitaxy,” Spring MRS Meeting, San Francisco, CA (March 30, 2005).
132. Henry Gerung, Scott D. Bunge, Timothy J. Boyle, C. Jeffrey Brinker, and Sang M. Han, “Synthesis of Germanium Nanocrystals and Nanowires via Ge(II) Precursors,” Spring MRS Meeting, San Francisco, CA (March 31, 2005).
133. Henry Gerung, Scott D. Bunge, Timothy J. Boyle, C. Jeffrey Brinker, and Sang M. Han, “Synthesis and Characterization of Germanium Nanocrystals and Nanowires,” 2004 AVS International Symposium, Anaheim, CA (November 16, 2004).
134. Qiming Li, Darin Leonhardt, Ying-Bing Jiang, Huifang Xu, Steven R. J. Brueck, Stephen Hersee, and Sang M. Han, “MBE of High-Quality Ge on Si by “Touchdown” of Nanoscale Ge Seeds,” 2004 AVS International Symposium, Anaheim, CA (November 16, 2004).
135. Madhava Kosuri, Henry Gerung, Qiming Li, Sang M. Han, Paulo Herrera, and Jason Weaver, “Vapor‑Phase Adsorption Kinetics of 1‑Decene on Hydrogenated Si(111),” 2004 AVS International Symposium, Anaheim, CA (November 16, 2004).
136. Qiming Li, Darin Leonhardt, Ying-Bing Jiang, Huifang Xu, Stephen Hersee, and Sang M. Han, “MBE of High-Quality Ge on Si by “Touchdown” of Nanoscale Ge Seeds,” AIChE 2004 Annual Meeting, Austin, TX (November 11, 2004).
137. Madhava Kosuri, Henry Gerung, Qiming Li, Sang M. Han, Paulo Herrera, and Jason Weaver, “Vapor‑Phase Adsorption Kinetics of 1‑Decene on Hydrogenated Si(111),” AIChE 2004 Annual Meeting, Austin, TX (November 9, 2004).
138. Madhava R. Kosuri, Roya Cone, Qiming Li, Bruce C. Bunker, Thomas M. Mayer, and Sang M. Han, “Liquid-Phase Self-Assembly of 1-Alkanethiols and 11-Mercapto-1-Undecanols on Hydrogenated Ge(111),” 40th Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 18, 2004).
139. Kyle J. Solis, Brian S. Swartzentruber, and Sang M. Han, “Strain-Mediated Formation of Adatom-Pair Structures in the Ge/Si(100) Heterosystem,” 40th Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 18, 2004).
140. Qiming Li, Darin Leonhardt, Ying-Bing Jiang, Huifang Xu, Steven R. J. Brueck, Stephen Hersee, and Sang M. Han, “Molecular Beam Epitaxy of High-Quality Ge on Si by Self-directed “Touchdown” of Nanoscale Seed Pads,” 40th Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 17, 2004).
141. Henry Gerung, Scott D. Bunge, Timothy J. Boyle, C. Jeffrey Brinker, and Sang M. Han, “Synthesis and Characterization of Germanium Nanocrystals,” 40th Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 17, 2004).
142. Qiming Li, Darin Leonhardt, Ying-Bing Jiang, Huifang Xu, Steven R. J. Brueck, Stephen Hersee, and Sang M. Han (speaker), “MBE of high-quality Ge on Si through vias of SiO2 nanotemplate and by self-directed “touchdown” of nanoscale seed pads,” Materials Research Society 2004 Spring Meeting, San Francisco (April 15, 2004).
143. Madhava R. Kosuri, Henry Gerung, Qiming Li, Sang M. Han (speaker),” Vapor-phase Adsorption Kinetics of 1-Decene on H-terminated Si(100),” AIChE 2003 Annual Meeting, San Francisco (November 19, 2003).
144. Henry Gerung, C. Jeffrey Brinker, Steve R. J. Brueck, and Sang M. Han (speaker), “*In Situ* Real Time Monitoring of Profile Evolution During Plasma Etching,” AIChE 2003 Annual Meeting, San Francisco (November 18, 2003).
145. Sang M. Han, “Tips for Preparing for NSF CAREER,” AIChE 2003 Annual Meeting, San Francisco (November 17, 2003).
146. Henry Gerung, C. Jeffrey Brinker, Steve R. J. Brueck, and Sang M. Han, “*In Situ* Real Time Monitoring of Profile Evolution During Plasma Etching,” AVS 50th International Symposium, Baltimore, MD (November 6, 2003).
147. Madhava R. Kosuri (poster presenter), Roya Cone, Qiming Li, Sang M. Han, Bruce C. Bunker, and Thomas M. Mayer, “Adsorption Kinetics of Alkanethiol Self-Assembly on Hydrogenated Ge(111),” AVS 50th International Symposium, Baltimore, MD (November 5, 2003).
148. Madhava R. Kosuri, Henry Gerung, Qiming Li, Sang M. Han (speaker), Bruce C. Bunker, and Thomas M. Mayer, “Vapor-phase Adsorption Kinetics of 1-Decene on H-Terminated Si(100),” AVS 50th International Symposium, Baltimore, MD (November 4, 2003).
149. Qiming Li and Sang M. Han, “Characterization of Ionic Species in SiH4/Ar ECR Plasma and Role of Ions on Si Film Deposition,” 39th Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (April 30, 2003).
150. Henry Gerung, Jeffrey C. Brinker, Steven R. J. Brueck, and Sang M. Han, “In-situ Real-time Monitoring of Profile Evolution During Plasma Etching,” 39th Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (April 30, 2003).
