

# CURRICULUM VITÆ OF GARY H. BERNSTEIN

Department of Electrical Engineering  
275 Fitzpatrick Hall  
University of Notre Dame  
Notre Dame, IN 46556  
(574) 631-6269 (office)  
(574) 277-0752 (home)  
bernstein.1@nd.edu  
fax: (574) 631-4393



## Education

Ph.D. Arizona State University, Tempe, AZ. July 1987 (Advisor – David K. Ferry).  
M.S.E.E. Purdue University, West Lafayette, IN. May 1981.  
B.S.E.E. University of Connecticut, Storrs, CT. May 1979 (Honors Scholar).

## Experience

Frank M. Freimann Professor of Electrical Engineering, July 1, 2010.  
*Co-Founder*, Indiana Integrated Circuits, LLC, 7/09.  
*Professor*, Department of Electrical Engineering, University of Notre Dame (5/98 to present).  
*Associate Chair*, Department of Electrical Engineering, University of Notre Dame (1/99 to 8/06).  
*Associate Professor*, Department of Electrical Engineering, University of Notre Dame (5/93 to 5/98).  
*Founding Director of the Notre Dame Nanofabrication Facility*, Department of Electrical Engineering, University of Notre Dame (3/90 to 8/98).  
*Assistant Professor*, Department of Electrical Engineering, University of Notre Dame (8/88 to 5/93).  
*Postdoctoral Fellow*, Center for Solid State Electronics Research, Arizona State University (8/87 to 5/88).  
*Research Associate*, Arizona State University (11/83 to 8/87).  
*Research Assistant*, Motorola Semiconductor Research and Development Laboratories, Phoenix, AZ (5/83 to 8/83).  
*Research Assistant*, Los Alamos National Laboratory, Los Alamos, NM. Employment included DOE security clearance (Summers 79-80).

## Areas of Interest

Nanofabrication using electron beam lithography, molecular electronics, microelectromechanical systems for integrated circuit packaging, and nanomagnetics.

## Honors and Awards

1. University of Connecticut School of Engineering Academy of Distinguished Engineers, December 2010.
2. Faculty Fellow of the university of Notre Dame John J. Reilly Center for Science Technology and Values, October 2010.
3. 2007 Best Paper of the Year Award in *IEEE Transactions on Advanced Packaging*, for paper entitled "Quilt Packaging: High-Density, High-Speed Interchip Communications" by G. H. Bernstein, Q. Liu, M. Yan, Z. Sun, D. Kopp, W. Porod, G. Snider, and P. Fay.
4. 2006 Best Paper of the Year Award in *Sensors and Transducers Journal*, for paper entitled, "A Microfabricated Transduction Coil for Inductive Deep Brain Stimulation," by J. Wu and G. H. Bernstein ([http://www.sensorsportal.com/HTML/DIGEST/Best\\_articles\\_2006.htm](http://www.sensorsportal.com/HTML/DIGEST/Best_articles_2006.htm)).
5. Fellow of the IEEE, 2006.
6. American Men and Women of Science, Gale Publishing, 2005-06.
7. Named among top 100 Nanotechnology Leading People by D&A Hi-Tech Information, 2002.
8. Who's Who in Engineering Education (WWEE), 2002.
9. Notre Dame Kaneb Teaching Award ([http://www.nd.edu/%7Ekaneb/pages/award\\_kaneb.html#coe](http://www.nd.edu/%7Ekaneb/pages/award_kaneb.html#coe)),

2001.

10. Research advisor to Islamshah Amlani, whose dissertation work on Quantum-dot Cellular Automata was awarded the \$50,000 first prize in the *1999 Merrill Lynch Innovation Grants Competition*, New York, January, 2000. A prize of \$5,000 for research was awarded to the advisor. (<http://www.wku.edu/news/releases/february/amlani.html>).
11. *Outstanding Paper Award* for co-authoring paper entitled, "Quantum-dot Cellular Automata," *12<sup>th</sup> Intl. Microprocesses and Nanotechnology Conf.*, Yokohama, Japan, July, 1999.
12. Co-recipient of the DARPA Ultra-Electronics *Sustained Excellence by a Performer in Fiscal Year 1998 Award*, 1999.
13. Senior Member of the IEEE, 1995.
14. *White House Presidential Faculty Fellowship*, National Science Foundation, 1992-97. (<http://www.nsf.gov/pubs/stis1991/nsf911103/nsf911103.txt>).
15. *IBM Faculty Development Award* (with S. Bandyopadhyay, C. Lent and W. Porod), 1989.
16. *IBM Faculty Development Award*, 1988.
17. Sigma Xi, Eta Kappa Nu, Tau Beta Pi, Phi Kappa Phi.

### **Educational Projects and Community Service**

1. Member of Nanotechnology Advisory Board, Ivy Tech Community College, 2010-present.
2. Presented demonstrations on sound waves to elementary school students, 2010.
3. Directed scanning electron microscope experiences for undergraduates and local teachers, 2008-present.
4. Developed scanning electron microscope outreach projects, *Notre Dame Extended Research Community* project participant, 2007-09.
5. Faculty advisor for Notre Dame Scrabble Club (2005-present).
6. Faculty advisor for Notre Dame Imaging Club (2010).
7. Presented workshop as part of NSF NEU program entitled, "First-Year Module on Information and Nanotechnologies," August 1-2, 2006 at the University of Notre Dame (with W. Porod).
8. Co-supervised Lynda Smith, teacher for *Research Experience for Teachers* (RET), Notre Dame, Summer, 2006 (with W. Porod).
9. Supervised Angela Lewis, teacher for *Research Experience for Teachers* (RET), Notre Dame, Summer, 2005.
10. Judge for FIRST Lego League Regional Competition, Notre Dame, Winters 2003-06.
11. G. H. Bernstein and N. Longenecker, Siemens summer teacher's project, "SEM for Curiosity-Driven High and Middle School Activities," Summers 2003-04.
12. Created the *National Coalition for Recruiting Electrical and Computer Engineering Students*, Spring, 2002 (<http://ncreces.nd.edu>).
13. Coach for First Lego League team, South Bend Hebrew Day School, 2001-02.
14. Presented workshop as part of NSF Bits-to-Chips program entitled, "From Bits-to-Chips: Curriculum Development in Microelectronics Design and Fabrication, and Emerging Technologies," July 23-27, 2001 at the University of Notre Dame (with J. Brockman, P. Kogge, and G. Snider).
15. Advisor to the student high school *Electrical Engineering Education Outreach* program, 1994- 2000.
16. Member of Indiana Electronics Manufacturers' Association *Mobile Electronics Manufacturing Line* Program, 1997.
17. Director of Junior design course and senior capstone design projects for AlliedSignal, Bayer, Hughes, Tellabs, Army Research Laboratory, General Motors Onstar, and Whirlpool, 1996 to 2001.
18. Member of Board of Directors, Sinai Synagogue, South Bend, IN, 1995-1998.
19. Faculty advisor for student chapter of IEEE, 1991-1997.

### **Grants and Awards Received – Total Budget Indicated (P.I. - \$8,881,148, co-P.I. - \$34,667,718)**

1. \$2,200,986 from MIND, Co-P.I. (with A. Seabaugh, P. Fay, T. Kosel, D. Jena, M. Wistey, G. Xing, M. Niemier, S. Hu), 1/11-12/12.
2. \$9,796,469 from DARPA, "Nanomagnet Logic," Co-P.I. (with G. Csaba, S. Hu, J. Nahas, M. Niemier, A. Orlov, and W. Porod), 10/10-3/15.

3. \$482,671 from ONR, "Radiation Hard Nanomagnetic Logic with Electronic Input and Output," **co-P.I.** (with W. Porod, S. Hu and M. Niemier), 9/09-12/10.
4. \$658,070 from NSF, "MRI: Acquisition: Characterization of and I/O for Magnetic Logic Structures," **P.I.** (with S. Hu, M. Niemier and W. Porod), 9/09-8/10.
5. \$100,000 from Sandia National Laboratory, "Demonstration of Quilt Packaging," **P.I.** (with M. Niemier and P. Fay), 2/09-1/10.
6. \$371,938 from NSF, "Catalytic Nanodiode," **co-P.I.** (with E. Wolf), 1/09 – 12/11.
7. \$85,000 from ONR, "Nanoantenna CNN-Chip Integration," **co-P.I.** (with W. Porod and P. Fay), 1/09 – 12/09.
8. \$597,000 from ONR, "Directed Self-Assembly of Smart Molecules," **co-P.I.** (with M. Lieberman), 1/09 – 12/10.
9. \$50,000 from Sandia National Laboratory, "Quilt Packaging," **P.I.** (with M. Niemier and P. Fay), 8/08-7/09.
10. \$126,000 from Rockwell-Collins, "Quilt Packaging Development," **P.I.** (with P. Fay), 5/08 – 4/09.
11. \$3,791,312 from SRC, "Midwest Institute for Nanoelectronics Discovery (MIND)," **co-P.I.** (with A. Seabaugh, P. Fay, S. Hu, D. Jena, T. Kosel, C. Lent, M. Niemier, W. Porod, and H. Xing), 3/08 – 2/11.
12. \$6,000 from NSF, "REU: Novel Superconnects for Ultrahigh-Performance Hybrid Communications Systems," **P.I.** (with P. Fay), 5/08-8/08.
13. \$980,153 from DoD, "Blending Processing into Advanced Memory Technologies to Enhance Massive, Memory-Critical Applications," **co-P.I.** (with P. Kogge, J. Brockman, S. Hu, W. Porod, and M. Niemier), 3/1/08 – 2/28/10.
14. \$1,000,826 from DoD, "Ultra-Wide-Bandwidth, Contiguous Superconnects for Advanced Computing Systems," **P.I.** (with P. Fay, G. Snider and J. Brockman), 10/07-9/09.
15. \$25,000 from Rockwell-Collins, "Quilt Packaging for High-Speed Chip-to-Chip Interconnects," **P.I.** (with P. Fay), 07/07-9/07.
16. \$6,000 from NSF, REU for one student for "Quilt Packaging," **P.I.**, 5/07-8/07.
17. \$298,248 from NSF, "Novel Superconnects for Ultrahigh-Performance Hybrid Communications Systems," **P.I.** (with P. Fay), 01/07-12/11.
18. \$300,000 from NSF, "NANO: Applications, Architectures, and Circuit Design for Nano-scale Magnetic Logic Devices," **co-P.I.** (with M. Niemier, X. S. Hu, and W. Porod), 09/06-09/09.
19. \$150,000 from the Semiconductor Research Corporation (SRC) Nanoelectronics Research Initiative (NRI), "Nanomagnet QCA," **co-P.I.** (with W. Porod), 09/06 - 12/09.
20. \$125,000 from the Missile Defense Agency, "Equipment Grant: Scanning Electron Microscope," **co-P.I.** (with W. Porod), 8/06.
21. \$150,000, STTR phase II from Missile Defense Administration (MDA), "Multispectral Infrared Sensors," **co-P.I.** (with W. Porod and P. Fay), 10/05-9/07.
22. \$450,000 STTR phase II ONR, "Focal Plane array processors with adaptive visual range and nanoantenna sensor," **co-P.I.** (with W. Porod and P. Fay), 10/05-9/07.
23. \$275,822 from NSF, "Quilt Packaging: A New Paradigm for the Integration of Heterogeneous Communications Systems-in-Package," **P.I.** (with G. Snider and P. Fay), 7/05-6/06.
24. \$523,800 DURIP from ONR, "Electron Beam Lithography System," **P.I.**, 10/04-9/05.
25. \$25,000 from the Intel Corporation, "Electron Beam Lithography System," **P.I.**, 10/04-9/05.
26. \$21,000 STTR Phase I from MDA, "Multispectral Infrared Sensors," **co-P.I.** (with W. Porod and P. Fay), 7/04-12/04.
27. \$60,000 STTR Phase I from ONR, "Focal Plane array processors with adaptive visual range and nanoantenna sensor," **co-P.I.** (with W. Porod and P. Fay), 7/04-12/04.
28. \$5,000,000 Multi-University Research Initiative (MURI) from ONR, "Biologically-Inspired CNN Image Processors with Dynamically-Integrated Hyperspectral Nanoscale Sensors," **co-P.I.** (with W. Porod, P. Fay, Y. F. Huang, A. I. Csurgay, L. O. Chua, B. Roska, T. Roska, and F. S. Werblin), 6/03-5/08.
29. \$1,475,233 from ONR, "Mixed Signal Nanoelectronics," **co-P.I.** (with A. Seabaugh, P. Fay and O. Collins), 8/02-8/06.

30. \$87,552 from NSF, “NER: Computing Architectures for Coupled Nanomagnets,” **co-P.I.** (with W. Porod), 5/02-4/04.
31. \$55,000 from Bayer Diagnostics, “Microfluidics for Medical Diagnostics,” **P.I.**, 1/02-12/03.
32. \$57,000 from the Notre Dame General Electric Learning Excellence Program, “A Learning Module for Microelectromechanical Systems,” **co-P.I.** (with M. Gad-el-Hak and G. Snider), 2/01-1/02.
33. \$90,000 from the Notre Dame Equipment Renewal and Restoration Program, “Hazardous Gas Handling System,” **co-P.I.** (with G. L. Snider, P. Fay, D. C. Hall, and A. C. Seabaugh), 1/01-6/01.
34. \$50,000 from Bayer Diagnostics, “Toward Purchase of Alcatel 601E Bosch Etcher,” **P.I.**, 1/01.
35. \$194,598 from Intel Corporation, “Metal/Tunnel-Junction Quantum-dot Cellular Automata Cells without Bias Control,” **P.I.** (with G. Snider), 11/00-10/03.
36. \$206,233 from the Semiconductor Research Corporation, “Background-Charge Insensitive Single-Electron Memories,” **co-P.I.** (with G. Snider and A. Orlov), 10/00-9/03.
37. \$1,670,536 from the Indiana 21<sup>st</sup> Century Research and Technology Fund, “Development of a Microfluidics-Based Blood Monitoring System,” **P.I.** (with J. Brockman, O. Collins, P. Fay, M. Gad-el-Hak, M. Lieberman, A. Seabaugh, and G. Snider), 9/00-8/03.
38. \$202,413 from NSF, “Acquisition of Electronic Instrumentation for Nanoscience and Education,” **co-P.I.** (with A. Seabaugh, P. Fay, G. Snider, and D. Hall), 7/00-7/01.
39. \$6,000 from the NSF CISE Educational Innovation Program, REU for one student for “Bits to Chips,” **P.I.**, 5/00-8/00.
40. \$55,000 from Bayer Diagnostics, “Microfluidics for Medical Diagnostics,” **P.I.**, 1/00-12/00.
41. \$1,100,000 from the Keck Foundation, “Nanoelectronics Research,” **co-P.I.** (with W. Porod and seven others), 1/00-12/03.
42. \$1,800,000 from ONR/DARPA, “Augmentation to Molecular Electronics Research,” **co-P.I.** (with W. Porod and seven others), 3/00-5/03.
43. \$343,000 from the ONR (DURIP), “Fabrication and Measurement of High-Speed, High Temperature Quantum-dot Cellular Automata,” **co-P.I.** (with A. Orlov, G. L. Snider, A. C. Seabaugh, and P. Fay), 3/00-3/01.
44. \$5,000, Advisor’s first prize in the Merrill Lynch Innovation Grants Competition, **P.I.**, 1/00.
45. \$3,000 from General Motors Onstar Division, “Senior Design Projects Course,” **co-P.I.** (with P. Fay), 9/99-5/00.
46. \$4,000 from NSF CISE Educational Innovation Program, REU for one student for “Bits to Chips,” **P.I.**, 6/98-8/98.
47. \$9,900 from AlliedSignal, “Microelectronics Laboratory,” **P.I.**, 3/99-2/00.
48. \$2,500 from Lockheed-Martin Corp., “Educational Outreach Program,” **P.I.**, 1/99-12/99.
49. \$1,534,492 from ONR/DARPA, “Molecular Electronics Based on Quantum-dot Cellular Automata,” **co-P.I.** (with M. Lieberman, C. S. Lent, G. L. Snider, W. Porod, G. J. Iafrate, T. P. Fehlner, G. V. Hartland, and O. G. Wiest), 1/99-4/01.
50. \$1,445,075 from ONR, “Sb-Based III-V Quantum Devices and Circuits for Ultra-High Frequency Digital Signal Processing Applications,” **P.I.** (with P. Fay), 6/98-12/00.
51. \$10,000 from NSF CISE Educational Innovation Program, REU for two students for “AC Separation of Particles by Biased Brownian Motion in a 2D Sieve,” **P.I.**, 6/98-8/98.
52. \$521,228 from NSF CISE Educational Innovation Program, “From Bits to Chips: A Multidisciplinary Curriculum for Microelectronics System Design Education,” **P.I.** (with G. L. Snider, R. J. Minniti, J. B. Brockman, P. M. Kogge, and B. Walvoord), 7/97-12/01.
53. \$75,000 from the University of Notre Dame Equipment Restoration and Renewal Program, “Photomask Fabrication System for Microelectronics Materials and Devices,” **P.I.** (with R. J. Minniti, G. L. Snider, D. C. Hall, W. B. Berry, P. M. Kogge, B. Walvoord, and J. B. Brockman), 1/97-12/97.
54. \$1,000 from Whirlpool Corp., “Senior Design Projects Course,” **P.I.**, 11/96-5/97.
55. \$1,500 from Bayer Laboratories, “Senior Design Projects Course,” **P.I.**, 11/96-5/97.
56. \$7,000 from Hughes Research Laboratory, “Development of Resonant Tunnel Diode Based Integrated Circuits Processing Techniques,” **P.I.**, 11/96-5/97.
57. \$180,000 from ARO, “Ultra-Nano Probe System,” **co-P.I.** (with J. L. Merz, G. L. Snider, and D. C.

- Hall), 9/95-8/98.
58. \$40,203 from the Mayo Foundation, "Ferroelectric Materials Research," **P.I.**, 8/95-8/96.
  59. \$35,000 from NSF, "Presenting Electrical Engineering Fundamentals to High School Students," **P.I.** (with G. L. Snider), 6/95-5/96.
  60. \$3,490,808 from the ONR/ARPA, "Silicon-Based Nanoelectronics Using Quantum Cellular Automata," **co-P.I.** (with J. L. Merz, G. L. Snider, W. Porod, C. S. Lent, E. T. Croke, and D. H. Chow), 7/95-7/98.
  61. \$117,686 from NSF, "Reactive Ion Etching for Device Fabrication and Materials Studies," **co-P.I.** (with G. L. Snider, J. L. Merz, and J. K. Furdyna), 4/95-3/96.
  62. \$20,000 from Los Alamos National Laboratory, "Fabrication of Tunnel Devices with Applications Toward Quantum Cellular Automata," **P.I.**, 1/95-6/95.
  63. \$50,000 from Hughes Research Laboratory, "Fabrication of Resonant Tunneling Diode Based Digital Logic Circuits," **P.I.**, 11/94-10/95.
  64. \$42,858 from Delco Electronics, "VLSI Fabrication Principles - Short Course," **P.I.** (with R. Minniti), 7/94-6/95.
  65. \$388,500 from AFOSR, "Electromigration and Local Field Effects in Mesoscopic Interconnects," **P.I.** (with W. Porod and C. S. Lent), 10/94-9/97.
  66. \$139,998 from ONR, "Coulomb Coupling Between Quantum Dots and Waveguides," (Augmentation Award for Science and Engineering Research Training Program), **co-P.I.** (with W. Porod and C. S. Lent), 6/94-5/96.
  67. \$90,000 from Mayo Foundation, "RTD-Based Microwave ICs," **P.I.** 6/93-5/94.
  68. \$30,000 from Miles Laboratories, "Microelectromechanical Systems," **P.I.** 4/93-6/94.
  69. \$25,000 from Miles Laboratories, "Design and Fabrication of Silicon ICs," **P.I.** 1/93-6/94.
  70. \$925,000 from ARPA, "Quantum Cellular Automata," **co-P.I.** (with W. Porod and C. S. Lent), 5/93-4/96.
  71. \$500,000 from NSF, "White House Presidential Faculty Fellow Award," **P.I.** 10/92-9/97.
  72. \$76,760 from NSF, "A Modern Integrated Circuits Teaching Laboratory," **co-P.I.** (with R. J. Minniti, B. Das, and S. Bandyopadhyay), 7/92-6/93.
  73. \$10,000 from the Jesse H. Jones Research Fund for 1991-92, "Electromigration in Ultra-Narrow Interconnects," **P.I.** 5/92-4/93.
  74. \$15,000 from Miles Laboratories, "Microelectronics Laboratory," **P.I.** 7/91-6/92.
  75. \$301,484 from ONR, "Interconnections in ULSI: Correlation and Crosstalk," **P.I.** (with S. Bandyopadhyay and W. Porod), 1/91-12/92.
  76. \$403,000 from AFOSR, "Quantum Transport," **co-P.I.** (with S. Bandyopadhyay, C. Lent and W. Porod), 1/91-12/93.
  77. \$50,000 from IBM, "Integrated Circuits Teaching Laboratory," **P.I.** (with S. Bandyopadhyay), 6/90-5/91.
  78. \$15,000 from Miles Laboratories, "Microelectronics Laboratory," **P.I.** 7/90-6/91.
  79. \$75,000 from IBM, "Faculty Development Award," **co-P.I.** (with S. Bandyopadhyay, C. Lent and W. Porod), 9/89-8/91.
  80. \$60,000 from IBM, "Faculty Development Award," **P.I.** 9/88-8/90.