151. Madhava R. Kosuri, Henry Gerung, Qiming Li, Sang M. Han*,* Bruce C. Bunker and Thomas M. Mayer, “Vapor-phase Adsorption Kinetics of 1-Decene on H-terminated Si(100),” 39th Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (April 29, 2003).
152. Henry Gerung, Dhaval Doshi, C. Jeffrey Brinker, and Sang M. Han (*speaker*), “*In Situ* Real Time Monitoring of Low-k Mesoporous SiO2 During Evaporation Induced Self-Assembly and Plasma Etching,” AIChE 2002 Annual Meeting, Indianapolis, IN (November 8, 2002).
153. Henry Gerung, Dhaval Doshi, C. Jeffrey Brinker, and Sang M. Han (*speaker*), “*In Situ* Real Time Monitoring of Low-k Mesoporous SiO2 During Evaporation Induced Self-Assembly and Plasma Etching,” AVS 49th International Symposium, Denver, CO (November 7, 2002).
154. Sang M. Han, “HIGH PERFORMANCE ENGINES: FAST CARS ACCELERATE LEARNING,” ASEE Summer School for Chemical Engineering Faculty Poster Competition and Winner, Boulder, CO (July 27 – August 2, 2002).
155. Henry Gerung, C. Jeffrey Brinker, and Sang M. Han (speaker), “*In Situ* Real Time Monitoring of Low-k Mesoporous SiO2 During Evaporation Induced Self-Assembly and Plasma Etching,” 38th Annual New Mexico American Vacuum Society Symposium, Albuquerque, NM (May 15, 2002).
156. Sang M. Han, “*In Situ* Real Time Investigation of High-Aspect-Ratio Porous Solgel Silica Features During Plasma Etching,” Center for Micro-Engineered Materials (CMEM) Annual Industrial Advisory Board (IAB) Meeting, Albuquerque, NM (March 20, 2002).
157. Sang M. Han, “Research Direction and Topics: In Situ Real Time Monitoring of Interfacial Phenomena,” Center for Micro-Engineered Materials (CMEM) Annual Industrial Advisory Board (IAB) Meeting, Albuquerque, NM (February 27, 2001).
158. Sang M. Han (speaker) and Eray S. Aydil, “Effects of Feed Gas Composition on Impurity Concentration, Structure, and Dielectric Constant of Fluorinated SiO2 Films Deposited from SiF4/SiH4/O2/Ar Plasmas,” Emerging Technologies 2000, American Vacuum Society – New Mexico Chapter, Albuquerque, NM (May 25, 2000).
159. Sang M. Han (speaker) and Eray S. Aydil, “Plasma enhanced chemical vapor deposition of fluorinated silicon dioxide films,” AIChE Annual Meeting, Los Angeles, CA (November 1997).
160. S. M. Han (speaker) and E. S. Aydil, “Structure and chemical composition of fluorinated SiO2 films deposited using SiF4/O2 and SiF4/SiH4/O2 plasmas,” 44th National Symposium of the American Vacuum Society, San Jose, CA (October 1997).
161. R. S. Larson, E. Meeks, P. Ho, C. Apblett, S. M. Han, E. A. Edelberg, and E. S. Aydil, “Modeling of silicon dioxide deposition in high density plasma reactors and comparison of model predictions with experimental measurements,” 44th National Symposium of the American Vacuum Society, San Jose, CA (October 1997).
162. S. M. Han (speaker) and E. S. Aydil, “Structure and chemical composition of fluorinated SiO2 films deposited using SiF4/O2 and SiF4/SiH4/O2 plasmas,” 30th Annual Southern California Chapter American Vacuum Society Symposium, Anaheim, CA (September 1997).
163. C. Sone, E. Yoon, S. M. Han, and E. S. Aydil, “Optical emission spectroscopy study on the low temperature growth of GaN by remote plasma enhanced chemical vapor deposition,” Joint International Meetings of the Electrochemical Society (192nd) and the International Society of Electrochemistry (48th), Symposium on Compound Semiconductors III-V Nitride Materials and Processes, Paris, France (September 1997).
164. E. S. Aydil and S. M. Han, “Plasma enhanced chemical vapor deposition of silicon dioxide: factors controlling the silanol incorporation,” AIChE Annual Meeting, Chicago, IL (November 1996).
165. S. M. Han (speaker) and E. S. Aydil, “Gas phase and surface diagnostics during plasma enhanced chemical vapor deposition of SiO2 through SiH4/O2/Ar discharges,” 189th Annual Electrochemical Society Meeting, Plasma Processing XI, Los Angeles, CA (May 1996).
166. S. M. Han (speaker) and E. S. Aydil, “Plasma and surface diagnostics during plasma enhanced chemical vapor deposition of SiO2 from SiH4/O2/Ar discharge,” International Conference on Metallurgical Coatings and Thin Films, San Diego, CA (April 1996).
167. S. M. Han and E. S. Aydil, “An *in situ* real time investigation of surface processes relevant to plasma enhanced chemical vapor deposition of SiO2 from SiH4/O2/Ar discharges,” 42nd National Symposium of the American Vacuum Society, Minneapolis, MN (October 1995).