### **New Equipment Donations Received**

1. Intel Corp., 5 Dell Core-duo computers, monitors, and software, \$6,000 (2007).
2. AMD, 6 Athlon Processors and motherboards, \$2,000 (2002).
3. Intel Corp., 6 Dell Pentium computers, monitors, and software, \$18,000 (2001).
4. AMD, 10 Athlon Processors and motherboards, \$3,000 (2000).
5. Intel Corp., 5 Dell Pentium computers, monitors, and software, \$15,000 (2000).
6. Hewlett-Packard, Inc., oscilloscopes and function generators, \$19,568 (1999).
7. Keithley Instruments, Inc., repair services and electrometers, \$15,000 (1997).
8. Metricon, Inc., Model PC-2000 Prism Coupler, \$24,000 (1993).
9. Keithley Instruments, Inc., Model 82 Capacitance-Voltage System, \$28,170 (1992).

### **Surplus Equipment Donations Received**

1. Solar World, three Heidenhain linear thickness gauges and electronics (2008).
2. Delphi Electronics, Electroglas automatic prober (2006).
3. ISI-SR50 SEM from MAS, for undergraduate education (2003).
4. Intersil, Inc., lab furniture and misc. equipment (2002).
5. Pentaim, Inc, miscellaneous cleanroom furniture (2002).
6. Intel, Inc., miscellaneous cleanroom furniture (2002).
7. Motorola, Inc., four Zeiss Axiotron microscopes (2001).
8. Motorola, Inc., probe station, microscope, and vacuum pump (2001).
9. Intel Corp., Micromanipulator 8-inch probe station with probes, hot chuck, and light box (2000).
10. HRL Laboratories, Airco Temescal FC-1800 6-pocket e-beam evaporator (2000).
11. CTDI, microwave frequency spectrum analyzer, other electronics test equipment (2000).
12. Delco Delphi Electronics, 15 Pentium-based computers (1998).
13. Delco Delphi Electronics, 25 Pentium-based computers (1998) (donated to the South Bend Hebrew Day School.)
14. Siemens Corporation, oscilloscopes and other misc. equipment (1998).
15. Lockheed-Martin, 23,000 silicon wafers and associated wafer handling materials (1998).
16. Dupont Photomask, Nikon mask comparitor system (with R. Minniti) (1996).
17. Photronics, GCA 3696 step-and-repeat camera (1996).
18. Lockheed-Martin Corp., miscellaneous electronic test eqpt. (1995).
19. IBM Technical Gifts Program, sputtering system and misc. eqpt. (with R. Minniti) (1995).
20. Raytheon Corp., Varian DF-5 ion implanter (1994).
21. Delco Electronics, two TRE step-and-repeat cameras (1994).
22. IBM, CVD equipment, vacuum pumps, and miscellaneous equipment and supplies (with R. Minniti) (1994).
23. JEOL, digital image processor (1994).
24. IBM, optical microscopes (1993).
25. IBM, GCA wafer stepper and a Leitz film thickness measurement system (with R. Minniti) (1993).
26. IBM, image processing system and a vacuum leak detector with RGA (1992).
27. CTS Corporation, wire bonder and laser scribes (with R. Minniti) (1992).
28. IBM, HEPA filters, probing equipment, infrared microscope and miscellaneous equipment (with R. Minniti) (1992).
29. Kulicke and Soffa, wire bonding supplies (with R. Minniti) (1992).
30. IBM Technical Gifts, reactive ion etcher (1991).
31. Magnavox, ellipsometer (with R. Minniti) (1991).
32. Dupont Photomask, mask copier, resist thickness monitor and photoplates (1991).
33. IBM, misc. surplus equipment (1991).
34. IBM misc. surplus equipment (1990).
35. IBM, digital diffusion furnaces and surplus equipment (1990).
36. IBM, 10 new PC-AT computers (1990).
37. IBM, scanning electron microscope (with Paul McGinn) (1990).
38. National Semiconductor, mask aligners, wafer track, wafers and hardware (with R. Minniti) (1990).
39. Intel, surplus equipment (1990).
40. Intel, surplus equipment (1989).
41. IBM, mask fabrication facility (1989).
42. IBM, diffusion furnaces and surplus equipment (1989).
43. Xerox, ISI -60A scanning electron microscope (1988).

### **Laboratories Established**

Founding director of the Notre Dame Nanofabrication Facility (1988-98). The laboratory allows fabrication of complete nano and CMOS circuits. See <http://www.nd.edu/~ndnf/>

**Committee Service (Dept. of EE, if not specified)**

1. University Committee on Libraries (2010-present)
2. University Library Planning Committee (2010-present)
3. College Elections Committee (2010)
4. Graduate Admissions Committee (2009)
5. College Committee on First Year Engineering (2007-08).
6. University Search Committee for ND Vice-President for Research (2007)
7. College Committee on Learning Center Development (2006-08)
8. Notre Dame Nanofabrication Facility Oversight Committee (1998-2009).
9. Space and Facilities (2001-06 (chair))
10. Appointments and Promotions (Fall, 2002, 2007-2009)
11. University Committee on Intellectual Property (2000-2008)
12. University Committee on Consortial Relations (2000-2001)
13. Industry Outreach (1999-08 (chair))
14. College Facilities (99-08)
15. College Curriculum Enhancement (1998-00)
16. Undergraduate (1990-91, 93-95, 96-98 (chair), 1999-05)
17. College Undergraduate Curriculum (1996-98, 05)
18. Materials Center (1996-97)
19. Graduate (1996-97)
20. Graduate Recruiting (1996-97)
21. Graduate Admissions (1993-1994)
22. Undergraduate Laboratory Equipment (1989-92, 98-06(chair))
23. College Safety (1988-92)
24. Patents (alternate, 1990-91)
25. Microelectronic Materials Equipment (1988-90)
26. Undergraduate Awards (1988-89)

**Courses Developed at Notre Dame**

1. Imaging for Nanotechnology (graduate level)
2. Vacuum and Scanning Electron Microscopy (graduate level)
3. Introduction to Engineering, developed new six-week module on information technology and nanotechnology (first-year engineering students)
4. Vacuum Technology for Microelectronics (1-credit, graduate level)
5. Scanning Electron Microscopy and Electron Beam Lithography (1-credit, graduate level)
6. Nanolithography Technologies (1-credit, graduate level)
7. Advanced IC Fabrication Techniques (graduate level) (Coordinator, with G. L. Snider, P. Fay, A. C. Seabaugh, D. C. Hall)
8. Frontiers in Microelectronics Systems (senior and graduate level) (Coordinator, with G. L. Snider, P. M. Kogge, and J. B. Brockman)
9. Technology for the 21<sup>st</sup> Century, coordinator (1-credit Freshman seminar course on engineering careers)
10. Submicron Fabrication Techniques (graduate level)
11. VLSI Fabrication Techniques (graduate level)
12. Integrated Circuits Processing Laboratory (senior and graduate level)

**Additional Courses Taught**

1. Introduction to Engineering (First Year level, team taught)
2. Electrical Engineering Design (Junior and Senior levels)
3. Electronics I (Sophomore level)
4. Electrophysics I (Junior level)
5. Analog Integrated Circuits (Senior level)

#### **Ph.D. Research in Progress**

1. "Nanomagnet Design for Magnetic QCA," Mohammad Jafar Siddiq, expected Spring, 2012 (co-advised with M. Niemier).
2. "Thermal Properties of Quilt Packaged Integrated Circuits," Mohammad Ashraf Khan, expected Spring, 2012 (co-advised with A. Kriman).
3. "Quilt Packaging for Supercomputers," Wayne Buckhanan, expected Spring, 2012.
4. "Interlocking Edge Interconnects for Ultrawide Bandwidth Chip-to-Chip Communication," Quanling Zheng, expected Spring, 2012.
5. "Electron Beam Lithography for Self-Assembly of DNA Nanostructures," Faisal Shah, expected Spring, 2013.
6. "Development of Magnetic Electrical Interface for Nanomagnetic Logic," Shiliang Liu, expected Spring, 2013 (co-advised with X. S. Hu).
7. "Vibrating Sample Magnetometry Study of Thin Films for MTJ Devices," Peng Li, expected Spring, 2014.

#### **Ph.D. Dissertations Completed**

1. "Design, Fabrication and Modeling of Clocked Nanomagnet Logic Circuit Elements," Mohammad Tanvir Alam, (co-advised with M. Niemier) Summer, 2010.
2. "A Lateral-Drive Method to Address Pull-in Failure in MEMS," Jie Su, Fall, 2007.
3. "Design and Fabrication of a Tunable Fabry-Perot Interferometer/Photodiode Micro-Spectral Image Sensor," Heng Yang, (co-advised with P. Fay) Fall, 2007.
4. "Quilt Packaging: A Novel High Speed Chip-to-Chip Communication Paradigm for Systems-in-Package," Qing Liu, Summer, 2007.
5. "Electric Field Detection by Electrostatic Force Microscopy for Clocking Quantum-dot Cellular Automata Molecules," Minjun Yan, Summer, 2006.
6. "Design and Fabrication of Nanometer Magnet Architectures," Alexandra Imre, (co-advised with W. Porod), Spring, 2005.
7. "Ultra High Resolution Electron Beam Lithography for Molecular Electronics," Wenchuang Hu, Spring, 2004.
8. "Fabrication of Molecular Electronics Arrays," Qingling Hang, Spring, 2004.
9. "Integrated Inductive Coupling Systems for MEMS Powering," Jie Wu, Winter, 2003.
10. "Experimental Study of Electromigration in Nanometer Al and Al-Cu Interconnects," Xun Pang (co-advised with A. Kriman), Summer, 2002.
11. "Experimental Demonstrations of Quantum-dot Cellular Automata: Basic Cell, Binary Wire and Logic Gates," Islamshah Amlani, Spring, 1999.
12. "A Feasibility Study of a Gallium Arsenide Based Quantum-dot Cellular Automata," Greg Bazán, Spring, 1998.
13. "Reliability of Ultra-narrow Metal Interconnects," Richard Frankovic, Fall, 1996.
14. "Experimental Investigation of DC Crosstalk Between Superconducting Interconnects Defined by High Resolution Electron Beam Lithography," Xiaokang Huang, Fall, 1994.

#### **Masters Theses Completed**

1. "Fabrication and Testing of Microneedles for Neurological Research," Quanling Zheng, Spring, 2010 (co-advised with W. Porod).
2. "Fabrication of a High Diodicity Check Valve," Heng Yang, Fall, 2002.
3. "Single Electron Transistor Made by Electron Beam Lithography and Three-Angle Evaporation," Minjun Yan, Fall, 2002.
4. "Investigation of Micropumps for Pumping Blood," Jie Su, Fall, 2002.
5. "Improved Treatment Method for Parkinson's Tremors," Sheilendra Dubhashi, Spring, 2002.
6. "Electron Beam Nanolithography of Contamination Resist and OTS SAMs," Qingling Hang, Spring, 2001.
7. "Sub-10-nm Structure Fabrication by Field Emission SEM Nanolithography System," Wenchuang Hu,

Spring, 2001.

8. "Development of 3-Micron Poly-Gate CMOS Process at Notre Dame," Jun Qian, Spring, 1999.
9. "A Tunable Analog VLSI Network for Preserving Discontinuities in One-Dimensional Signals," Hazim M. Zayed, Fall, 1993 (co-advised with R. L. Stevenson).
10. "A Novel Method for Producing Nanofabricated Quantum Structures in Silicon Inversion Layers," Brad Campbell, Fall, 1993.
11. "Characteristics of MOS Capacitors Fabricated Using Electron Beam Lithography," Renu Kamath, Summer, 1992.
12. "Ultra-Short Gate GaAs MESFETs Fabricated by Electron Beam Lithography," Greg Bazán, Spring, 1991.
13. "Single Electron Tunneling in an Array of Quantum Dots," Steven Koester, Spring, 1991.
14. "The Design of an Electron Beam Lithography System Based on a Scanning Electron Microscope," John N. Monteiro, Spring, 1990.

### **Undergraduate Projects Directed**

1. "Scanning Electron Microscopy for K-12 Outreach," Allison O'Rourke, Summer, 2010-Spring, 2011.
2. "Demonstration of Quilt Packaging of Silicon Integrated Circuits," Santiago Garces, Fall, 2009, Summer, 2010-Spring, 2011.
3. "Scanning Electron Microscopy," Blake Powell, Summer 2010.
4. "Spin Polarized Scanning Tunneling Microscopy," Ucheena Onwegbuesi, Summer 2010.
5. "Thermal Shock Cycling with Peltier Devices for Quilt Packaging Reliability," Michael Sizemore, Spring to Fall, 2009, Summer, 2010.
6. "Quilt Packaging on III-V Substrates," Honors Thesis, Scott Garvey, Spring to Fall, 2009, Spring, 2010. "Deep Reactive Ion Etching of Si for Undercut of Sidewalls," Adam Miller, Spring to Fall, 2009.
7. "Scanning Electron Microscopy for Curiosity-Driven Undergraduate Student Research," Michael Padberg, Spring, 2008 and Summer to Fall, 2009.
8. "Etching of InP Substrates in an ICP," Kristen Anderson, Summer, 2008 (NSF REU).
9. "Design and Fabrication of Compliant Quilt Packaging Nodules," Joseph Bonath, Summer and Fall, 2008.
10. "Sn Plating and Reflow for Copper Nodule Connections," Ryan Savino, Summer and Fall, 2008.
11. "Economic Implications of Quilt Packaging," Thomas Bounds, Fall, 2008.
12. "Electron Beam Lithography for Reticule Fabrication," Santiago Garces, Spring, 2008.
13. "Backside Grinding for Uniform Wafer Thickness in Quilt Packaging," Siyuan Dai, Spring, 2008.
14. "Improved Secondary Electron Imaging Using Novel Backscattered Electron Spatial Filters," Andrew Carter, Spring, 2008.
15. "Electronics for Inductively-Coupled Deep Brain Stimulation," Eric Schafer, Spring, 2008.
16. "Quilt Packaging of III-V Materials," Anne Krishnan, Spring, 2008.
17. "Accurate Placement of Quilt Packaging Die," Ryan Savino, Fall, 2007, Spring 2008.
18. "Soldering of Nodules for Quilt Packaging," Daniel Meyer, Summer and Fall, 2007, Spring 2008.
19. "Electron Beam Lithography of Multilayer Resist for Nanofluidics," Katrina Epperson, NSF REU program, Summer and Fall 2007.
20. "IC Manufacturing for Quilt Packaging," Jason Kulick, Summer and Fall 2007.
21. "Quantitative Comparison of SEM Surface Roughness and Atomic Force Microscopy," Andrew Carter, Spring, and Fall 2007.
22. "Photomask Fabrication," Peter van Loon, Fall, 2006.
23. "Electron Beam Surface Roughness Analyzer," Joseph Bonath and Eric Shafer, Fall, 2006.
24. "Interconnecting Quilt Packaging ICs," Jason Kulick, Summer and Fall, 2006.
25. "Photomask Exposure in the Elionix ELS-7700 Electron Beam Lithography System," Andrew Carter, Fall 2005- Fall, 2006.
26. "Molecular Deposition on Charged Patterns," Alan Huang, Summer, 2006.
27. "Deposition of Contamination Structures for Ultrahigh Resolution MFM Tips," Jesse Cole and John Mallinger, Fall 2003- Spring 2006.

28. "Microneedles for Multiple Virus Injection into Mouse Optical Cortex," Michael Bastar, Ariana Salazar and Stacy Markus, Spring, 2006.
29. "Microneedles for Multiple Virus Injection into Mouse Optical Cortex," Michael Bastar and Alvaro Guevera, Fall, 2005.
30. "Study of Environmental Noise for Electron Beam Lithography," Jay Samilo and Jeff Simmer, Fall, 2005.
31. "Design of Package for Microfluidic Microneedles," Yesenia Bernal, McNair Scholars Program, Summer, 2005.
32. "Solid-Metal Fuel Cell Cathodes," Douglas Lavanture (high school), Spring 2004.
33. "Development of Nanomagnets for Field-Coupled QCA," Georgina Nunez, Summer, 2003 (REU supported by NSF).
34. "Comparison of Modeling Packages for MEMS Development," Gregory Skony, Fall, 2000.
35. "Calibration of Semiconductor Measurement Equipment," Jeffery Joseph, Summer, 2000 (REU supported by NSF).
36. "Fabrication Procedures for CMOS Microprocessor," Patrick Arthurs, Summer, 1999 (REU supported by NSF).
37. "Design and Fabrication of 2D Molecular Sieve for DNA Separation," Jonathan Ziebarth and Brian Smith, Summer, 1998 (REU supported by NSF).
38. "Ion Implantation for Ohmic Contacts," Thomas McCarthy and Darcie Tutin, Spring, 1996-1998.
39. "Ion Implantation for Ohmic Contacts," Thomas McCarthy, Spring, 1996.
40. "Design and Fabrication of Capacitors for Testing with the Keithley Model 82 C-V Measurement System," Chris Martino, Spring, 1994.
41. "Investigation of Sodium Contamination in Oxides," Alvin Ilarina, Fall, 1993.
42. "Design of a Photolithographic Mask Set for a Microfabricated Electrohydrodynamic Pump," Anne Haban, Fall, 1993.
43. "Fabrication of Micromotors," William Driscoll, Fall, 1993.
44. "Fabrication of Custom Wafer for Capacitance-Voltage Testing," Jay Millar, Spring, 1993.
45. "Advanced C-V Measurements on the Keithley Model 82," Chris Martino, Spring, 1993.
46. "Rapid Thermal Processing," James Shiely, Fall, 1992 and Spring, 1993.
47. "Conversion of L-Edit IC Layout Files to Electron Beam Lithography System Format," Chakthorn Sukapanpotharam, Summer, 1992.
48. "An Introduction to Statistical Design Procedures for High Contrast Resist Developers," Christine Brodowski, Spring, 1992.
49. "Plasma Enhanced Chemical Vapor Deposition," Christopher J. Uhas, Spring, 1992.
50. "Implementing a Plot Function for Electron Beam Lithography," Robert T. Topel, Spring, 1992.
51. "Design of Pulsed DC Test for Electromigration Failure in Ultra-Narrow Interconnects," Patrick Bednarz, Spring, 1992.
52. "Design of a Local Area Network," Stephen P. McGinnis, Spring, 1992.
53. "Techniques for High Resolution Photomasks," Stephen McGinnis, Fall, 1991.
54. "Conversion of an ISI-60A Scanning Electron Microscope to an Electron Beam Lithography System," Patrick Fay, Spring, 1991.
55. "Reconditioning of a JEOL JSM-35 Scanning Electron Microscope and Applications to Integrated Circuit Analysis," Keith Harber, Spring, 1991.
56. "Crystal Frame Store and Modifications for Amray 1400 SEM," Patrick N. Fay, Spring, 1990.
57. "Integrating a GCA Mann 3000 and a GCA Mann 3696 to an IBM XT System and Vivid CAD Software Package," Victor C. Huynh, Fall, 1989.
58. "The GCA 3696 Photorepeater," Sean P. McKenna, Fall, 1989.
59. "Optical Lithography with a Cobilt CA-800 Mask Aligner," Terrence P. McGuigan, Fall, 1989.
60. "Investigation of Wafer Cleaning Procedures Using a Wettability Goniometer," David N. Lewis, Spring, 1989.
61. "Fabrication of MOS Capacitors," Anthony J. Deliberato, Fall, 1988.
62. "Capacitance-Voltage Measurements of MOS Structures," Shawn J. Gaffney, Fall, 1988.