**PATENT APPLICATIONS AND ISSUED PATENTS** – 6 pending applications and 19 issued patents

1. Mahmoud Reda Taha, Sang M. Han, John Stormont, Thomas Dewers, Laura Pyrak Nolte, and Shreya Vemuganti, “Cementitious Sensors Exhibiting Stopbands in Acoustic Transmission Spectra and Methods of Making,” UNM STC-2019-017; US Provisional Patent Application 62/722,746 (August 24, 2018).
2. Sang M. Han and Sang Eon Han, “Radiative Cooling Material System,” UNM STC-2018-013; PCT International Patent Application PCT/US18/51397 (September 17, 2018). *Licensed/Optioned Exclusive*
3. Omar Abudayyeh, Andre Chavez, Sang M. Han, and David M. Wilt, “Materials Engineering to Increase Crack-Tolerance of Screen-Printable Metal Paste,” UNM STC-2018-107; US Provisional Patent Application 62/694,337 (July 5, 2018). *Licensed/Optioned Exclusive*
4. Sang M. Han, Jarred Caldwell, Nicholas Brechtel, Nathan Madrid, Divya Prakash, “Innovation in Feeding Tube Visualization,” UNM STC-2016-045; PCT International Patent Application PCT/US17/65159 (December 7, 2017).
5. Sang Eon Han and Sang M. Han, “Microsphere-Based Coatings for Radiative Cooling Under Direct Sunlight,” UNM STC-2016-018 International Patent Application PCT/US16/57407 (October 17, 2016); Licensed/Optioned-Exclusive to Osazda Energy (October 20, 2016); WO02017/066795 A2 (April 20, 2017).
6. Omar Abudayyeh, Nathan Gapp, David Wilt, Sang M. Han, “Methods to Mitigate Stress-Induced Metal Line Fractures for Thin-Film Solar Cells, Using Metal-Carbon-Nanotube Composites,” UNM STC-2015-123; International Patent Application PCT/US16/38197 (June 17, 2016); *Licensed/Optioned-Exclusive* to Osazda Energy (April 20, 2016); **PCT International Patent WO 2016/205722 A1** (December 22, 2016).
7. Sang M. Han, Cornelius F. Ivory, Mani Hossein-Zadeh, “Biomarker Sensing Based on Nanofluidic Amplification and Resonant Optical Detection,” US Patent Application US 2015/0024507 A1 (January 22, 2015).
8. Sang Eon Han, Brittany R. Hoard, Sang M. Han, and Swapnadip Ghosh, “Methods to Introduce Sub-Micrometer, Symmetry-Breaking Surface Corrugation to Silicon Substrates to Increase Light Trapping,” UNM STC 2017-12-11 Notice of Allowance (December 1, 2017); **U.S. Patent No. US 9,530,906 B2** (September 29, 2016).
9. Sang Eon Han, Brittany R. Hoard, Sang M. Han, and Swapnadip Ghosh, “Methods to Introduce Sub-Micrometer, Symmetry-Breaking Surface Corrugation to Silicon Substrates to Increase Light Trapping,” UNM STC 2014-033 Notice of Allowance (August 15, 2016); Licensed/Optioned-Exclusive to Osazda Energy (April 20, 2016). **U.S. Patent No. US 9,530,906 B2** (September 29, 2016).
10. Sang M. Han and Talid Sinno, “Large-Scale Patterning of Germanium Quantum Dots by Stress Transfer,” UNM STC 2014-010 **U.S. Patent No. 9,373,547 B1** (June 21, 2016) and **U.S. Patent No. 9,666, 431 B1** (May 30, 2017).
11. Olga Lavrova, Sang M. Han, Ganesh Balakrishnan, and Christos Christodoulou, “Multi-Source Optimal Reconfigurable Energy Harvester,” UNM-2012-052-01 Provisional U.S. Patent Application (January 2012) and International Patent Application PCT/US2013/022760 (January 23, 2013). **U.S. Patent No. 9,768,338 B2** (September 19, 2017).