63. “Projection Lithography with a Perkin-Elmer 210 Aligner,” Craig A. Waller, Fall, 1988.

### Professional Activities

1. Argonne National Laboratory Center for Nanoscale Materials (CNM) Proposal Evaluation Board, Fall 2010-present.
2. Member of Conference Organizing Committee, *Toward Regulation of Nanomaterials: Conversation between Academia, Industry, Law and Government*, Notre Dame, IN, May, 2010.
3. Member of review panel for the The ERA-Net Nanoscience Research Funding Network, Berlin, May, 2008.
4. Chair of the Technical Committee on Nanofabrication for the IEEE Nanotechnology Council, Spring 2002 to July, 2007.
5. Session organizer for Special Invited Session on Nanotechnology, *IEEE-NANO 2007*, Hong Kong August, 2007.
6. Co-instructor of tutorial session at the March Meeting of the APS, entitled, “Introduction to Electron Beam Lithography” Baltimore, MD, 2006.
7. Member of the Program Committee of the *European Nano Systems Conference 2006 (ENS 2006)*.
8. Member of the Subcommittee on Nanofabrication, Nanolithography, Micromanipulation and Nanoimaging for *IEEE Nano-2006*.
9. Member of the Technical Program Committee for the first *IEEE International Conference on Nano/Micro Engineered and Molecular Systems (IEEE-NEMS 2006)*.
10. Member of the Program Committee of the *European Nano Systems Conference 2005 (ENS 2005)*.
11. Guest Associate Editor for special issue of *IEEE Transactions on Nanotechnology*, 2005.
12. Editor of the *IEEE Nanotechnology Council Newsletter*, 2003-2005.
13. Member of the Scientific Committee of the *European Micro and Nano Systems 2004 (EMN04)*, Paris, France, October, 2004.
14. Participant in *NNI Workshop on Grand Challenges in Nano-electronics, -photonics, and -magnetics (NEMP)*, Arlington, VA, February, 2004.
15. Member of the Program Committee for the *Fourth IEEE Conf. on Nanotechnology (IEEE NANO) 2004*.
16. Member of Advisory Board for the Notre Dame Center for Microfluidics and Medical Diagnostics, Fall, 2003 to present.
17. Member of Nanofabrication and Nanolithography Program Committee, *Third IEEE Conf. on Nanotechnology (IEEE NANO)*, San Francisco, California, August (2003).
18. Session Chair for Nanofabrication and Nanolithography sessions, *Third IEEE Conf. on Nanotechnology (IEEE NANO)*, San Francisco, California, August (2003).
19. Charter Member of the W. M. Keck Foundation MEMS & Microfabrication Laboratory Advisory Board, Rose-Hulman University, Summer 2003 to present.
20. Member of Program Committee for the *Intl. Conf. on Microelectronic Systems Education, MSE '02 and '03*.
21. Reviewer for the *Intl. Conf. on Electron, Ion, Photon Beams and Nanofabrication*, 2001-2003.
22. Guest editor of special edition of *Nanotechnology* **10** No 2 (June 1999).
23. Program Chairman for the *IEEE Silicon Nanoelectronics Workshop*, Honolulu, HI, June, 1998.
24. Program Section Head for the *Intl. Conf. on Electron, Ion, Photon Beams and Nanofabrication*, 1994-2000.
25. Organizer and co-instructor of tutorial session at the March Meeting of the APS entitled, “Practical Aspects of Nanofabrication,” with P. M. Campbell, E. L. Hu, and H. I. Smith, San Jose, CA, 1995.
26. Guest lecturer for summer High School Women and Minorities Program, University of Notre Dame, 1989-1997, 2003, 2004.
27. Reviewer for U.S. Civilian Research and Development Foundation (CRDF), 2006.
28. Reviewer for the *Intl. Conf. on Electron, Ion, Photon Beams and Nanofabrication*, 1994-2004.
29. Reviewer for *Nanotechnology*.
30. Reviewer for *Journal of Micromechanics and Microengineering*.
31. Reviewer for Science Foundation Ireland, 2001.

32. Reviewer for Institute of Physics.
33. Reviewer for *Nanoscience and Technology*.
34. Reviewer for the Department of Energy.
35. Reviewer for the National Science Foundation.
36. Reviewer for *Journal of Applied Physics and Applied Physics Letters*.
37. Reviewer for *Journal of Vacuum Science and Technology*.
38. Reviewer for *IEEE Transactions on Electron Devices*.
39. Reviewer for *IEEE Journal of Solid State Circuits*.
40. Reviewer for Kluwer Academic Publishers.

### **Consulting Activities**

1. General Patent Corporation, Chicago, 2009.
2. Vyteris, Inc., medical patch technology, 2007.
3. Law firm of Quinn Emmanuel, New York, NY, integrated circuit processing, 2006.
4. Law firm of Stadheim and Gear, Chicago, IL, integrated circuit processing, 2002-03.
5. Bayer Corporation, Elkhart, IN, electronic instruments for health care and microfluidics, 1998-2001.
6. Prentice-Hall Publishing Co., book review, 1997.
7. National Technological University, Boulder, CO, video course entitled, "Introduction to Solid State Electronics," with W. Porod, 1996.
8. National Technological University, Boulder, CO, video course entitled, "Introduction to Nanolithography," 1995.
9. Delco Electronics, Kokomo, IN, integrated circuits course taught at Notre Dame (with R. J. Minniti), 1994.
10. Cybercyte, Inc., Chicago, IL, report on integrated optics research, 1994.
11. Metrika Laboratories, interface to IC manufacturers and battery selection for handheld electronic medical diagnostics, 1993 and 1995.
12. Automated Molded Plastics, South Bend, IN, four point probe measurements, 1990.
13. West Educational Publishing Co., book reviews, 1991 and 1992.
14. Karl Suss, Inc., Waterbury Center, VT, presented "Advances in Electron Beam Lithography of Positive and Negative Resists," for the Karl Suss Seminar Series, Cherry Hill, NJ (March 1989), Los Angeles, CA (April 1988) and Tempe, AZ (April 1988).

### **Professional Societies**

1. International Microelectronics and Packaging Society (IMAPS)
2. Institute of Electrical and Electronics Engineers (IEEE, Fellow)
3. American Physical Society (APS)
4. American Society for Engineering Education (ASEE)
5. American Vacuum Society (AVS)

### **Patents**

1. G. H. Bernstein, M. Niemier, S. Hu, W. Porod, M. T. Alam, and E. Varga, "Non-Majority MQCA Magnetic Logic Gates and Arrays Based on Misaligned Magnetic Islands," filed with the U.S. Patent Office.
2. G. H. Bernstein, P. Fay, Q. Liu, and W. Porod, "Inter-Chip Communication," 2 applications filed with the U.S. Patent Office.
3. G. H. Bernstein, P. Fay, Q. Liu, and W. Porod, "Inter-Chip Communication," U.S. Patent #7,612,443, November 3, 2009.
4. G. H. Bernstein, P. Fay, Q. Liu, and W. Porod, "Interconnect Packaging Systems," U.S. Patent #7,608,919, October 27, 2009.
5. G. H. Bernstein and R. Frankovic, "Planar-Processing Compatible Metallic Microextrusion Process," U.S. Patent #6,594,894, July 22, 2003.
6. M. A. Kheiri, J. E. Ruggiero, and G. H. Bernstein, "Electronic Lancet Device," U.S. Patent #6,364,889,

April 2, 2002.

7. A. M. Krizan and G. Bernstein, "The QUADFET- a Novel Field Effect Transistor," U.S. Patent #4,962,410, Oct. 8, 1990.
8. G. Bernstein, W. P. Liu, and D. K. Ferry, "Process of Obtaining Improved Contrast in Electron Beam Lithography," U.S. Patent #4,937,174, June 26, 1990.
9. G. Bernstein, W. P. Liu, and D. K. Ferry, "Developer Solutions for PMMA Electron Resist," U.S. Patent #4,877,716, Oct. 31, 1989.
10. G. Bernstein and D. K. Ferry, "Lateral Surface Superlattices Having Negative Differential Conductivity and Novel Process for Producing Same," U.S. Patent #4,872,038, Oct. 3, 1989.

#### **Publications in Refereed Journals (Over 2200 total citations)**

1. M. Niemier, E. Varga, G. H. Bernstein, W. Porod, M. T. Alam, A. Dingler, A. Orlov, and X. S. Hu, "Shape Engineering for Controlled Switching with Nanomagnet Logic," to appear in *IEEE Transactions on Nanotechnology*, 2010.
2. E. Varga, M. Siddiq, M., Niemier, G. H. Bernstein, W. Porod, "Experimental Investigation of Slanted Supermalloy Nanomagnets and Their Application in Nanomagnet-Logic," to appear in *IEEE Trans. Nanotechnol.*
3. S. Liu, S. Hu, J. J. Nahas, M. Niemier, W. Porod and G. H. Bernstein, "Magnetic-Electrical Interface for Nanomagnet Logic," to appear in *IEEE Transactions on Nanotechnology*.
4. M. Niemier, E. Varga, G. H. Bernstein, W. Porod, M. T. Alam, A. Dingler, A. Orlov, and X. S. Hu, "Boolean Logic through Shape-Engineered Magnetic Dots with Slanted Edges," to appear in *IEEE Trans. Nanotechnol.*
5. P. Deshlahra, K. Pfeifer, G. H. Bernstein, and E. E. Wolf, "CO Absorption and Oxidation Studies on Nanofabricated Model Catalysts using Multilayer Enhanced IRAS Technique," *Applied Catalysis A: General* 391, 1-2, 22-30, (2011).
6. E. Varga, A. Orlov, M. T. Niemier, X. S. Hu, G. H. Bernstein, and W. Porod, "Experimental Demonstration of Fanout for Nanomagnetic Logic," *IEEE Transactions on Nanotechnology*, p. 668, 9(6), (2010).
7. J. A. Bean, B. Tiwari, G. Szakmany, G. H. Bernstein, P. Fay, and W. Porod, "Antenna Length and Polarization Response of Antenna-coupled MOM Diode Detectors," *Infrared Science and Technology* 53, 182-185, (2010).
8. B. Gao, K. Sarveswaran, G. H. Bernstein, M. Lieberman, "Guided Deposition of Individual DNA Nanostructures on Silicon Substrates," *Langmuir*, 26(15) pp. 12680-12683, (2010).
9. M. T. Alam, M. J. Siddiq, G. H. Bernstein, M. Niemier, W. Porod, and X. S. Hu, "On-Chip Clocking for Nanomagnet Logic Devices," *IEEE Transactions on Nanotechnology*, p. 348-351, Volume 9(3), (2010).
10. J. Su, H. Yang, P. Fay, W. Porod, and G. H. Bernstein, "A Surface Micromachined Offset-Drive Method to Extend Electrostatic Travel Range," *J. Micromech. and Microeng.*, 20 (015004) 10 pages (2010).
11. P. Deshlahra, B. Tiwari, G. H. Bernstein, L. E. Ocola and E. E. Wolf, "FTIR Sensitivity Enhancement on Pt/SiO<sub>2</sub>/Au layered Structures: A Novel Method for CO Adsorption Studies on Pt Surfaces," *Surf. Sci.*, 604 (2), pp. 79-83 (2010).
12. B. Gao, G. H. Bernstein and M. Lieberman, "Self-Assembled Monolayers of Poly(Ethylene Glycol) Silane as a Resist for Ultrahigh-Resolution Electron Beam Lithography on Silicon Oxide," *J. Vac. Sci. Technol. B*, 27(5), 2292-2300, (2009).
13. B. Tiwari, J. A. Bean, G. Szakmany, G. H. Bernstein, P. Fay, and W. Porod, "Controlled Etching and Regrowth of Tunnel Oxide for Antenna-Coupled MOM Diodes," *J. Vac. Sci. Technol. B*, Vol. 27(5), pp. 2153-2160 (2009).
14. Y. Wang, M. Lieberman, Q. Hang, and G. H. Bernstein, "Selective Binding, Self-Assembling and Nanopatterning of the Creutz-Taube Ions on Surfaces," *Int. J. Mol. Sci.*, special issue on Recent Advances in Molecular Electronics, 10(2), pp. 533-558 (2009).
15. J. A. Bean, B. Tiwari, G. H. Bernstein, P. Fay, and W. Porod, "Thermal Infrared Detection Using

- Dipole Antenna-Coupled Metal-Oxide-Metal Diodes," *J. Vac. Sci. and Technol. B* **27**(1), pp. 11-14 (2009).
16. A. Orlov, A. Imre, L. Ji, G. Csaba, W. Porod, and G. H. Bernstein, "Magnetic Quantum-dot Cellular Automata: Recent Developments and Prospects," *J. Nanoelectronics and Optoelectronics*, **3**(1), pp. 55-68 (2008).
  17. M. Crocker, X. Hu, M. Niemier, M. Yan and G. Bernstein, PLAs in Quantum-Dot Cellular Automata," *IEEE Transactions on Nanotechnology*, **7**(3), 376-386 (2008).
  18. G. H. Bernstein, Q. Liu, M. Yan, Z. Sun, W. Porod, G. Snider, and P. Fay, "Quilt Packaging: High-Density, High-Speed Interchip Communications," *IEEE Trans. Adv. Packaging*, **30**(4) pp. 731-740 (2007).
  19. Q. Liu, P. Fay, and G. H. Bernstein, "A Novel Scheme for Wide Bandwidth Chip-to-Chip Communications," *J. Microelectronics and Electronics Packaging*, vol. **4**(1), pp. 1-7 (2007).
  20. M. Yan and G. H. Bernstein, "A Quantitative Method for Dual-Pass Electrostatic Force Microscopy Phase Measurements," *Surface and Interface Analysis*, vol. **39**(4), pp. 354-358 (2007).
  21. K. Sarveswaran, W. Hu, P. W. Huber, G. H. Bernstein, and M. Lieberman, "Deposition of DNA Rafts on Cationic SAMS on silicon [100]," *Langmuir*, **22**, 11279-11283 (2006).
  22. A. Imre, E. Varga, L. Ji, B. Ilic, V. Metlushko, G. Csaba, A. Orlov, G. H. Bernstein, and W. Porod, "Flux-Closure Magnetic States in Triangular Cobalt Ring Elements," *IEEE Trans. Mag.*, **42**(11), pp. 3641-3644 (2006).
  23. M. Yan and G. H. Bernstein, "Apparent Height in Tapping Mode of Electrostatic Force Microscopy," *Ultramicroscopy*, **106**(7), pp. 582-586 (2006).
  24. A. Imre, G. Csaba, L. Ji, A. O. Orlov, G. H. Bernstein, and W. Porod, "Majority Logic Gate for Magnetic Quantum-Dot Cellular Automata," *Science*, **311**, pp. 205-208 (2006).
  25. J. Wu and G. H. Bernstein, "A Microfabricated Transduction Coil for Inductive Deep Brain Stimulation," *Sensors and Transducers Journal*, **69**(7), pp. 615-621 (2006).
  26. J. Wu, V. Quinn, and G. H. Bernstein, "An Inductive Link with Integrated Receiving Coil - Coupling Coefficient and Link Efficiency," *J. Computational Elec.*, **4**, pp. 221-230 (2005).
  27. W. Hu, K. Sarveswaran, M. Lieberman, and G. H. Bernstein, "High-resolution Electron Beam Lithography and DNA Nano-patterning for Molecular QCA," *IEEE Transactions on Nanotechnology*, **4**(3), pp. 312-316 (2005).
  28. G. H. Bernstein, A. Imre, V. Metlushko, A. Orlov, L. Zhou, L. Ji, G. Csaba, and W. Porod, "Magnetic QCA Systems," *Microelectronics Journal*, **36**, pp. 619-624 (2005).
  29. R. K. Kumamuru, M. Liu, A. O. Orlov, C. S. Lent, G. H. Bernstein, and G. L. Snider, "Temperature Dependence of the Locked Mode in a Single-Electron Latch," *Microelectronics Journal*, **36**, pp. 304-307 (2005).
  30. J. Wu, S. Dubhashi and G.H. Bernstein, "Inductive Pulse Transmission by Amplitude Modulation Using Thin Film and Electroplated Microcoils," *J. Microlith. Microfab. Microsys.*, **4**(1), 013011 (2005).
  31. W. Porod, F. Werblin, L. O. Chua, T. Roska, A. Rodriguez-Vazquez, B. Roska, P. Fay, G. H. Bernstein, Y.-F. Huang, and A. I. Csurgay, "Bio-Inspired Nano-Sensor-Enhanced CNN Visual Computer," *Annals New York Academy of Sciences*, **1013**, pp. 92-109 (2004).
  32. W. Hu, K. Sarveswaran, M. Lieberman, and G. H. Bernstein, "Sub-10 nm Electron Beam Lithography Using Cold Development of Poly(methylmethacrylate)," *J. Vac. Sci. Technol. B* **22**(4), pp. 1711-1716, (2004).
  33. J. Wu, S. Dubhashi and G.H. Bernstein, "Inductive Generation of Arbitrary Waveforms for Electrical Stimulation Using Implantable Microcoils," *J. Micromech. Microeng.*, **14**(7), pp. 1012 – 1021 (2004).
  34. J. Wu, V. Quinn, and G. H. Bernstein, "Powering Efficiency of Inductive Links with Inlaid Electroplated Microcoils," *J. Micromech. Microeng.*, **Vol. 14**, pp. 576-586 (2004).
  35. J. Wu and G. H. Bernstein, "An Inlaid Electroplated Copper Coil for On-chip Powering of MEMS Devices," *J. Vac. Sci. Technol. B*, **22**(2), pp. 611-618 (2004).
  36. X. Wang, W. Hu, R. Ramasubramaniam, G. H. Bernstein, G. Snider, and M. Lieberman, "Formation, Characterization, and Sub-50-nm Patterning of Organosilane Monolayers with Embedded Disulfide