12. Darin Leonhardt, Swapnadip Ghosh, and Sang M. Han, “Relief of Stress Caused by Thermal Expansion Mismatch Based on SiO2 Templates Deposited Using Chemical Vapor Deposition,” UNM-2011-097 **U.S Patent No. 8,937,366 B1** (January 20, 2015) and **U.S. Patent No. 9,269,724 B2** (February 23, 2016).
13. Sang M. Han, Cornelius F. Ivory, and Mani Hossein-Zadeh, “Biomarker Sensing Based on Nanofluidic Amplification and Resonant Optical Detection,” UNM-2010-093 Provisional U.S. Patent Application 61/483,327 (May 6, 2011); International Patent Application PCT/US13/32519 (March 15, 2013); U.S. Patent Application 14/380,350 (August 21, 2014); Notice of Allowance (November 21, 2017); **U.S. Patent No. 9,869,669 B2** (January 16, 2018).
14. Qiming Li and Sang M. Han, “Threading-dislocation-free nanoheteroepitaxy of Ge on Si using self-directed touch-down of Ge through a thin SiO2 layer,” UNM-2004-009 **U.S. Patent No. 7,888,244** (February 15, 2011).
15. Darin Leonhardt and Sang M. Han, “Filling Etch Pits with Dielectric Materials for Dislocation Blocking and Subsequent Growth to Achieve Low-Dislocation-Density Heteroepitaxial Films on Lattice-Mismatched Substrates,” UNM-2011-048 **U.S. Patent No. 9,269,569 B1** (February 23, 2016).
16. Josephine Sheng, Darin Leonhardt, and Sang M. Han, “Slurry-Free Chemical Mechanical Planarization (CMP) of Engineered Germanium-on-Silicon Wafers,” UNM-925/UNM-2009-036 **U.S. Patent No. 8,338,301 B1** (December 25, 2012).
17. Younjin Oh, Cornelius F. Ivory, and Sang M. Han, “High Resolution Focusing and Separation of Proteins in Nanochannels,” UNM-2009-031 **U.S. Patent 8,623,192 B2** (January 7, 2014).
18. Younjin Oh, Cornelius F. Ivory, and Sang M. Han, “Control of Electrolyte Solution in Nanofluidic Channels,” UNM-2009-031 **U.S. Patent 8,303,789 B1** (November 6, 2012).
19. Qiming Li and Sang M. Han, “Threading-dislocation-free nanoheteroepitaxy of Ge on Si using self-directed touch-down of Ge through a thin SiO2 layer,” UNM-2004-009 **U.S. Patent No. 7,579,263** (August 25, 2009).
20. Darin Leonhardt and Sang M. Han, “Defect Reduction by Annealing Nanoscale Semiconductor Islands During the Initial Stage of Coalescence,” UNM-960/UNM-2009-122 **U.S. Patent No. 8,242,003 B1** (August 14, 2012).
21. Qiming Li and Sang M. Han, “Ultra-Thin High-Quality Ge on Si by Low-Temperature Epitaxy and Insulator-Capped Annealing,” UNM-780/UNM-2007-006 **U.S. Patent No. 7,968,438** (June 28, 2011).
22. Sang M. Han, “Surface Corrugation on Internal Reflection Infrared Waveguide for Enhanced Detection Sensitivity and Selectivity,” UNM-586/UNM-2001-048 **U.S. Patent No. 7,200,311** (April 3, 2007).
23. Steve R. J. Brueck, Sang M. Han, Cornelius F. Ivory, Gabriel P. Lopez, and Dimiter N. Petsev, “Nanofluidics for Bioseparation and Analysis,” UNM-675/UNM-2005-001 **U.S. Patent No. 8,105,471 B1** (January 31, 2012).