- Bonds: An Engineered Self-Assembled Monolayer Resist for Electron-Beam Lithography,” *Langmuir*, **19**, pp. 9748-9758 (2003).
37. A. Imre, G. Csaba, V. Metlushko, G. H. Bernstein, and W. Porod, “Controlled Domain Wall Motion in Micron-scale Permalloy Square Rings,” *Physica E* **19**, 240-245 (2003).
  38. A. Imre, G. Csaba, G. H. Bernstein, W. Porod, and V. Metlushko, “Investigation of Shape-Dependent Switching of Coupled Nanomagnets,” *Superlattices and Microstructures*, **34**, 513-518 (2003).
  39. A. O. Orlov, R. Kumamuru, R. Ramasubramaniam, C. S. Lent, G. H. Bernstein, and G. L. Snider, “Clocked Quantum-dot Cellular Automata Shift Register,” *Surface Science*, **532-535**, pp. 1193-1198 (2003).
  40. R. K. Kumamuru, A. O. Orlov, R. Ramasubramaniam, C. S. Lent, G. H. Bernstein, and G. L. Snider, “Operation of a Quantum-Dot Cellular Automata (QCA) Shift Register and Analysis of Errors,” *IEEE Transactions on Electron Devices*, **50**(9), pp. 1906-1913 (2003).
  41. Q. Hang, Y. Wang, M. Lieberman, and G. H. Bernstein, “A Liftoff Technique for Molecular Nanopatterning,” *J. Nanosci. and Nanotechnol.* **3**(4), pp. 309-312 (2003).
  42. X. Pang, A. M. Kriman, and G. H. Bernstein, “Electromigration-Induced Morphology of 70 nm Al-Cu and Al Lines,” *J. Electrochem. Soc.*, **150**(4), pp. G258-G265 (2003).
  43. Q. Hang, Y. Wang, M. Lieberman, and G. H. Bernstein, “Selective Deposition of Molecules through Polymethylmethacrylate Patterns Defined by Electron Beam Lithography,” *J. Vac. Sci. Technol. B*, **21**, pp. 227-232, Jan/Feb (2003).
  44. Q. Hang, D. A. Hill, and G. H. Bernstein, “Efficient Removers for Polymethylmethacrylate,” *J. Vac. Sci. Technol. B*, **21**, pp. 91-97, Jan/Feb (2003).
  45. G. Csaba, A. Imre, G. H. Bernstein, and W. Porod, “Nanocomputing by Field-Coupled Nanomagnets,” *IEEE Trans. Nanotech.* **1**(4), pp. 209-213 (2002).
  46. A. O. Orlov, R. Kumamuru, R. Ramasubramaniam, C. S. Lent, G. H. Bernstein, and G. L. Snider, “A Two-stage Shift Register for Clocked Quantum-dot Cellular Automata,” *J. Nanosci. and Nanotechnol.*, **2**, pp. 351-355 (2002).
  47. W. Hu, T. Orlova, and Gary H. Bernstein, “Technique for Preparation of Precise Wafer Cross-Sections and Applications to EBL of PMMA Resist,” *J. Vac. Sci. Technol. B*, **20**, pp. 3085-3088 Nov/Dec (2002).
  48. R. K. Kumamuru, A. O. Orlov, J. Timler, G. Toth, C. S. Lent, R. Rajagopal, G. H. Bernstein, and G. L. Snider, “Power Gain in a Quantum-dot Cellular Automata Latch,” *Appl. Phys. Lett.*, **81**, pp. 1332-1334 (2002).
  49. B. A. K. Chibber, P. Fay, G. H. Bernstein, F. J. Castellino, and J. G. Duman, “Remote Multisensing of Biological Systems,” in *Multisensor Fusion*, edited by A. K. Hyder et al. pp. 883-887, Kluwer, Netherlands (2002).
  50. M. Lieberman, S. Chellamma, B. Varughese, Y. Wang, C. Lent, G. H. Bernstein, G. Snider, and F. C. Peiris, “Quantum-Dot Cellular Automata at a Molecular Scale,” *Annals New York Academy of Sciences*, **96**, pp. 225-239 (2002).
  51. X. Pang, A. M. Kriman, and G. H. Bernstein, “Electromigration in Nanometer Al-Cu Interconnect Lines,” *J. Electrochem. Soc.*, **149**(2), pp. G103-G108 (2002).
  52. Q. Hang, Y. Wang, M. Lieberman, and G. H. Bernstein, “Molecular Patterning through High-Resolution Polymethylmethacrylate Masks,” *Appl. Phys. Lett.*, **80**(22), pp. 4220-4222 (2002).
  53. P. Fay, J. Lu, Y. Xu, G. H. Bernstein, D. H. Chow, and J. N. Schulman, “Microwave Performance and Modeling of InAs/AlSb/GaSb Resonant Interband Tunneling Diodes,” *IEEE Trans. Electron Dev.*, **49**(1) pp. 19-24 (2002).
  54. P. Fay, J. Lu, Y. Xu, G. H. Bernstein, A. Gonzalez, P. Mazumder, D. H. Chow, and J. N. Schulman, “Digital Integrated Circuit Using Integrated InAlAs/InGaAs/InP HEMTs and InAs/AlSb/GaSb RTDs,” *Electronics Lett.*, **37**(12), pp. 758-759 (2001).
  55. P. Fay, J. Lu, Y. Xu, G. H. Bernstein, D. H. Chow, J. N. Schulman, H. L. Dunlap, and H. J. De Los Santos, “Fabrication of Monolithically-Integrated InAlAs/InGaAs/InP HEMTs and InAs/AlSb/GaSb Resonant Interband Tunneling Diodes,” *IEEE TED*, **48**(6), pp. 1282-1284 (2001).
  56. A. O. Orlov, R. K. Kumamuru, R. Ramasubramaniam, G. Toth, C. S. Lent, G. H. Bernstein, and G. L.

- Snider, "Experimental Demonstration of a Latch in Clocked Quantum-dot Cellular Automata," *Appl. Phys. Lett.*, **78**(11), pp. 1625-1627 (2001).
57. I. Amlani, A. O. Orlov, R. K. Kummmamuru, G. H. Bernstein, C. S. Lent, and G. L. Snider, "Experimental Demonstration of a Leadless Quantum-dot Cellular Automata Cell," *Appl. Phys. Lett.*, **77**(5), pp. 738-740 (2000).
  58. A. O. Orlov, I. Amlani, R. K. Kummmamuru, R. Ramasubramaniam, G. Toth, C. S. Lent, G. H. Bernstein, and G. L. Snider, "Experimental Demonstration of Clocked Single-Electron Switching in Quantum-dot Cellular Automata," *Appl. Phys. Lett.*, **77**(2), pp. 295-297 (2000).
  59. G. L. Snider, A. O. Orlov, I. Amlani, G. H. Bernstein, C. S. Lent, J. L. Merz, and W. Porod, "Quantum-dot Cellular Automata: Line and Majority Logic Gate," *Jap. J. Appl. Phys.*, **38**, pp. 7227-7229 (1999).
  60. G. H. Bernstein, I. Amlani, A. O. Orlov, C. S. Lent and G. L. Snider, "Observation of Switching in a Quantum-dot Cellular Automata Cell," *Nanotechnology*, **10**(1999), pp. 166-173 (1999).
  61. G. Toth, A. O. Orlov, I. Amlani, C. S. Lent, G. H. Bernstein, and G. L. Snider, "Conductance Suppression due to Correlated Electron Transport in Coupled Double Quantum Dots," *Phys. Rev B*, **60**(24), pp. 16906-16912 (1999).
  62. G. L. Snider, A. O. Orlov, I. Amlani, X. Zuo, G. H. Bernstein, C. S. Lent, J. L. Merz, and W. Porod, "Quantum-dot Cellular Automata," *J. Vac. Sci. Technol. A*, **17**(4), pp. 1394-1398 (1999).
  63. G. L. Snider, A. O. Orlov, I. Amlani, X. Zuo, G. H. Bernstein, C. S. Lent, J. L. Merz, and W. Porod, "Quantum-dot Cellular Automata: Review and Recent Experiments," *J. Appl. Phys.*, **85**(8), pp. 4283-4285 (1999).
  64. G. L. Snider, A. O. Orlov, I. Amlani, G. H. Bernstein, C. S. Lent, J. L. Merz and W. Porod, "Quantum-dot Cellular Automata," *Microelectronic Engineering*, **47**, pp. 261-63 (1999).
  65. I. Amlani, A. O. Orlov, G. L. Snider, C. S. Lent, W. Porod and G. H. Bernstein, "Experimental Demonstration of Electron Switching in a Quantum-dot Cellular Automata (QCA) Cell," *Superlat. And Microstruc.*, **25**(1/2), pp. 273-278 (1999).
  66. A. Orlov, I. Amlani, G. Toth, C. S. Lent, G. H. Bernstein, and G. L. Snider, "Experimental Demonstration of Binary Wire for Quantum-dot Cellular Automata," *Appl. Phys. Lett.*, **74**(19), pp. 2875-2877 (1999).
  67. I. Amlani, A. Orlov, G. Toth, G. H. Bernstein, C. S. Lent, G. L. Snider, "Digital Logic Gate Using Quantum-dot Cellular Automata," *Science*, **284**, pp. 289-291 (1999).
  68. W. Porod, C. S. Lent, G. H. Bernstein, A. O. Orlov, I. Amlani, G. L. Snider, and J. L. Merz, "Quantum-dot Cellular Automata: Computing with Coupled Quantum Dots," *Int. J. of Electr.*, **86**(5), pp. 549-590 (1999).
  69. G. L. Snider, A. O. Orlov, I. Amlani, G. H. Bernstein, C. S. Lent, J. L. Merz, and W. Porod, "Experimental Demonstration of Quantum-dot Cellular Automata," *Semiconductor Science and Technology*, **13**, pp. A130-A134 (1998).
  70. I. Amlani, A. O. Orlov, G. L. Snider, C. S. Lent, and G. H. Bernstein, "Demonstration of a Functional Quantum-dot Cellular Automata Cell," *J. Vac. Sci. Technol. B*, **16**(6), pp. 3795-3799 (1998).
  71. A. O. Orlov, I. Amlani, G. Toth, C. S. Lent, and G. L. Snider, "Correlated Electron Transport in Coupled Metal Double Dots," *App. Phys. Lett.*, **73**(19), pp. 2787-2790 (1998).
  72. G. L. Snider, A. O. Orlov, I. Amlani, G. H. Bernstein, C. S. Lent, J. L. Merz, and W. Porod, "A Functional Cell for Quantum-dot Cellular Automata," *Solid State Electronics*, **42**(7-8), pp. 1355-1359 (1998).
  73. I. Amlani, A. O. Orlov, G. L. Snider, C. S. Lent, and G. H. Bernstein, "Demonstration of Six-dot Quantum Cellular Automata System," *Appl. Phys. Lett.*, **72**(17), pp. 2179-2181 (1998).
  74. I. Amlani, A. O. Orlov, G. L. Snider, and G. H. Bernstein, "Differential Charge Detection for Quantum-dot Cellular Automata," *J. Vac. Sci. Technol. B*, **15**(6), pp. 2832-2835 (1997).
  75. I. Amlani, A. O. Orlov, G. L. Snider, C. S. Lent and G. H. Bernstein, "External Charge State Detection of a Double-dot System," *Appl. Phys. Lett.*, **71**(12), pp. 1730-1732 (1997).
  76. A. O. Orlov, I. Amlani, G. H. Bernstein, C. S. Lent, and G. L. Snider, "Realization of a Functional Cell for Quantum-dot Cellular Automata," *Science*, **277**, pp. 928-930 (1997).

77. A. C. Krauth, G. H. Bernstein, and E. E. Wolf, "Novel Microfabricated Pd-Au/SiO<sub>2</sub> Bimetallic Model Catalysts for the Hydrogenation of 1,3-Butadiene," *Catalysis Lett.*, **45**, pp. 177-186 (1997).
78. R. Frankovic and G. H. Bernstein, "Temperature Dependence of Electromigration Threshold in Cu," *J. Appl. Phys.*, **81**(3), pp. 1604-1605 (1997).
79. R. Frankovic, G. L. Snider, and G. H. Bernstein, "A Novel Micromachining Technique for the Formation of Extrusions," *IEEE Elec. Dev. Lett.*, **18**(4), pp. 135-137 (1997).
80. R. E. Bartolo, N. Giordano, X. Huang, and G. H. Bernstein, "h/e Aharonov-Bohm Photovoltaic Oscillations in Mesoscopic Au Rings," *Phys. Rev. B*, **55**, p. 2384 (1997).
81. W. Williamson, S. Enquist, B. Gilbert, S. Subramaniam, P. Lei, G. H. Bernstein, and D. H. Chow, "12 GHz Clocked Operation of Ultra-Low Power Interband Resonant Tunneling Diode Pipelined Logic Gates," *IEEE J. Solid State Circ.*, **32**(2), pp. 222-231 (1997).
82. P. Lei, S. Subramaniam, G. H. Bernstein, W. Williamson III, B. Gilbert, and D. H. Chow, "Process Technology for Monolithic High-Speed Schottky/Resonant Tunneling Diode Logic Integrated Circuits," *J. Vac. Sci. Tech. B*, **14**(6), pp. 3497-3501 (1996).
83. G. H. Bernstein, G. Bazán, M. Chen, C. S. Lent, J. L. Merz, A. O. Orlov, W. Porod, G. L. Snider, and P. D. Tougaw, "Practical Issues in the Realization of Quantum-dot Cellular Automata," *Superlattices and Microstructures*, **20**(4), pp. 447-459 (1996).
84. G. Bazán, A. O. Orlov, G. L. Snider, and G. H. Bernstein, "Charge Detector Realization for AlGaAs/GaAs Quantum-dot Cellular Automata," *J. Vac. Sci. Technol. B*, **14**(6), pp. 4046-4050 (1996).
85. R. Frankovic and G. H. Bernstein, "Electromigration Drift and Threshold in Cu Thin Film Interconnects," *IEEE Trans. Elec. Dev.*, **43**(12), pp. 2233-2239 (1996).
86. P. Lei, S. Subramaniam, G. H. Bernstein, W. Williamson III, B. Gilbert, and D. H. Chow, "Fabrication of InGaAs/AlAs Double Barrier RTD Based Monolithic High Speed Logic Integrated Circuits," *Microelectronics and Computers* (Chinese), **13**(2), pp. 1-5 (1996).
87. R. Frankovic, G. H. Bernstein, and J. J. Clement, "Pulsed Current Duty Cycle Dependence of Electromigration-Induced Stress Generation in Aluminum Conductors," *IEEE Elec. Dev. Lett.*, **17**(5), pp. 244-246 (1996).
88. D. Chow, H. L. Dunlap, W. Williamson, S. Enquist, B. Gilbert, S. Subramaniam, P. Lei, and G. H. Bernstein, "InAs/AlSb/GaSb Resonant Interband Tunneling Diodes With Au-on-InAs/AlSb-Superlattice Schottky Diodes for Logic Circuits," *IEEE Elec. Dev. Lett.*, **17**(2), pp. 69-71 (1996).
89. B. E. Campbell, X. Huang, and G. H. Bernstein, "Novel Method for Producing Nanostructures in Silicon Inversion Layers," *J. Vac. Sci. Technol. B*, **13**(3), pp. 1135-1138 (1995).
90. X. Huang, G. Bazán, G. H. Bernstein, "Observation of Supercurrent Drag Between Normal Metals and Superconducting Films," *Phys. Rev. Lett.*, **74**(20), pp. 4051-4054 (1995).
91. G. H. Bernstein, R. J. Minniti, and X. Huang, "An Advanced IC Processing Laboratory at the University of Notre Dame," *IEEE Trans. on Educ.*, **37**(4), pp. 334-340 (1994).
92. A. C. Krauth, K. H. Lee, G. H. Bernstein, and E. E. Wolf, "A Novel Microfabricated Pd/SiO<sub>2</sub> Model Catalyst for the Hydrogenation of 1,3-Butadiene," *Catal. Lett.*, **27**, pp. 43-51 (1994).
93. X. Huang, G. Bazán, G. H. Bernstein, "New Technique for Computation and Challenges for Electron Beam Lithography," *J. Vac. Sci. Technol. B*, **11**(6) pp. 2565-2569 (1993).
94. X. Huang, G. H. Bernstein, G. Bazán, and D. A. Hill, "Spatial Density of Lines Exposed in PMMA by Electron Beam Lithography," *J. Vac. Sci. Technol. A* **11**(4), pp. 1739-1744 (1993).
95. G. Bazán and G. H. Bernstein, "Electron Beam Lithography Over Very Large Scan Fields," *J. Vac. Sci. Technol. A* **11**(4), pp. 1745-1752 (1993).
96. C. S. Lent, P. D. Tougaw, W. Porod, and G. H. Bernstein, "Quantum Cellular Automata," *Nanotechnology* **4**(1), pp. 49-57 (1993).
97. S. W. Polchlopek, G. H. Bernstein, and R. Kwor, "Properties of Nitrogen Implanted SOI Substrates," *IEEE Trans. Electron Devices* **40**(2), pp. 385-391 (1993).
98. G. H. Bernstein, S. W. Polchlopek, R. Kamath, and W. Porod, "Determination of Electron-Beam-Induced Positive Oxide Charge," *Scanning* **14**, pp. 345-349 (1992).
99. D. A. Hill, X. Huang, G. Bazán, and G. H. Bernstein, "Swelling and Surface Forces-Induced Instabilities in Nanoscopic Polymeric Structures," *J. Appl. Phys.* **72**(9), pp. 4088-4094 (1992).

- 100.X. Huang, G. Bazán, G. H. Bernstein, and D. A. Hill, "Stability of Thin Resist Walls," *J. Electrochem. Soc.* **139**(10), pp. 2952-2956 (1992).
- 101.G. H. Bernstein and D. A. Hill, "On the Attainment of Optimum Development Parameters for PMMA Resist," *Superlat. and Microstruct.* **11**(2), pp. 237-240 (1992).
- 102.G. H. Bernstein, D. A. Hill and W. P. Liu, "New High-Contrast Developers for PMMA Resist," *J. Appl. Phys.* **71**(8), pp. 4066-4075 (1992).
- 103.S. J. Koester, G. Bazán, G. H. Bernstein, and W. Porod, "Fabrication of Ultrasmall Tunnel Junctions by Electron Beam Lithography," *Rev. Sci. Instrum.* **63**(3), pp. 1918-1921 (1992).
- 104.S. Subramaniam, S. Bandyopadhyay, B. Das, G. H. Bernstein, and P. Sekula-Moisé, "Anomalous Magnetoresistance due to Correlations Between Disorder and Boundary Scattering in a Two-Dimensional Electron Gas Channel," *Phys. Rev. B.* **45**(7), pp. 3826-3829 (1992).
- 105.R. Puechner, J. Ma, R. Mezzener, W. P. Liu, A. M. Kriman, G. N. Maracas, G. Bernstein, D. K. Ferry, P. Chu, H. H. Wieder, and P. Newman, "Magnetoconductance in Lateral Surface Superlattices," *Surface Science* **228**, pp. 520-523 (1990).
- 106.A. M. Kriman, G. H. Bernstein, B. S. Haukness, and D. K. Ferry, "Analysis of Electron Diffraction in a Novel Field-Effect Transistor," *Superlattices and Microstructures* **6**(4), pp. 381-386 (1989).
- 107.G. Bernstein, W.P. Liu, Y.N. Khawaja, M. N. Kozicki, D. K. Ferry, and L. Blum, "High Resolution Electron Beam Lithography with Negative Organic and Inorganic Resists," *J. Vac. Sci. Technol. B* **6**, pp. 2298-2302 (1988).
- 108.G. Bernstein and D. K. Ferry, "Velocity Overshoot in Ultra-Short-Gate-Length GaAs MESFETs," *IEEE Trans. Electron Devices* **35**(7), pp. 887-892 (1988).
- 109.G. Bernstein and D. K. Ferry, "Observation of Negative Differential Conductivity in a FET with a Structured Gate," *Z. Physik B* **67**(4), pp. 449-452 (1987).
- 110.G. Bernstein and D. K. Ferry, "Negative Differential Conductivity in Lateral Surface Superlattices," *J. Vac. Sci. Technol. B* **5**, pp. 964-966 (1987).
- 111.G. Bernstein and D. K. Ferry, "Fabrication of Ultra-Short Gate MESFETs and BlochFETs by Electron Beam Lithography," *Superlattices and Microstructures* **2**(4), pp. 373-376 (1986).
- 112.G. Bernstein and D. K. Ferry, "Electron Beam Lithographic Fabrication of Ultra-Submicron Gate GaAs MESFETs," *Superlattices and Microstructures* **2**(2), pp. 147-150 (1986).

#### **Publications in Conference Proceedings**

1. W. L. Buckhanan, M. Niemier and G. H. Bernstein, "Bridging the HPC Processor-Memory Gap with Quilt Packaging," *Proc. Micro/Nano Symposium (UGIM)*, p. 130-132, West Lafayette, IN, June (2010).
2. M. A. Khan, A. M. Kriman, and G. H. Bernstein, "Thermal Modeling of Quilt Packaging Interconnects," *Proc. Micro/Nano Symposium (UGIM)*, p. 166-168, West Lafayette, IN, June (2010).
3. M. Alam, G. H. Bernstein, J. Bokor, D. Carlton, X. S. Hu, S. Kurtz, B. Lambson, M. T. Niemier, W. Porod, M. Siddiq, and E. Varga, "Experimental Progress of and Prospects for Nanomagnet Logic (NML)," in *Proc. of the Silicon Nanoelectronics Workshop* (Hawaii), June 15-17, (2010).
4. E. Varga, M. T. Niemier, G. H. Bernstein, W. Porod, and X. S. Hu, "Programmable MQCA-Based Majority Gates," in *Proc. of the Device Research Conference*, p. 85-86, (2010).
5. E. Varga, S. Liu, M.T. Niemier, W. Porod, X.S. Hu, G. H. Bernstein, M. T. Alam, and A. Orlov, "Experimental Demonstration of Fanout for Nanomagnet Logic," in *Proc. of the Device Research Conference*, p. 95-96, (2010).
6. E. Varga, M. Siddiq, M. T. Niemier, M. T. Alam, G. H. Bernstein, W. Porod, A. Orlov, and X. S. Hu, "Experimental Demonstration of Non-Majority, Nanomagnet Logic Gates," in *Proc. of the Device Research Conference*, p. 87-88, (2010).
7. W. Porod, J. A. Bean, Z. Sun, B. Tiwari, G. Szakmany, G. H. Bernstein, and P. Fay, "Nanostucture Antennas for the LW-IR Regime," *Proc. 2010 IEEE MTT-S International Microwave Symposium (IMS 2010)*, Anaheim, CA, May, (2010).
8. **(Invited)** S. Kurtz, M. Niemier, X. S. Hu, W. Porod, and G. H. Bernstein, "Design Space Exploration for Nanomagnet Logic Systems," *Proc. of Foundations of Nanoscience (FNANO 2010)*,

- April, (2010).
9. K. Sarveswaran, B. Gao, K. N. Kim, G. H. Bernstein, M. Lieberman, "Adhesion of DNA Nanostructures and DNA Origami to Lithographically Patterned Self-Assembled Monolayers on Si[100], *Proc. of the Alternative Lithographic Technologies II Conference* as part of the *SPIE Symposium on SPIE Advanced Lithography*, San Jose, CA, (2010).
  10. D. Kopp, M. A. Khan, J. Kulick, A. M. Kriman, P. Fay and G. H. Bernstein, "RF and Thermal Testing of Quilt Packaging Systems," *Proc. of the 6<sup>th</sup> International Conference and Exhibition on Device Packaging (IMAPS)*, Scottsdale, AZ, (2010).
  11. D. Kopp, M. A. Khan, S. Garvey, K. Anderson, J. Kulick, P. Fay, A. M. Kriman, and G. H. Bernstein, "Quilt Packaging: A Coplanar Chip-to-Chip Interconnect Offering Ultra-Wide Bandwidth," in *Proc. of 2010 International Conference on Compound Semiconductor Manufacturing Technology (CS Mantech)*, p. 309, Portland, OR (2010).
  12. W. Porod and G. H. Bernstein, "Nanomagnet-Based Logic Devices," *SRC-NRI Annual Review of the Southwest Academy for Nanoelectronics (SWAN)*, Austin, TX, (2009).
  13. B. Tiwari, G. H. Bernstein, P. Fay, W. Porod, "Long-Wave Infrared Response of Antenna-Coupled Metal-Oxide-Metal Diodes," *International Symposium on Advanced Nanostructures and Nanodevices (ISANN)*, Kaanapali, Hawaii, (2009).
  14. A. Dingler, M. J. Siddiq, M. T. Niemier, X. S. Hu, M. T. Alam, G. H. Bernstein, and W. Porod, "Controlling Magnetic Circuits: How Clock Structure Implementation will Impact Logical Correctness and Power," in *Proc. of the IEEE International Symposium on Defect and Fault Tolerance in VLSI Systems*, pp. 94-102, Chicago (2009).
  15. D. Kopp, C. Liang, J. Kulick, M. Khan, G. H. Bernstein, and P. Fay, "Quilt Packaging of RF Systems with Ultrawide Bandwidth," *Proc. of the IMAPS - Advanced Technology Workshop on RF and Microwave Packaging*, San Diego (2009).
  16. E. Varga, G. H. Bernstein, X. S. Hu, M. T. Niemier, and W. Porod, "Non-volatile and Reprogrammable MQCA-based Majority Gates," *Proc. Device Research Conference*, University Park, PA (2009).
  17. G. H. Bernstein, J. Bonath, J. Brockman, W. Buckhanan, A. Carter, S. Dai, P. Fay, M. Khan, D. Kopp, J. Kulick, A. Kriman, Y. Lee, C. Liang, D. Myers, M. Niemier, M. Padberg, R. Savino, and G. Snider, "Quilt Packaging – a Quasi-Monolithic Way to Merge Technologies and Size Scales," *Proc. Foundations of Nanoscience (FNANO09)*, Snowbird, UT (2009).
  18. L. Ji, A. Orlov, A. G. H. Bernstein, W. Porod, and G. Csaba, "Domain-Wall Trapping and Control on Submicron Magnetic Wire by Localized Field," *Proc. 9<sup>th</sup> International Conference on Nanotechnology (IEEE Nano)*, pp. 758-762, Genoa, Italy (2009).
  19. **(Invited)** M. Alam, S. Kurtz, M. T. Niemier, S. X. Hu, G. H. Bernstein, and W. Porod, "Nanomagnet Logic Based on Field-Coupled Nanomagnets: Clocking Structures and Power Analysis," *Proc. Foundations of Nanoscience (FNANO09)*, Snowbird, UT (2009).
  20. C. Liang, W. Buckhanan, A. Carter, P. Fay, M. Khan, D. Kopp, J. Kulick, Y. Lee, M. Padberg, R. Savino, G. Snider, and G. H. Bernstein, "Novel Packaging via Solder Joints at Chip Edges," *Proc. 5<sup>th</sup> Annual International Conference and Exhibition on Device Packaging, IMAPS 2009*, Scottsdale, AZ (2009).
  21. M. Niemier, A. Dingler, X. Sharon Hu, M. Tanvir Alam, G. Bernstein, and W. Porod, "Bridging the Gap between Nanomagnetic Devices and Circuits," in *26th IEEE International Conference on Computer Design*, Lake Tahoe, CA, pp. 506-513S (2008).
  22. M. T. Alam, S. Kurtz, M. T. Niemier, S. X. Hu, G. H. Bernstein, and W. Porod, "Magnetic Logic Based on Field-Coupled Nanomagnets: Clocking Structures and Power Analysis," *Proc. 8th IEEE Int. Conf. on Nanotechnology*, Arlington, TX, August, p. 637 (2008).
  23. M. T. Alam, G. H. Bernstein, W. Porod, S. Hu, M. Niemier, M. Putney, and J. DeAngelis, "Power Dissipation for Clocked Magnetic QCA," in *Proc. of the 12th Int. Workshop on Computational Electronics*, pp. 293-294 (2007).
  24. M. T. Niemier, M. T. Alam, X. S. Hu, G. H. Bernstein, W. Porod, M. Putney, and J. DeAngelis, "Clocking Structures and Power Analysis for Nanomagnet-based Logic Devices," *Proc. Int. Symp.*

- Low Power Electronics and Design*, pp. 26-31 (2007).
25. A. Orlov, A. Imre, L. Ji, G. Csaba, G. H. Bernstein, and W. Porod, "Fabrication and Operation of Magnetic Quantum-Dot Cellular Automata All Magnetic Logic," *Proc. 2006 Joint Int. Meeting of the Electrochemical Soc. (2006)*, **3**(27), pp. 317-327 (2007).
  26. B. Rakos, H. Yang, J. A. Bean, G. H. Bernstein, P. Fay, A. I. Csurgay, and W. Porod, "Investigation of Antenna-Coupled MOM Diodes for Infrared Sensor Applications," *Proc. 14th Int. Conf. on Nonequilibrium Carrier Dynamics in Semiconductors*, Springer Proc. in Physics, **Vol. 110**, pp. 105-108 (2006).
  27. X. Hu, M. Crocker, M. Niemier, M. Yan, and G. H. Bernstein, "PLAs in Quantum-dot Cellular Automata," *IEEE Computer Society Annual Symposium on VLSI: Emerging VLSI Technologies and Architectures (ISVLSI 2006)*, pp. 242-250 (2006).
  28. H. Yang, J. Su, W. Porod, P. Fay, and G. H. Bernstein, "Design and Fabrication of a Tunable Fabry-Perot Interferometer/Photodiode (FPI/PD) Spectral Image Sensor for Visible Wavelengths," *Proc. SPIE Conf. on MOEMS Display, Imaging, and Miniaturized Microsystems IV*, **V6114**, pp. 87-97 (2006).
  29. J. Su, H. Yang, W. Porod, P. Fay, and G. H. Bernstein, "Laterally Driven Electrostatic Actuators with Extended Travel Range," *Proc. SPIE Conf. on MOEMS Display, Imaging, and Miniaturized Microsystems IV*, **V6114**, pp. 232-240 (2006).
  30. G. L. Snider, A. Orlov, C. S. Lent, G. H. Bernstein, M. Lieberman, and T. Fehlner, "Implementations of Quantum-dot Cellular Automata," *Proc. 2006 Int'l Conf. on Nanosci. and Nanotechnol., ICONN*, pp. 544-547 (2006).
  31. G. H. Bernstein, L. McWilliams, K. Meyers, S. Silliman, W. Porod, P. Fay, J. Brockman, A. Lewis, M. Buckle, A. Carter, S. Govea, and C. Suhendra, "Information and Nano Technologies in an Introductory Engineering Course," *Proc. ASEE 2006 Illinois-Indiana and North Central, Joint Section Conference* published online at <http://www.asee4ilin.org/Conference2006program/Papers/Bernstein-P34.pdf>.
  32. G. H. Bernstein, Q. Liu, Z. Sun, and P. Fay, "Quilt Packaging: A New Paradigm for System-in-Package," *Proc. of the IEEE 7th Electronics Packaging Technol. Conf. (EPTC2005)*, pp. 1-6 (2005).
  33. J. Wu, V. Quinn, and G. H. Bernstein, "A Detachable Transformer with Microfabricated Secondary Coil for Powering MEMS Devices," *Proc. Magnetics 2004*, June 9-10, 2004, Denver, CO.
  34. G. H. Bernstein, W. Hu, Q. Hang, K. Sarveswarn, and M. Lieberman, "Electron Beam Lithography and Ltoff of Molecules and DNA Rafts," *Fourth IEEE Conference on Nanotechnology*, pp. 16-19 (2004).
  35. G. H. Bernstein, "Quantum-dot Cellular Automata by Electric and Magnetic Field Coupling," *Proc. IEEE 2003 Custom Integrated Circuits Conf.*, pp. 223-229 (2003).
  36. A. Imre, G. Csaba, G. H. Bernstein, W. Porod, and V. Metlushko, "Investigation of Antiferromagnetic Ordering Along Chains of Coupled Nanomagnets," *Proc. Third IEEE Conf. on Nanotechnology*, **Vol. 2**, pp. 20-23 (2003).
  37. W. Hu, G. H. Bernstein, K. Sarveswaran, and M. Lieberman, "Low Temperature Development of PMMA for Sub-10-nm Electron Beam Lithography," *Proc. Third IEEE Conf. on Nanotechnology*, **Vol. 2**, pp. 602-605 (2003).
  38. S. Baglio, S. Castorina, L. Fortuna, G. H. Bernstein, and W. Porod, "Integrated Optical Nanosystems with an Embedded In-Line Thermo-Optic Modulator," *Proc. Third IEEE Conf. on Nanotechnology*, **Vol. 2**, pp. 303-306 (2003).
  39. J. Wu and G. H. Bernstein, "Selective Signal Transmission to Inlaid Microcoils by Inductive Coupling," *Proc. Transducers '03*, pp. 1695-1698 (2003).
  40. G. H. Bernstein, "Quantum-dot Cellular Automata: Computing by Polarized Systems," *Proc. 40th Design Automation Conf.*, Anaheim, California, pp. 268-273 (2003).
  41. G. H. Bernstein, J. B. Brockman, G. L. Snider, P. M. Kogge, and B. E. Walvoord, "From Bits to Chips: A Multidisciplinary Curriculum for Microelectronic System Design Education," *Proc. Intl. Conf. on Microelectronic Systems Education*, Anaheim, California (2003).
  42. R. Kummamuru, A. O. Orlov, C. S. Lent, G. H. Bernstein, G. L. Snider, "Clocked Quantum-Dot

- Cellular Automata Shift Register,” *Proc. 2<sup>nd</sup> Intl. Workshop on Quantum Dots for Quantum Computing and Classical Size Effect Circuits*, pp. 26-27 (2003).
43. R. Kumamuru, A. O. Orlov, C. S. Lent, G. H. Bernstein, G. L. Snider, “Clocked Quantum-Dot Cellular Automata Circuits,” *Proc. 2<sup>nd</sup> Intl. Workshop on Quantum Dots for Quantum Computing and Classical Size Effect Circuits*, pp. 26-27 (2003).
  44. R. K. Kumamuru, G. Toth, J. P. Timler, C. S. Lent, G. H. Bernstein, A. O. Orlov, G. L. Snider, “Power Gain in Clocked Quantum-Dot Cellular Automata Devices,” *Proc. 2003 NSTI Nanotechnology Conference and Trade Show - Nanotech 2003*, pp. 149-152 (2003).
  45. G. H. Bernstein, R. K. Kumamuru, A. O. Orlov, R. Ramasubramaniam, C. S. Lent, and G. L. Snider, “Experimental Progress in Quantum-dot Cellular Automata,” *Proc. Fourth Intl. Symp. on Nanostructures and Mesoscopic Systems*, pp. FA3 (2003).
  46. G. Csaba, A. Imre, G. H. Bernstein, and W. Porod, “Application of Magnetic Rings for Field-Coupling Computing,” *Proc. Fourth Intl. Symp. on Nanostructures and Mesoscopic Systems*, pp. FA4 (2003).
  47. G. Csaba, A. Imre, G. H. Bernstein, W. Porod, and V. Metlushko, “Signal Processing with Coupled Ferromagnetic Dots,” *Proc. 2002 2<sup>nd</sup> IEEE Conf. on Nanotechnology*, pp. 59-62 (2002).
  48. G. H. Bernstein, J. B. Brockman, P. M. Kogge, G. L. Snider, and B. M. Walvoord, “From Bits to Chips: A Multidisciplinary Curriculum for Microelectronics System Design Education,” *Proc. ASEE IL/IN Sectional Conf. Engineering Education in a Changing Economy*, pp. 24-27 (2002).
  49. G. L. Snider, A. O. Orlov, R. K. Kumamuru, R. Ramasubramaniam, I. Amlani, G. H. Bernstein, and C. S. Lent, “Quantum-dot Cellular Automata,” *Mat. Res. Soc. Symp., Proc. Vol. 696* pp. 221-231 (2002).
  50. G. L. Snider, A. O. Orlov, R. K. Kumamuru, R. Ramasubramaniam, I. Amlani, G. H. Bernstein, C. S. Lent, J. L. Merz, and W. Porod, “Quantum-dot Cellular Automata: Introduction and Experimental Overview,” *IEEE-Nano 2001*, Maui, Hawaii, (2001).
  51. A. O. Orlov, R. K. Kumamuru, R. Ramasubramaniam, C. S. Lent, G. H. Bernstein, and G. L. Snider, “Clocked Quantum-dot Cellular Automata Devices: Experimental Studies,” *IEEE-Nano 2001*, Maui, Hawaii, (2001).
  52. P. Fay, Y. Xu, J. Lu, G. H. Bernstein, A. Gonzalez, P. Mazumder, D. H. Chow, and J. N. Schulman, “A Flip-Flop Based on Monolithic Integration of InAs/AlSb/GaSb RITDs and InAlAs/InGaAs/InP HEMTs,” *Proc. 59th Device Research Conf.*, pp. 47-48 (2001).
  53. R. K. Kumamuru, A. O. Orlov, G. Toth, J. Timler, R. Rajagopal, C. S. Lent, G. H. Bernstein, and G. L. Snider, “Power Gain in a Quantum-dot Cellular Automata (QCA) Shift Register,” *IEEE-Nano 2001*, Maui, Hawaii, (2001).
  54. J. Wu, V. Quinn, and G. H. Bernstein, “A Simple, Wireless Powering Scheme for MEMS Devices,” *MEMS Components and Applications for Industry, Automobiles, Aerospace, and Communication*, Henry Helvajian, Siegfried W. Janson, Franz Lärmer, Editors, *Proc. of SPIE Vol. 4559*, pp. 43-52 (2001).
  55. M. Lieberman, S. Chellamma, B. Varughese, Y. Wang, C. S. Lent, G. H. Bernstein, G. L. Snider, and F. C. Peiris, “Quantum-dot Cellular Automata at a Molecular Scale,” *Proc. 2000 Molecular Electronics Conf.*, Hilo, HI (2000).
  56. P. Fay, J. Lu, Y. Xu, G. H. Bernstein, D. H. Chow, J. N. Schulman, H. L. Dunlap, and H. J. De Los Santos, “Monolithic Integration of InAlAs/InGaAs/InP HEMTs and InAs/AlSb/GaSb Resonant Interband Tunneling Diodes (RITDs) for High Speed Integrated Circuits,” *Proc. 58th Device Research Conf.*, pp. 161-162 (2000).
  57. P. Fay, G. H. Bernstein, D. Chow, J. Schulman, P. Mazumder, W. Williamson, and B. Gilbert, “Integration of InAs/AlSb/GaSb Resonant Interband Tunneling Diodes with Heterostructure Field-Effect Transistors for Ultra-High-Speed Digital Circuit Applications,” *Proc. Great Lakes Symp. on VLSI*, pp. 162-165, Ann Arbor, MI (1999).
  58. I. Amlani, A. O. Orlov, G. H. Bernstein, G. L. Snider, G. Toth, C. S. Lent, and W. Porod, “Quantum-Dot Cellular Automata,” *Proc. of the Symp. on Giga Scale Integration Technology*, ed. by M. A. Osman and O. O. Awadelkarim, pp. 15-23 (1998).