**THESIS ADVISOR AND POSTGRADUATE-SCHOLAR SPONSOR**

**CURRENT STUDENTS, POSTDOCTORAL RESEARCHERS, AND RESEARCH PROFESSORS**

Leonid Miroshnik, PhD (2018 – present)

Andre Chavez, PhD (2017 – present)

Bokyung Park, PhD (2017 – present)

Seung-Ho Lee, Postdoctoral Researcher (2017 – present)

Lyle Menk, PhD (2016 – present)

Brian Rummel, PhD (2015 – present)

John Plumley, Postdoctoral Researcher (2014 – present)

Seok Jun Han, PhD (2014 – present)

Cayla Nelson, PhD (2014 – present)

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**TOTAL NUMBER OF RESEARCH FACULTY AND STUDENTS ADVISED:** 2 Postdoctoral Researchers, 8 PhD students currently advised; 7 PhDs and 8 MSs graduated; 1 postdoctoral researcher mentored; 1 research faculty advised

**PhD** of Omar Abudayyeh “Development of Metal Matrix Composite Gridlines for Space Photovoltaics” (October 2016).

**PhD** of Swapnadip Ghosh “Large-Area, Wafer-Scale Epitaxial Growth of Germanium on Silicon and Integration of High-Performance Transistors” (December 2014).