59. C. S. Lent, W. Porod, J. L. Merz, G. L. Snider, and G. H. Bernstein, "Nanoelectronics Using Quantum-dot Cellular Automata," *Proc. of the 1998 Government Microcircuit Applications Conf.*, pp. 389-392, (1998).
60. R. Frankovic and G. H. Bernstein, "In-Situ Observations of Pre-Patterned Void Interactions Under Electromigration-Induced Stress," in *Reliability in Microelectronics VI*, edited by W. F. Filter, A.S. Oates, J. J. Clement, R. Rosenberg, and P. M. Lenahan, (MRS, Pittsburgh, PA) **428**, pp. 109-114 (1996).
61. R. Frankovic and G. H. Bernstein, "Duty Cycle and Frequency Effects of Pulsed-dc Currents on Electromigration-Induced Stress in Al Interconnects," in *Reliability in Microelectronics VI*, ed. by W.F. Filter, J.J. Clement, A.S. Oates, R. Rosenberg, and P.M. Lenahan, (MRS, Pittsburgh, PA) **428**, pp. 101-107 (1996).
62. R. Frankovic and G. H. Bernstein, "In-Situ Observations of Electromigration-Induced Void Dynamics," in *In-Situ Electron and Tunneling Microscopy of Dynamic Processes*, ed. by R. Sharma, M. G.-Josifovska, P. L. Gai, R. Sinclair, and L. J. Whitman, MRS Pittsburgh Symposium Proceedings, no. **404**, p. 163-169 (1996).
63. R. Frankovic and G. H. Bernstein, "Grain Structure And Electromigration Testing Of Deep Sub-Micrometer Cu Interconnects," *Materials Reliability in Microelectronics V*, A. S. Oates, W. F. Filter, R. Rosenberg, A. L. Greer, and K. Gadepally eds. (MRS, Pittsburgh, PA) **391**, pp. 403-408 (1995).
64. R. R. Schultz, H. M. Zayed, R. L. Stevenson, R. J. Minniti, and G. H. Bernstein, "ASIC Design for Robust Signal and Image Processing," *Proc. Great Lakes Symp. on VLSI*, pp. 138-143, Notre Dame, IN (1994).
65. G. H. Bernstein and A. M. Kriman, "A Novel Electron-Diffraction Transistor," *SPIE vol. 1284 Nanostructures and Microstructure Correlation with Physical Properties of Semiconductors*, pp. 91-100 (1990).
66. S. Krause, J. Mohr, G. Bernstein, D. K. Ferry, and D. C. Joy, "A New Method for Measuring the Thickness of Thin Film Insulators," *Proc. of the Microbeam Analysis Society* **14**, pp. 459-462 (1989).
67. S. Bandyopadhyay, G. H. Bernstein, and W. Porod, "Quantum Devices Based on Phase Coherent Lateral Transport," in *Nanostructure Physics and Fabrication*, ed. by M. A. Reed and W. P. Kirk, pp. 183-188, Academic Press, Boston, MA (1989).
68. G. H. Bernstein and A. M. Kriman, "Electron-Diffraction Transistors," *Proc. IEEE/Cornell Conf. on Advanced Concepts in High Speed Semiconductor Devices and Circuits*, pp. 246-254, Ithaca, NY (1989).
69. D. K. Ferry, G. Bernstein, R. Puechner, J. Ma, A. M. Kriman, R. Mezzener, W. P. Liu, G. N. Maracas, and R. Chamberlin, "Magnetoconductance in Lateral Surface Superlattices," in *High Magnetic Fields in Semiconductor Physics II*, pp. 344-352, ed. by G. Landwehr, Springer-Verlag, Heidelberg (1988).
70. M. N. Kozicki, Y. N. Khawaja, J. L. Edwards, B. Qurachi, G. Bernstein, and A. E. Owen, "Alternative Materials and Processes for Integrated Optics," *Proc. Fall Meeting of the Electrochemical Society*, Chicago (1988).
71. R. Puechner, A. M. Kriman, G. Bernstein, J. Ma, W. P. Liu, D. K. Ferry, and G. N. Maracas, "Conductance Oscillations in Lateral Surface Superlattices," *Inst. of Phys. Conf. Ser. No. 96: Chapt. 9, Intl. Symp. on GaAs and Related Compounds*, pp. 581-586, IOP Publishing Ltd., Bristol, England (1988).

### Encyclopedia Entries

1. Bernstein, Gary H., and Wolfgang Porod. "Nanocomputing," *Computer Sciences*, Ed. Roger R. Flynn. Vol. 4: *Electronic Universe*, New York: Macmillan Reference USA, 2002, pp. 169-172.
2. G. H. Bernstein and A. M. Kriman, "Electromigration," in the *Encyclopedia of Electrical and Electronics Engineering*, ed. by J. Webster, vol. 6, pp. 514-523, John-Wiley and Sons, Inc., New York, (1999).
3. G. H. Bernstein, "Microprocessors," in *Microsoft Encarta Encyclopedia* (<http://encarta.msn.com/encnet/refpages/RefArticle.aspx?refid=761559091&pn=2>) (1997-2006).

### Book Chapters

1. J. Bean, B. Tiwari, G. Szakmany, G. H. Bernstein, P. Fay and W. Porod, "Nanoantenna Infrared Sensors," in *Cellular Nanoscale Sensory Wave Computing*, ed. by C. Baatar, W. Porod and T. Roska, pp. 27-86, Springer-Verlag (2009).
2. A. Imre, G. Csaba, G. H. Bernstein, and W. Porod, "Magnetic Quantum-dot Cellular Automata (MQCA)," in *Quantum Cellular Automata: theory, experimentation and prospects*, edited by M. Macucci, pp. 269-276 Imperial College Press, London (2006).
3. G. H. Bernstein, L. O. Chua, Á. I. Csurgay, P. Fay, Y.F. Huang, W. Porod, Á. Rodriguez-Vásquez, B. Roska, T. Roska, F. Werblin, and Á. Zarándy, "Biologically-Inspired Cellular Machine Architectures," in *Managing Nano-Bio-Info-Cogno Innovations: Converging Technologies in Society*, edited by M. C. Roco and W. S. Bainbridge, pp. 133-152, Springer, Dordrecht (2006).
4. A. O. Orlov, R. Kummamuru, J. Timler, C. S. Lent, G. L. Snider, and G. H. Bernstein, "Experimental Studies of Quantum-dot Cellular Automata Devices," in *Mesoscopic Tunneling Devices*, H. Nakashima, editor, pp. 125-160, Research Signpost, Kerala, India (2004).
5. C. S. Lent, G. L. Snider, G. Bernstein, W. Porod, A. Orlov, M. Lieberman, T. Fehlner, M. Niemier, and P. Kogge, "Quantum-dot Cellular Automata," in *Electron Transport in Quantum Dots*, J. P. Bird, editor, pp. 397-432, Kluwer Academic Publishers, Norwell, MA (2003).
6. G. H. Bernstein, H. Goodson, and G. L. Snider, "Nanoelectromechanical Systems Processing Technology," in *The MEMS Handbook*, M. Gad-el-Hak, editor, pp. 36-1 to 36-24, CRC Press, Boca Raton, Florida (2001).
7. R. Frankovic and G. H. Bernstein, "In-situ Observation and Quantitative Analysis of Electromigration Void Dynamics," in *Advances in In-situ Electron Microscopy*, ed. by P. L. Gai, pp. 93-122, Kluwer, New York (1997).
8. D. K. Ferry and G. Bernstein, "Lateral Surface Superlattices," in *Submicron Integrated Circuits*, ed. by R. K. Watts, pp. 360-375, John Wiley and Sons, Inc., New York (1989).

#### Other Publications

1. A. Biswas, G. H. Bernstein and I. S. Bayer, "Nanofabrication Techniques State-Of-The-Art," *Vacuum Technology and Coating Magazine*, April (2010).
2. G. H. Bernstein, P. Fay, and Q. Liu, "Tutorial 78: Quilt Packaging," tutorial no. 77 at [www.flipchips.com](http://www.flipchips.com) (2007).
3. G. H. Bernstein and T. Fuja, "Is a Graduate Degree in Your Future?," tutorial at the International Engineering Consortium GradNet website, [http://gradnet.iec.org/career/tu\\_graduate\\_future.asp](http://gradnet.iec.org/career/tu_graduate_future.asp) (2005). (Can be found at [http://www.hku.hk/bse/tu\\_graduate\\_future.pdf](http://www.hku.hk/bse/tu_graduate_future.pdf)).
4. G. H. Bernstein, "The Role of the Laboratory Teaching Assistant," *IEEE Potentials Magazine*, August/September, pp. 36-38 (2002).
5. C. Martino, S. Polchlopek, J. Millar, R. J. Minniti, G. H. Bernstein, and L. Stauffer, "Technical Report: Keithley Model 82 Simultaneous CV Measurement System, Laboratory Experiments," Keithley sales technical literature (1994).
6. D. K. Ferry, G. Bernstein, and W. P. Liu, "Electron Beam Lithography of Ultra-Submicron Devices," in *Physics and Technology of Submicron Structures*, ed. by H. Heinrich, G. Bauer and F. Kuchar, pp. 37-44, Springer-Verlag, Heidelberg (1989).
7. G. Bernstein and D. K. Ferry, "Fabrication of Short GaAs MESFETs by Electron Beam Lithography," in *The Physics and Fabrication of Microstructures and Microdevices*, p. 462, ed. by M. J. Kelly and C. Weisbuch, Springer-Verlag, New York (1986).
8. G. Bernstein, "Ge/Au/Ni Ohmic Contacts to GaAs," internal report, Motorola Semiconductor Research and Development Laboratory, Phoenix, AZ (1983).

#### Invited Panel Participation

1. "Defense Related Research and Funding," Purdue University, December, 2006.
2. "Opportunities and Challenges for Faculty at a Catholic Research University," University of Notre Dame New Faculty Retreat, New Buffalo, MI, August, 2006.
3. "A Dialogue on Engineering Education: the Role of the First Year," Workshop on First Year

Engineering Courses, University of Notre Dame, July, 2006.

4. "What's Beyond the Planar MOSFET?" VLSI Joint Panel of the *2004 Symposium on VLSI Circuits*, Honolulu, Hawaii, June, 2004.
5. Co-chair of the "Issues for Nanotechnology in Transmitting from Nanodevices and Between Nanosystems" *National Nanotechnology Initiative Interagency Grand Challenge Workshop on Nanoelectronics*, Arlington, Virginia, February, 2004.
6. "Integration of Nano Devices on the Silicon Platform" *Silicon Nanoelectronics and Beyond Conf.*, Portland, Oregon, October, 2003.

### Presentations at Technical Meetings

1. **(Invited)** G. H. Bernstein, S. Hu, M. Niemier and W. Porod, "Nanomagnet Logic: A New Paradigm in Non-Volatile Logic," presented at the *Workshop on Materials for Low Power Non-Volatile Memories: Oxides and Beyond*, Argonne National Laboratory, Chicago, February 2011.
2. **(Invited)** G. H. Bernstein, "The Moore's Law Cliff and IC Manufacturing Beyond CMOS," presented at the *Institute for Defense Analyses' ISAT Beyond Moore's Law Cliff Workshop*, Menlo Park, CA, February 2011.
3. E. Varga, G. Csaba, G. H. Bernstein, M. Niemier, S. Hu, and W. Porod, "Nanomagnet Logic," presented at the *2010 Workshop on Innovative Nanoscale Devices and Systems (WINDS)*, Kohala Coast, Hawaii, December 2010.
4. B. Tiwari, G. Szakmany, P. Krenz, G. H. Bernstein, P. Fay, and W. Porod, "Investigation of Different Lead Designs and Their Effect on the Radiation Properties of IR Antennas," presented at the *2010 Workshop on Innovative Nanoscale Devices and Systems (WINDS)*, Kohala Coast, Hawaii, December 2010.
5. G. Szakmany, B. Tiwari, G. H. Bernstein, P. Fay, and W. Porod, "Antenna-Coupled Metal-Oxide-Metal Diodes Fabrication Using Atomic Layer Deposition," presented at the *2010 Workshop on Innovative Nanoscale Devices and Systems (WINDS)*, Kohala Coast, Hawaii, December 2010.
6. E. Varga, M. J. Siddiq, M. T. Niemier, G. H. Bernstein, and W. Porod, "Shape-Based Logic Built from Supermalloy Nanomagnets," presented at the *TECHCON 2010: Technology and Talent for the 21st Century*, Austin, TX, September, 2010.
7. **(Invited)** G. H. Bernstein, "Nanomagnetic Logic for Beyond Moore Systems," presented at *University Government Industry Micro/Nano Symposium (UGIM)*, West Lafayette, IN, June 2010.
8. M. A. Khan, A. M. Krizan and G. H. Bernstein, "Thermal Modeling of Quilt Packaging Interconnects," poster presented at the *University Government Industry Micro/Nano Symposium (UGIM)*, Lafayette, IN, June 2010.
9. W. L. Buckhanan, M. Niemier and G. H. Bernstein, "Bridging the HPC Processor-Memory Gap with Quilt Packaging," poster presented at the *Proc. Micro/Nano Symposium (UGIM)*, p. 130-132, West Lafayette, IN, June 2010.
10. M. Alam, G. H. Bernstein, J. Bokor, D. Carlton, X. S. Hu, S. Kurtz, B. Lambson, M. T. Niemier, W. Porod, M. Siddiq, and E. Varga, "Experimental Progress of and Prospects for Nanomagnet Logic (NML)," presented at the *Proc. of the Silicon Nanoelectronics Workshop (Hawaii)*, June 15-17, 2010.
11. M. T. Niemier, W. Porod, X. S. Hu, and G. H. Bernstein, "Demonstration of the Five Tenets Necessary for Digital Systems in Nanomagnet Logic," presented at the *68th Device Research Conference (DRC)*, South Bend, IN, June, 2010.
12. E. Varga, M. Siddiq, M. T. Niemier, M. T. Alam, G. H. Bernstein, W. Porod, A. Orlov, and X. S. Hu, "Experimental Demonstration of Non-Majority, Nanomagnet Logic Gates," poster presented at the *68th Device Research Conference (DRC)*, Notre Dame, Indiana, June, 2010.
13. E. Varga, M. T. Niemier, G. H. Bernstein, W. Porod, and X. S. Hu, "Programmable Nanomagnet-Logic Majority Gate," poster presented at the *68th Device Research Conference (DRC)*, Notre Dame, Indiana, June 2010.
14. E. Varga, S. Liu, M. T. Niemier, W. Porod, X. S. Hu, G. H. Bernstein, M. T. Alam, and A. Orlov, "Experimental Demonstration of Fanout for Nanomagnet Logic," in *Proc. of the Device Research Conference*, p, 95-96, 2010.

15. E. Varga, M. T. Niemier, X. S. Hu, A. Orlov, G. H. Bernstein, W. Porod, "Experimental Demonstration of New Nanomagnet Logic Circuits," poster presented at *Toward the Regulation of Nanomaterials Conference*, Notre Dame, Indiana, 2010.
16. W. Porod, J. A. Bean, Z. Sun, B. Tiwari, G. Szakmany, G. H. Bernstein, and P. Fay, "Nanostructure Antennas for the LW-IR Regime," presented at the *2010 IEEE MTT-S International Microwave Symposium (IMS 2010)*, Anaheim, CA, May, 2010.
17. D. Kopp, M. A. Khan, S. Garvey, K. Anderson, J. Kulick, P. Fay, A. M. Kriman, and G. H. Bernstein, "Quilt Packaging: A Coplanar Chip-to-Chip Interconnect Offering Ultra-Wide Bandwidth," presented at the *CS ManTech Conference*, Portland, OR, May, 2010.
18. **(Invited)** S. Kurtz, M. Niemier, X. Sharon Hu, W. Porod, and G. H. Bernstein, "Design Space Exploration for Nanomagnet Logic Systems," presented at *Foundations of Nanoscience (FNANO10)*, (Snowbird, UT), p. 62-63, April 27-30, 2010.
19. K. Sarveswaran, G. H. Bernstein, M. Lieberman, "Attachment of DNA Origami on Lithographically Patterned Silicon," poster presented at the Foundations of Nanoscience, Snowbird, Utah, April 27-30, (2010).
20. D. Kopp, M. A. Khan, J. Kulick, A. M. Kriman, P. Fay and G. H. Bernstein, "RF and Thermal Testing of Quilt Packaging Systems," poster presented at the *6<sup>th</sup> International Conference and Exhibition on Device Packaging*, Scottsdale, AZ, March, 2010.
21. K. Sarveswaran, B. Gao, K. Kim, L. Mark, G. H. Bernstein, and M. Lieberman, "EBL-Directed Assembly of DNA Nanostructures and Origami on Silicon," presented at the *Alternative Lithographic Technologies II Conference* as part of the *SPIE Symposium on SPIE Advanced Lithography*, San Jose, CA, February, 2010.
22. R. Saini, J. Randall, W. Dillard, M. Lutz, and G. H. Bernstein, "Manufacturable Meta-Chip that Integrates MEMS, IMU, Timing, and Electronics in a Single Low-Cost Package," presented at the *DARPA Workshop: Deep Integration of Timing and Inertial Measurement Units (TIMUs)*, Park City, UT, February, 2010.
23. B. Tiwari, G. H. Bernstein, P. Fay and W. Porod, "Long-Wave Infrared Response of Antenna-Coupled Metal-Oxide-Metal Diodes," presented at the *International Symposium on Advanced Nanodevices and Nanotechnology*, Kaanapali, Maui, HI, November, 2009.
24. L. Ji, A. Orlov, A. G. H. Bernstein, W. Porod, and G. Csaba, "Domain-Wall Trapping and Control on Submicron Magnetic Wire by Localized Field," presented at the *Proc. 9<sup>th</sup> International Conference on Nanotechnology (IEEE Nano)*, pp. 758-762, Genoa, Italy (2009).
25. M.T. Alam, M.A., M.T. Niemier, X.S. Hu, W. Porod, and G. H. Bernstein, "Fabrication of On-Chip Clock Structure for Nanomagnet QCA (MQCA)," presented at the *TECHCON 2009: Technology and Talent for the 21st Century (winner of best in session award)*.
26. W. Porod and G. H. Bernstein, "Nanomagnet-Based Logic Devices," presented at the *SRC-NRI Annual Review of the Southwest Academy for Nanoelectronics (SWAN)*, Austin, TX, (2009).
27. A. Dingler, M.J. Siddiq, M.T. Niemier, X.S. Hu, M.T. Alam, G. H. Bernstein, and W. Porod, "Controlling Magnetic Circuits: How Clock Structure Implementation will Impact Logical Correctness and Power," presented at the *24<sup>th</sup> IEEE International Symposium on Defect and Fault Tolerance in VLSI Systems (DFT 2009)*, Chicago, October, 2009.
28. D. Kopp, C. Liang, J. Kulick, M. Khan, G. H. Bernstein, and P. Fay, "Quilt Packaging of RF Systems with Ultrawide Bandwidths," presented at the *IMAPS Advanced Technology Workshop on RF and Microwave Packaging*, September, 2009, San Diego (**winner of best student paper award**).
29. **(Invited)** L. Ji, G. Csaba, A. Orlov, G. H. Bernstein and W. Porod, "Domain-Wall Trapping and Control on Submicron Magnetic Wire by Localized Field," presented at *IEEE NANO*, Genoa, Italy, July, 2009.
30. C. Liang, W. Buckhanan, A. Carter, P. Fay, M. Khan, D. Kopp, J. Kulick, Y. Lee, M. Padberg, R. Savino, G. Snider, and G. H. Bernstein, "Novel Packaging via Solder Joints at Chip Edges," presented at the *5<sup>th</sup> Annual International Conference and Exhibition on Device Packaging*, IMAPS 2009, Scottsdale, AZ (2009).
31. E. Varga, G. H. Bernstein, X. S. Hu, M. T. Niemier, and W. Porod, "Non-volatile and

- Reprogrammable MQCA-based Majority Gates,” presented at the *Device Research Conference (DRC)*, College Station, PA, June, 2009.
32. J. A. Bean, B. Tiwari, G. Szakmány, G. H. Bernstein, P. Fay, and W. Porod, “Multi-Spectral CMOS Compatible Antenna-Coupled MOM Diode Infrared Detectors,” poster presented at the *2009 Silicon Nanoelectronics Workshop*, Conference, Kyoto, June, 2009.
  33. B. Tiwari, G. Szakmany, J. A. Bean, G. H. Bernstein, P. Fay, and W. Porod, “Fabrication of Antenna-Coupled Metal-Oxide-Metal Diode Thermal Infrared Detectors Using In-Situ Oxidation,” presented at the *EIPBN Conference*, Marco Island, FL, May, 2009.
  34. **(Invited)** M. T. Alam, S. Kurtz, M. T. Niemier, S. X. Hu, G. H. Bernstein, and W. Porod, “Magnetic Logic Based on Field-Coupled Nanomagnets,” presented at the *NSTI Nanotech Conference & Expo*, Houston, TX, May 2009.
  35. C. Liang, R. Savino, J. Kulick, D. Kopp, W. Buckhanan, G. Snider, P. Fay, and G. H. Bernstein, “Solderability Study on Immersion Tin Coated on Cu Nodules for Chip-to-Chip Connection,” presented at the *MRS Spring Meeting*, San Francisco, April, 2009.
  36. **(Keynote)** G. H. Bernstein, J. Bonath, J. Brockman, W. Buckhanan, A. Carter, S. Dai, P. Fay, M. Khan, D. Kopp, J. Kulick, A. Kriman, Y. Lee, C. Liang, D. Myers, M. Niemier, M. Padberg, R. Savino, and G. Snider, “Quilt Packaging – a Quasi-Monolithic Way to Merge Technologies and Size Scales,” presented at the *Foundations of Nanoscience (FNANO09)*, Snowbird, UT, April, 2009.
  37. **(Invited)** M. Alam, S. Kurtz, M. T. Niemier, S. X. Hu, G. H. Bernstein, and W. Porod, “Nanomagnet Logic Based on Field-Coupled Nanomagnets: Clocking Structures and Power Analysis,” presented at the *Foundations of Nanoscience (FNANO09)*, Snowbird, UT, April, 2009.
  38. C. Liang, W. Buckhanan, D. Kopp, M. Khan, R. Savino, J. Kulick, M. Padberg, A. Carter, G. Snider, P. Fay, and G. H. Bernstein, “Novel Packaging via Solder Joints at Chip Edges,” presented at the *5<sup>th</sup> Annual International Conference and Exhibition on Device Packaging, IMAPS 2009*, Scottsdale, AZ, March, 2009.
  39. J. A. Bean, B. Tiwari, G. H. Bernstein, P. Fay, W. Porod, “Thermal Infrared Detection Using Dipole Antenna-Coupled Metal-Oxide-Metal Diodes,” presented at the *Advanced Heterostructures and Nanotstructures Workshop (AHNW)*, Kohala Koast, December 2008.
  40. M. Niemier, A. Dingler, X. Sharon Hu, M. Tanvir Alam, G. Bernstein, and W. Porod, “Bridging the Gap between Nanomagnetic Devices and Circuits,” presented at the *26th IEEE International Conference on Computer Design*, Lake Tahoe, CA, October, 2008.
  41. J. Bean, B. Tiwari, G. H. Bernstein, P. Fay, and W. Porod, “Long Wave Infrared Detection Using Dipole Antenna-Coupled Metal-Oxide-Metal Diodes,” presented at the *The International Conference on Infrared, Millimeter and Terahertz Waves (IRMMW-THz)*, Pasadena, September, 2008.
  42. **(Invited)** M. T. Alam, S. Kurtz, M. T. Niemier, S. X. Hu, G. H. Bernstein, and W. Porod, “Magnetic Logic Based on Field-Coupled Nanomagnets: Clocking Structures and Power Analysis,” presented at the *IEEE NANO*, Arlington, TX, August, 2008.
  43. **(Invited)** P. Fay, G. H. Bernstein, and W. Porod, “Antenna-Coupled Tunnel-Diode nanosensors for Millimeter-Wave Through Infrared Imaging,” presented at the *Workshop on Nanoelectronics for RF and Electronics Applications*, Army Research Laboratory (ARL), Adelphi, MD, August, 2008.
  44. J. Bean, B. Tiwari, G. H. Bernstein, P. Fay, and W. Porod, “Long-Wave Infrared Detection Using Dipole Antenna-Coupled Metal-Oxide-Metal Diodes,” presented at the *Silicon Nanoelectronics Workshop*, Honolulu, HI, June, 2008.
  45. J. Bean, B. Tiwari, G. H. Bernstein, P. Fay, and W. Porod, “Thermal Infrared Detection Using Dipole Antenna-Coupled Metal-Oxide-Metal Diodes,” presented at the *2008 EIPBN Conference*, Portland, May, 2008.
  46. L. Ji, A. Orlov, G. H. Bernstein, and W. Porod, “Domain-Wall Trapping by Localized Field on Submicron Permalloy Wire,” presented at the *IEEE International Magnetics Conference (INTERMAG)*, Madrid, May, 2008.
  47. M. Lieberman and G. H. Bernstein, “Lithographically Assisted Assembly and Patterning of DNA Nanostructures on Semiconductor Surfaces,” presented at the *ONR DNA Nanofabrication Workshop*, Arlington, VA, April, 2008.

48. B. Gao, G. H. Bernstein, and M. Lieberman, "Electron Beam Lithography on Self-assembled Monolayers of Poly(ethylene glycol) for Nanoscale Biomolecule Patterning," poster presented at the *5<sup>th</sup> Foundations Of Nanoscience: Self-Assembled Architectures And Devices FNANO08*), Snowbird, Utah, April, 2008.
49. **(Invited)** A. Imre, L. Ji, A. Orlov, G. Csaba, P. Lugli, G. H. Bernstein, and W. Porod, "Magnetic Logic Based on Field-Coupled Nanomagnets," presented at the *SRC-NRI Western Institute for Nanoelectronics (WIN) Workshop on Ferromagnetic Devices, Circuits, and Applications*, Los Angeles, February 2008.
50. **(Invited)** A. Imre, G. Csaba, L. Ji, A. Orlov, G. H. Bernstein, and W. Porod, "Magnetic Logic Based on Field-Coupled Nanomagnets," presented at the *52<sup>nd</sup> Magnetism and Magnetic Materials Conference - MMM 2007*, Tampa, FL, November, 2007.
51. M. T. Alam, G. H. Bernstein, W. Porod, S. Hu, M. Niemier, M. Putney, and J. DeAngelis, "Power Dissipation for Clocked Magnetic QCA," presented at the *12th International Workshop on Computational Electronics*, Amherst, MA, October, 2007.
52. M. T. Alam, G. H. Bernstein, W. Porod, S. Hu, M. Niemier, M. Putney, and J. DeAngelis, "Power Dissipation for Clocked Magnetic QCA," presented at the *International Workshop on Computational Electronics – IWCE*, Amherst, MA, October, 2007.
53. **(Invited)** A. Imre, L. Ji, G. Csaba, A. Orlov, G. H. Bernstein, and W. Porod, "Magnetic Logic based on Field-Coupled Nanomagnets," presented at the *International Conference on Electromagnetics in Advanced Applications (ICEAA-07)*, Torino, Italy, September, 2007.
54. A. Imre, L. Ji, G. Csaba, A. Orlov, G. H. Bernstein, and W. Porod, (Invited), "Magnetic Logic Based on Field-Coupled Nanomagnets," presented at the *International Conference on Electromagnetics in Advanced Applications (ICEAA-07)*, Torino, Italy, September 2007.
55. G. H. Bernstein, M. Alam, W. Porod, S. Hu, M. Niemier, M. Putney, and J. DeAngelis, "Clocking Scheme for Nanomagnet QCA," presented at the *Seventh IEEE Int. Conf. on Nanotechnology – IEEE-NANO 2007*, Hong Kong, August, 2007.
56. M. Niemier, X. S. Hu, M. Alam, G. Bernstein, W. Porod, M. Putney, and J. DeAngelis, "Clocking Structures and Power Analysis for Nanomagnet-Based Logic Devices," presented at the *International Symposium on Low Power Electronics and Design 2007 (ISLPED-2007)*, Portland, Oregon, August, 2007.
57. L. Ji, A. Orlov, G. H. Bernstein, W. Porod, "Current-Driven Domain-Wall Motion in a Magnetic Wire with Multiple Constrictions," presented at the *Seventh IEEE International Conference on Nanotechnology – IEEE-NANO 2007*, Hong Kong, August, 2007.
58. W. Porod, G. H. Bernstein, P. Fay, Y.-F. Huang, and Á. I. Csurgay, "Toward Multispectral Nanoscale Sensor Arrays for CNN-UM," presented at the *Technology Assessment Meeting on Cellular (CNN) Sensing–Computing–Activating Technology*, Budapest, Hungary, July, 2007.
59. L. Ji, A. Orlov, G. H. Bernstein, and W. Porod, "Current-driven Domain-Wall Motion in a Magnetic Wire with Multiple Constrictions," presented at the *2007 Silicon Nanoelectronics Workshop*, Kyoto, Japan, June, 2007.
60. M. T. Alam, M. Niemier, W. Porod, S. Hu, M. Putney, J. DeAngelis, and G. H. Bernstein, "On-Chip Clocking Scheme for Nanomagnet QCA," poster presented at the *65th Device Research Conference (DRC)*, University of Notre Dame, Indiana, June, 2007.
61. A. Orlov, A. Imre, L. Ji, G. Csaba, G. H. Bernstein, and W. Porod, "Fabrication and Operation of Magnetic Quantum-Dot Cellular Automata All Magnetic Logic," presented at the *Proc. 2006 Joint Int. Meeting of the Electrochemical Soc. (2006)*, **3**(27), pp. 317-327 (2007).
62. **(Invited)** G. H. Bernstein, "Quilt Packaging: A Novel Interchip Communications Method," keynote address at the *Indiana IMAPS/SMTA Vendor's Day and Mini-Symposium*, Indianapolis, April, 2007.
63. **(Plenary Paper)** A. Imre, L. Ji, G. Csaba, A. Orlov, G. H. Bernstein, and W. Porod, "Magnetic Logic Devices Based on Field-Coupled Nanomagnets," presented at the *Nano and Giga Challenges in Electronics and Photonics (NGC0-7)*, Phoenix, Arizona, March, 2007.
64. J. Bean, G. H. Bernstein, P. Fay, and W. Porod, "Antenna-Coupled Metal-Oxide-Metal Diodes for Terahertz Detection," presented at the *Advanced Heterostructure Workshop*, Kohala Coast, Hawaii,

December, 2006.

65. **(Invited)** A. Imre, L. Ji, G. Csaba, A. Orlov, G. H. Bernstein, and W. Porod, "Fabrication of Magnetic Quantum-dot Cellular Automata Systems," presented at the *2006 Joint International Meeting of the Electrochemical Society*, Cancun, Mexico, October, 2006.
66. G. H. Bernstein, Q. Liu, M. Yan, A. Tong, J. Kulick, W. Buckhanan, G. Snider, and P. Fay, "Fabrication and Characterization of Quilt Packaging: A Novel Inter-Chip Communication Paradigm for System-in-Package (SiP)" presented at the *International Workshop on 3S(SOP, SIP, SOC) Electronics Technologies*, Atlanta, September, 2006.
67. **(Invited)** A. Imre, L. Ji, G. Csaba, V. Metlushko, A. Orlov, G. H. Bernstein, and W. Porod, "Magnetic Quantum-Dot Cellular Automata (MQCA) Fabrication," presented at the *Gordon Research Conference: Nanostructure Fabrication*, Tilton, New Hampshire, July, 2006.
68. B. Gao, G. H. Bernstein, P. Clark, and M. Lieberman, "Biomolecule Nanopatterns Defined by Electron Beam Lithography and Molecular Liff-off," presented at the *2006 EIPBN Conference*, Baltimore, June, 2006.
69. J. Bean, G. H. Bernstein, W. Porod, "Antenna-Coupled Metal-Oxide-Metal Diodes for Terahertz Detection," poster presented at the *2006 EIPBN Conference*, Baltimore, June, 2006.
70. J. Bean, B. Rakos, G. H. Bernstein, P. Fay, W. Porod, "Antenna Coupled Metal-Oxide-Metal Diodes for Terahertz Detection," poster presented at the *2006 Silicon Nanoelectronics Workshop*, Honolulu, Hawaii, June 2006.
71. G. H. Bernstein, L. McWilliams, K. Meyers, S. Silliman, W. Porod, P. Fay, J. Brockman, A. Lewis, M. Buckle, A. Carter, S. Govea, and C. Suhendra, "Information and Nano Technologies in an Introductory Engineering Course," presented at the *ASEE 2006 Illinois-Indiana and North Central, Joint Section Conference*, Ft. Wayne, IN, March, 2006.
72. S. Hu, M. Crocker, M. Niemier, M. Yan, and G. H. Bernstein, "PLAs in Quantum-dot Cellular Automata," presented at the *IEEE Computer Society Annual Symposium on VLSI (ISVLSI 2006)*, Karlsruhe, Germany, March, 2006.
73. J. Su, H. Yang, W. Porod, P. Fay, and G. H. Bernstein, "Laterally Driven Electrostatic Actuators with Extended Travel Range," presented at the *SPIE Conf. on MOEMS Display, Imaging, and Miniaturized Microsystems IV*, San Jose, January, 2006.
74. H. Yang, J. Su, W. Porod, P. Fay, and G. H. Bernstein, "Design and Fabrication of a Tunable Fabry-Perot Interferometer/Photodiode (FPI/PD) Spectral Image Sensor for Visible Wavelengths," presented at the *SPIE Conf. on MOEMS Display, Imaging, and Miniaturized Microsystems IV*, San Jose, January, 2006.
75. B. Rakos, H. Yang, J. A. Bean, G. H. Bernstein, P. Fay, A. I. Csurgay, and W. Porod, "Investigation of Antenna-Coupled MOM Diodes for Infrared Sensor Applications," presented at the *Proc. 14th Int. Conf. on Nonequilibrium Carrier Dynamics in Semiconductors*, Springer Proceedings in Physics, **Vol. 110**, pp. 105-108 (2006).
76. G. L. Snider, A. Orlov, C. S. Lent, G. H. Bernstein, M. Lieberman, and T. Fehlner, "Implementations of Quantum-dot Cellular Automata," presented at the *Proc. 2006 Int'l Conf. on Nanosci. and Nanotechnol., ICONN*, pp. 544-547 (2006).
77. L. Ji, A. Imre, E. Varga, A. Orlov, G. H. Bernstein, and W. Porod, "Domain Wall Trapping in Magnetic Wires by Nanomagnets," presented the joint *7<sup>th</sup> International Conference on New Phenomena in Mesoscopic Structures and the 5<sup>th</sup> International Conference on Surfaces and Interfaces in Mesoscopic Devices – NPMS-7/SID-5*, Maui, Hawaii, November December 2005.
78. **(Invited)** A. Imre, L. Ji, G. Csaba, A. Orlov, G. H. Bernstein, and W. Porod, "Magnetic Logic Devices Based on Field-Coupled Nanomagnets," presented at the *International Semiconductor Device Research Symposium (ISDRS-05)*, Bethesda, Maryland, December, 2005.
79. G. H. Bernstein, Q. Liu, Z. Sun, G. Snider, and P. Fay, "Quilt Packaging: A New Paradigm for System-in-Package," presented at the *7<sup>th</sup> Electronics Packaging Technology Conference (EPTC2005)*, Singapore, December, 2005.
80. J. Bean, J. McRaven, B. Rakos, G. Bernstein, P. Fay, and W. Porod, "Antenna-coupled Metal-oxide-metal Diodes for Terahertz Detection," poster presented at the *Second Joint International Conference*

*on New Phenomena in Mesoscopic Systems and Surfaces and Interfaces of Mesoscopic Devices*, Maui, Hawaii November, 2005.

81. A. Imre, G. Csaba, L. Ji, A. Orlov, G. H. Bernstein, and W. Porod, "Magnetic Logic Gates Based on Field-coupled Nanomagnets," presented at the *50th Magnetism and Magnetic Materials Conference*, San Jose, California, October, 2005.
82. L. Ji, E. Varga, A. Wolf, A. Imre, G. H. Bernstein, A. Orlov, and W. Porod, "Investigation of Different Wire Geometries for Magnetization Reversal and Domain-wall Trapping in Submicron Permalloy Wires," poster presented at the *50th Magnetism and Magnetic Materials Conference (MMM)*, San Jose, California, October, 2005.
83. G. Snider, G. H. Bernstein, and J. Brockman, "Work in Progress – Multidisciplinary Experience in System-on-Chip Development," presented at the *Frontiers in Education Conference, Pedagogies and Technologies for the Emerging Global Economy (FIE)*, Indianapolis, Indiana, October, 2005.
84. **(Invited)** G. H. Bernstein, A. Imre, K. Sarveswaran, M. Lieberman and W. Porod, "Fabrication and Demonstration of Quantum-dot Cellular Automata Systems," presented at the *Solid State Devices and Materials 2005 (SSDM2005)*, Kobe, Japan, September, 2005.
85. B. Rakos, H. Yang, J. A. Bean, G. H. Bernstein, P. Fay, A. I. Csurgay, and W. Porod, "Investigation of Antenna-Coupled MOM Diodes for Infrared Sensor Applications," presented at the *14th International Conference on Nonequilibrium Carrier Dynamics in Semiconductors*, Chicago, July, 2005.
86. A. Imre, L. Ji, G. Csaba, A. Orlov, G. H. Bernstein, and W. Porod, "Logic Gates Featuring Field Coupled Nanomagnets," presented at the *2005 Silicon Nanoelectronics Workshop (SNW)*, Kyoto, Japan, June, 2005.
87. W. Porod, A. Imre, G. Csaba, L. Ji, A. Orlov, G. H. Bernstein, and V. Metlushko, "Field-coupled Nanomagnets for Logic Applications," presented at *SPIE Microtechnologies for the New Millennium 2005*, Sevilla, Spain, May, 2005.
88. **(Invited)** A. Imre, L. Ji, Gy. Csaba, A. Orlov, G. H. Bernstein, and W. Porod, "Magnetic Logic Devices Based on Field-Coupled Nanomagnets," presented at the *Second IEEE Conference on Nanoscale Devices and System Integration (NDSI'05)*, Houston, TX, April, 2005.
89. J. Wu and G. H. Bernstein, "A MEMS Inductive Deep Brain Stimulator," poster presented at the *Second IEEE Conference on Nanoscale Devices and System Integration (NDSI'05)*, Houston, TX, April, 2005.
90. **(Invited)** P. Esfandiari, G. Bernstein, P. Fay, W. Porod, B. Rakos, A. Zarandy, B. Berland, L. Boloni, G. Boreman, B. Lail, B. Monacelli, and A. Weeks, "Tunable Antenna-Coupled Metal-Oxide (MOM) Uncooled IR Detector," presented at the *SPIE Defense and Security Symposium 2005, Infrared Technology and Applications Conference*, Orlando, Florida, March, 2005.
91. K. Sarveswaran, W. Hu, G. H. Bernstein, S. Arico, M. Niemier, M. Lieberman, "Towards Self-assembling Circuit Boards," poster presented at *Molecular-Scale Electronics VII*, San Diego, CA, January 23-26 (2005).
92. A. Imre, G. Csaba, P. Lugli, G. H. Bernstein, V. Metlushko, and W. Porod, "Magnetic Logic Devices," presented at the *Advanced Heterostructure Workshop*, Kohala Coast, Hawaii, December, 2004.
93. **(Invited)** W. Porod and G. H. Bernstein, "Nanotechnology: Overview and Relevance to Biology," presented at the *National Association of Biology Teachers National Convention*, Chicago, IL, November, 2004.
94. **(Invited)** G. H. Bernstein, "Magnetic QCA Systems," presented at the *European Micro and Nano Systems 2004 (EMN04)*, Paris, France, October, 2004.
95. G. H. Bernstein, W. Hu, Q. Hang, K. Sarveswaran, and M. Lieberman, "Electron Beam Lithography and Liftoff of Molecules and DNA Rafts," presented at the *4<sup>th</sup> IEEE Conference on Nanotechnology (IEEE-NANO)*, Munich, August, 2004.
96. A. Imre, L. Zhou, A. Orlov, G. Csaba, G. H. Bernstein, W. Porod, and V. Metlushko, "Application of Mesoscopic Magnetic Rings for Logic Devices," presented at the *4<sup>th</sup> IEEE Conference on Nanotechnology (IEEE-NANO)*, Munich, August, 2004.