**PhD** of Josephine J. Sheng “Empirical Correlation of Minority Carrier Lifetime to Defect Density Profile in Germanium on Silicon Heteroepitaxy” (May 6, 2013).

**PhD** of Louis Tribby “Experimental and Theoretical Comparison of Aspect-Ratio-Dependent Diffusion of CdSe Nanocrystals Through Nanochannels” (April 12, 2013).

**PhD** of Darin Leonhardt “Selective Epitaxial Growth Techniques to Integrate High-Quality Germanium on Silicon” (May 2011).

**PhD** of Henry Gerung “Germanium Nanomaterials: Synthesis, Characterization, and Applications” (April 6, 2006).

**PhD** of Qiming Li “Selective Molecular Beam Epitaxy of Germanium on Oxide-Covered Silicon” (June 17, 2005).

**Plan I MS** of Lyle Menk, “Copper Electrodeposition in Mesoscale Through-Silicon Vias,” (July 13, 2017).

**Plan I MS** of Emilee Reinholz “Composition and Manufacturing Effects on Electrical Properties of Li/FeS2 Thermal Battery Cathodes,” (October 2015).

**Plan I MS** of Nicholas Shoop “Modeling of Kinetically Limited Growth Rate for Solution-Synthesized Germanium Nanocrystals” (May 2014).

**Plan I MS** of Kyle J. Solis “Atomic-Level Investigation of Surface Processes Governing SiGe Wetting layer Formation Using STM/STS” (March 31, 2010).

**Plan I MS** of Madhava Kosuri "Formation of Self-Assembled Monolayers on Semiconductor Surfaces" (October 28, 2003).

**Plant II MS** of Nicholas Brechtel “Near IR Absorber Using Ge Structures on Si” (November 3, 2016).

**Plan II MS** of Alfonso Navarrete “Adhesion Output Improvement and Defect Reduction Through Enhanced TiN Process Recipes” (December 6, 2005).

**Plan II MS** of Jeffrey O. Stevens “Process Optimization of Polycrystalline Si Etch in Cl2/HBr Plasma: Minimization of Isolated-to-Dense Critical Dimension Bias” (April 14, 2004).

**Postdoctoral Researcher:** Younjin Oh, protein and nanoparticle separations in nanofluidic FET devices (2005 – 2008)

**Research Faculty:** Dr. Thomas M. Mayer, Research Professor (2009 – 2011)

**AWARDS**

* STC.UNM Innovation Fellow (2018)
* STC.UNM Creative Awards (2009 – 2018)
* University of New Mexico Regents Professor (2015)
* Air Force Summer Faculty Fellowship Program (2015)
* Air Force Summer Faculty Fellowship Program (2014)
* Air Force Summer Faculty Fellowship Program (2012)
* University of New Mexico School of Engineering Teaching Award (2012)
* Nomination for University of New Mexico Regents Lectureship (2011)
* Nomination for University of New Mexico School of Engineering Teaching Award (2006, 2011)
* University of New Mexico School of Engineering Junior Faculty Research Excellence Award (2005)
* Nomination for University of New Mexico Teacher of the Year (TOYA) Award (2003)
* ASEE Chemical Engineering Faculty Summer School Poster Session Winner (2002)
* National Science Foundation CAREER Award (2001)
* The Electrochemical Society Norman Hackerman Young Author Award (1998)
* National Science Foundation Summer Institute in Korea (1996)
* National Science Foundation Summer Institute in Japan (1996)