97. J. Wu, V. Quinn, and G. H. Bernstein, "A Detachable Transformer with Microfabricated Secondary Coil for Powering MEMS Devices," presented at the *Magnetics 2004*, Denver, CO, June, 2004.
98. G. L. Snider, R. K. Kummamuru, H. Qi, S. Sharma, Z. Li, A.O. Orlov, C.S. Lent, G.H. Bernstein, and T.P. Fehlner, "Experimental Demonstrations of Quantum-dot Cellular Automata," presented at the *IEEE Si Nanoelectronics Workshop*, Honolulu, HI, June, 2004.
99. G. H. Bernstein, Q. Hang, W. Hu, K. Sarveswaran, and M. Lieberman, "Electron Beam Lithography for Patterning of Molecular Electronics," poster presented at the *IEEE Si Nanoelectronics Workshop*, Honolulu, HI, June, 2004.
100. A. Imre, G. Csaba, G.H. Bernstein, W. Porod, and V. Metlushko "Shape Engineering of Dipole-Coupled Nanomagnets for Magnetic Logic Devices," poster presented at *IEEE Si Nanoelectronics Workshop*, Honolulu, HI, June, 2004.
101. A. Imre, G. Csaba, L. Zhou, A. Orlov, G. H. Bernstein, W. Porod, and V. Metlushko, "Shape Engineering of Dipole-Coupled Nanomagnets for Magnetic Logic Devices," poster presented at the *62<sup>nd</sup> Device Research Conference*, Notre Dame, IN, June, 2004.
102. A. Imre, G. Csaba, G. Bernstein, W. Porod, and V. Metlushko, "Shape Engineering of Dipole-Coupled Nanomagnets for Magnetic Logic," poster presented at the *Metallic Multilayers Symposium*, Boulder, Colorado, June, 2004.
103. V. V. Metlushko, U. Welp, V. Vlasko-Vlasov, G. Crabtree, M. Grimsditch, V. Novosad, N. Zaluzec, J. Bekaert, V. Moshchalkov, Y. Bruynseraede, P. Vavassori, B. Ilic, Xiaobin Zhu, A. Imre, G. Bernstein and W. Porod, "Nanomagnets: from nanodots to nanorings," presented at the *2004 MRS Spring Meeting*, San Francisco, April, 2004.
104. K. Sarveswaran, W. Hu, P. Huber, Gh. H. Bernstein, M. Niemier, and M. Lieberman, "Self-Assembly and Lithographic Patterning of DNA Rafts," presented at *Foundations Of Nanoscience: Self-Assembled Architectures And Devices (FNANO04)*, Snowbird, Utah, April, 2004.
105. **(Invited)** V. Metlushko, U. Welp, V. Vlasko-Vlasov, G. Crabtree, M. Grimsditch, V. Novosad, J. Hiller, N. Zaluzec, P. Vavassori, B. Ilic, Xiaobin Zhu, P. Grütter, A. Imre, G. H. Bernstein, W. Porod, J. Bekaert, V. V. Moshchalkov, and Y. Bruynseraede "Magnetic Ring Devices for Memory and Logic Applications," presented at the *IEEE Nanoscale Devices and System Integration (NDSI) 2004*, Miami, February, 2004.
106. **(Invited)** G. H. Bernstein, Q. Hang and W. Hu, "Nanolithography for Molecular Electronics," presented *IEEE Nanoscale Devices and System Integration (NDSI) 2004*, Miami, February, 2004.
107. A. Imre, G. Csaba, G. H. Bernstein, W. Porod, and V. Metlushko, "Investigation of shape dependent switching of coupled nanomagnets," presented at the *2003 Sixth Int. Conf. on New Phenomena in Mesoscopic Systems NPMS-6/SIMD-4*, Maui, Hawaii, December, 2003.
108. L. Zhou, A. Orlov, A. Imre, G. Csaba, G. H. Bernstein, and W. Porod, "Magnetoresistive Measurements on Patterned Nanomagnet Films," poster presented at the *2003 Sixth Int. Conf. on New Phenomena in Mesoscopic Systems NPMS-6/SIMD-4*, Maui, Hawaii, December, 2003.
109. R. K. Kummamuru, G. Toth, J. P. Timler, C. S. Lent, G. H. Bernstein, A. O. Orlov, G. L. Snider, "Power Gain in Clocked Quantum-Dot Cellular Automata Devices," presented at the *Proc. 2003 NSTI Nanotechnology Conference and Trade Show - Nanotech 2003*, pp. 149-152 (2003).
110. **(Invited)** G. H. Bernstein, "Quantum-dot Cellular Automata by Electric and Magnetic Field Coupling," presented at the *IEEE 2003 Custom Integrated Circuits Conf.*, San Jose, California, September, 2003.
111. G. Csaba, A. Imre, G. Bernstein, A. Csurgay, and W. Porod, "Circuit Simulations for Single-Domain Field-Coupled Nanomagnets," presented in the Special Session 'Nanoelectronic Circuits' at the *European Conference on Circuit Theory and Design - ECCTD'03*, Krakow, Poland, September, 2003.
112. J. Wu and G. H. Bernstein, "Selective Signal Transmission to Inlaid Microcoils by Inductive Coupling," presented at the *Proc. Transducers '03*, pp. 1695-1698 (2003).
113. G. H. Bernstein, "Quantum-dot Cellular Automata: Computing by Polarized Systems," presented at the *Proc. 40<sup>th</sup> Design Automation Conf.*, Anaheim, California, pp. 268-273 (2003).
114. W. Hu, G. H. Bernstein, K. Sarveswaran, and M. Lieberman, "Low Temperature Development of

- PMMA for Sub-10-nm Electron Beam Lithography,” presented at the *Third IEEE Conf. on Nanotechnology*, San Francisco, California, August, 2003.
115. Y. Wang, W. Hu, M. Lieberman, G. H. Bernstein, and Q. Hang, “Molecular Nanopatterning by Electron Beam Lithography,” presented at the *Third IEEE Conf. on Nanotechnology*, San Francisco, California, August, 2003.
  116. S. Baglio, S. Castorina, L. Fortuna, G. H. Bernstein, and W. Porod, “Integrated Optical Nanosystems with an Embedded In-Line Thermo-Optic Modulator,” presented at the *Third IEEE Conf. on Nanotechnology*, San Francisco, California, August, 2003.
  117. R. Kumamuru, A. Orlov, C. Lent, G. Bernstein, and G. Snider, “Clocked Quantum-dot Cellular Automata Shift Register,” presented at the *International Workshop on Quantum Devices and Quantum Computing*, Notre Dame, IN, August, 2003.
  118. U. Welp, V. V. Vlasko-Vlasov, G. Crabtree, M. Grimsditch, V. Novosad, J. Hiller, N. Zaluzec, B. Llic, X. Zhu, P. Grutter, G. Csaba, A. Imre, G. H. Bernstein, W. Porod, J. Bekaert, V. Moshchalkov, Y. Bruynseraede, and V. Metlushko, “High-density Arrays of Magnetic Ring Elements,” presented at the *Third IEEE Conf. on Nanotechnology*, San Francisco, California, August, 2003.
  119. A. Imre, G. Csaba, A. Orlov, G. Bernstein, W. Porod, and V. Metlushko, “Investigation of Antiferromagnetic Ordering along Chains of Coupled Nanomagnets,” presented at the *Third IEEE Conf. on Nanotechnology*, San Francisco, California, August, 2003.
  120. W. Porod, G. H. Bernstein, P. Fay, and A. Csurgay, “Toward Hyperspectral Nanoscale Sensor Arrays for CNN-UM,” presented at the *CNN Technology Assessment Meeting*, Budapest, Hungary, July, 2003.
  121. A. Imre, G. Csaba, V. Metlushko, G. H. Bernstein, and W. Porod, “Switching Behavior of Magnetically-Coupled Rings,” poster presented at the *2003 Silicon Nanoelectronics Workshop*, Kyoto, Japan, June, 2003.
  122. G. H. Bernstein, J. B. Brockman, P. M. Kogge, G. L. Snider, and B. E. Walvoord, “From Bits to Chips: A Multidisciplinary Curriculum for Microelectronics System Design Education,” presented at the *Microelectronics Systems Education Conference*, Anaheim, CA June, 2003.
  123. **(Invited)** G. H. Bernstein, “Quantum-dot Cellular Automata: Computing by Polarized Systems,” presented at the *40<sup>th</sup> Design Automation Conf.*, June, 2003.
  124. G. Csaba, A. Imre, G. H. Bernstein, W. Porod, and V. Metlushko, “Application of Magnetic Rings for Field-Coupling Computing,” presented at the *Nanomes 2003*, Tempe, AZ, February, 2003.
  125. G. H. Bernstein, R. K. Kumamuru, A. O. Orlov, R. Ramasubramaniam, C. S. Lent, and G. L. Snider, “Experimental Progress in Quantum-dot Cellular Automata,” presented at the *Fourth International Symposium on Nanostructures and Mesoscopic Systems (Nanomes) 2003*, Tempe, AZ, February, 2003.
  126. A. O. Orlov, R. Kumamuru, G. H. Bernstein, C. S. Lent, and G. L. Snider, “Quantum-dot Cellular Automata Shift Register,” presented at the *NanoTech 2003*, San Francisco, February, 2003.
  127. M. Lieberman, Q. Hang, Y. Wang, G. H. Bernstein, “Sub-50-nm Patterning by Molecular Liftoff,” presented at the *6<sup>th</sup> Engineering Foundation Conf. on Molecular-Scale Electronics*, Key West, December, 2002.
  128. Q. Hang, D. A. Hill, and G. H. Bernstein, “Study of Polymethylmethacrylate Removers for Electron Beam Lithography through Quantitative Surface Roughness Characterization by AFM,” poster presented at the *AVS 49<sup>th</sup> Intl. Symp.*, Denver, November, 2002.
  129. W. Hu, T. Orlov, and G. H. Bernstein, “Study of PMMA EBL Cross-Sections by a Novel Process,” presented at the *AVS 49<sup>th</sup> Intl. Symp.*, Denver, November, 2002.
  130. G. L. Snider, A. O. Orlov, R. K. Kumamuru, R. Ramasubramaniam, I. Amlani, G. H. Bernstein, and C. S. Lent, “Quantum-dot Cellular Automata,” *Mat. Res. Soc. Symp., Proc.* **Vol. 696** pp. 221-231 (2002).
  131. Q. Hang, Y. Wang, M. Lieberman, and G. H. Bernstein, “Selective Deposition of Molecules through Polymethylmethacrylate Patterns Defined by Electron Beam Lithography,” poster presented at the *10<sup>th</sup> Foresight Conf. on Molecular Nanotechnology*, Bethesda, October, 2002.
  132. J. Wu and G. H. Bernstein, “An inlaid electroplated copper coil for implanted and MEMS applications,” presented at the *AVS Prairie Chapter 2002 Meeting*, Chicago, October, 2002.

133. G. Csaba, A. Imre, G. H. Bernstein, W. Porod, and V. Metlushko, "Signal Processing with Coupled Ferromagnetic Dots," presented at the *IEEE-Nano 2002 Conf.*, Washington D.C., August, 2002.
134. G. H. Bernstein, J. B. Brockman, P. M. Kogge, G. L. Snider, and B. M. Walvoord, "From Bits to Chips: A Multidisciplinary Curriculum for Microelectronics System Design Education," presented at the *Proc. ASEE IL/IN Sectional Conf. Engineering Education in a Changing Economy*, pp. 24-27 (2002).
135. M. Lieberman, X. Wang, W. Hu, R. Rajagopal, M. Jiang, G. L. Snider and G. H. Bernstein, "Formation, characterization, and sub-50 nm patterning of organosilane monolayers with embedded disulfide bonds," presented at the *224<sup>th</sup> Meeting of the American Chemical Society*, Boston, MA, August, 2002.
136. M. Lieberman, S. Chellamma, Y. Wang, Q. Hang, G. H. Bernstein, and C. S. Lent, "Molecules and Supramolecular Arrays for Quantum-dot Cellular Automata," presented at the *224<sup>th</sup> Meeting of the American Chemical Society*, Boston, 2002.
137. G. Csaba, A. Imre, G. H. Bernstein, W. Porod, and V. Metlushko, "Nanocomputing by Field-Coupled Nanomagnets," presented at the *2002 IEEE Silicon Nanoelectronics Workshop*, Honolulu, HI, June, 2002.
138. A. O. Orlov, R. Kumamuru, R. Ramasubramaniam, C. S. Lent, G. H. Bernstein, and G. L. Snider, "Clocked quantum-dot cellular automata devices," presented at the *10<sup>th</sup> International Symposium: Nanostructures: Physics and Technology*, St. Petersburg, Russia, June, 2002.
139. A. O. Orlov, R. Kumamuru, R. Ramasubramaniam, C. S. Lent, G. H. Bernstein, and G. L. Snider, "Clocked Quantum-dot Cellular Automata Shift Register," presented at the *7th International Conference on Nanometer-scale Science and Technology*, Malmö, Sweden, June, 2002.
140. X. Wang, M. Lieberman, R. Ramasubramaniam, W. Hu, G. H. Bernstein, and G. L. Snider, "Ultra-Thin Resist Based on Self-Assembled Monolayer for Electron-Beam Lithography and AFM Anodization," presented at the *46th Intl. Conf. On Electron, Ion and Photon Beam Technology & Nanofabrication*, Anaheim, May, 2002.
141. Q. Hang, Y. Wang, M. Lieberman, and G. H. Bernstein, "Selective Deposition of Molecules through Polymethylmethacrylate Patterns Defined by Electron Beam Lithography," poster presented at the *46th Intl. Conf. On Electron, Ion and Photon Beam Technology & Nanofabrication*, Anaheim, May, 2002.
142. W. Hu, T. Orlova, and Gary H. Bernstein, "Technique for Preparation of Precise Wafer Cross-Sections and Applications to EBL of PMMA Resist," poster presented at the *46th Intl. Conf. On Electron, Ion and Photon Beam Technology & Nanofabrication*, Anaheim, May, 2002.
143. G. H. Bernstein, J. B. Brockman, P. M. Kogge, G. L. Snider, and B. M. Walvoord, "From Bits to Chips: A Multidisciplinary Curriculum for Microelectronics System Design Education," presented at the *ASEE IL/IN Sectional Conf. Engineering Education in a Changing Economy*, Chicago, April, 2002.
144. R. Kumamuru, A. Orlov, R. Rajagopal, C. Lent, G. Bernstein, G. L. Snider, "Operation of a Multi-Stage Shift Register in Quantum-dot Cellular Automata," presented at the *American Physical Society March Meeting*, Indianapolis, March, 2002.
145. **(Invited)** G. L. Snider, A. O. Orlov, R. K. Kumamuru, R. Ramasubramaniam, I. Amlani, G. H. Bernstein, C. S. Lent, J. L. Merz, and W. Porod, "Quantum-dot Cellular Automata: Introduction and Experimental Overview," presented at the *IEEE-Nano 2001*, Maui, HI, October, 2001.
146. A. O. Orlov, R. K. Kumamuru, R. Ramasubramaniam, C. S. Lent, G. H. Bernstein, and G. L. Snider, "Clocked Quantum-dot Cellular Automata Devices: Experimental Studies," presented at the *IEEE-Nano 2001*, Maui, HI, October, 2001.
147. R. K. Kumamuru, A. O. Orlov, G. Toth, J. Timler, R. Rajagopal, C. S. Lent, G. H. Bernstein, and G. L. Snider, "Power Gain in a Quantum-dot Cellular Automata (QCA) Shift Register," presented at the *IEEE-Nano 2001*, Maui, HI, October, 2001.
148. D. H. Chow, J. N. Schulman, P. Fay, J. Lu, Y. Xu, G. H. Bernstein, A. Gonzalez, P. Mazumder, E. T. Croke, H. L. Dunlap, K. S. Holabird, M. A. Morgan, and S. Weinreb, "Interband Tunneling Diodes for High Performance Electronics and Millimeter Wave Detection," presented at the *Third*

- Workshop on the Fabrication, Characterization, and Applications of 6.1 Å III-V Semiconductors*, Snowbird, UT, 2001.
149. J. Wu, V. Quinn, and G. H. Bernstein, "A Simple, Wireless Powering Scheme for MEMS Devices," presented at the *Micromachining and Microfabrication 2001*, San Francisco, October, 2001.
  150. J. Pei, X. Li, M. Lieberman, and G. H. Bernstein, "Interdigitated Microelectrodes Yield Better Sensitivity and Response Time for Polymer Composite Sensors," poster presented at the *Second Annual BioMEMS and Biomedical Nanotechnology World, 2001*, Columbus, OH, September, 2001.
  151. P. Fay, Y. Xu, G. H. Bernstein, A. Gonzalez, P. Mazumder, D. H. Chow, and J. N. Schulman, "A Flip-Flop Based on Monolithic Integration of InAs/AlSb/GaSb RITDs and InAlAs/InP HEMTs," presented at the *59<sup>th</sup> Device Research Conf.*, Notre Dame, IN, June, 2001.
  152. R. Kummamaru, A. O. Orlov, J. P. Timler, R. Ramasubramaniam, C. S. Lent, G. H. Bernstein, and G. L. Snider, "A Quantum-dot Cellular Automata Shift Register," presented at the *59<sup>th</sup> Device Research Conf.*, Notre Dame, IN, June, 2001.
  153. J. Wu, G.H. Bernstein, V. Quinn, "A Versatile Power Supply for MEMS Devices," presented at the *AVS Prairie Chapter 2001 Spring Meeting*, May 21, 2001, Evanston, IL, USA.
  154. A. Orlov, R. Kummamuru, R. Ramasubramaniam, G. Toth, C. Lent, G. H. Bernstein, and G. L. Snider, "Experimental Demonstration of a Latch in Clocked Quantum-dot Cellular Automata," presented at the *American Physical Society March Meeting*, Seattle, March, 2001.
  155. R. Kummamuru, A. Orlov, G. Toth, J. Timler, R. Rajagopal, Craig Lent, G. H. Bernstein, and G. L. Snider, "Power Gain in Clocked QCA Devices," presented at the *American Physical Society March Meeting*, Seattle, March, 2001.
  156. M. Lieberman, C. Lent, G. H. Bernstein, F. Peiris, and G. Snider, "Quantum-dot Cellular Automata at a Molecular Scale," presented at the *2000 Molecular Electronics Conf.*, Hilo, HI, December, 2000.
  157. **(Invited)** M. Lieberman, S. Chellamma, B. Varughese, Y. Wang, C. Lent, G. H. Bernstein, G. Snider, and F. Peiris, "Towards Implementation of Molecular QCA," presented at the *2000 United Engineering Foundation Conf. on Molecular Electronics*, Hilo, HI, December, 2000.
  158. **(Invited)** G. H. Bernstein, I. Amlani, C. Lent, J. L. Merz, A. O. Orlov, G. L. Snider, W. Porod, and G. Toth, "Advanced Measurements in Quantum-dot Cellular Automata Systems," presented at the *42nd Electronic Materials Conf.*, Denver, June, 2000.
  159. P. Fay, J. Lu, Y. Xu, G. H. Bernstein, D. H. Chow, J. N. Schulman, H. L. Dunlap, and H. J. De Los Santos, "Monolithic Integration of InAlAs/InGaAs/InP HEMTs and InAs/AlSb/GaSb Resonant Interband Tunneling Diodes (RITDs) for High Speed Integrated Circuits," presented at the *58<sup>th</sup> Annual Device Research Conf.*, Denver, June, 2000.
  160. A. Orlov, G. Toth, I. Amlani, R. Kummamuru, R. Ramasubramaniam, C. Lent, G. H. Bernstein, and G. Snider, "Experimental Studies of Clocked Quantum-dot Cellular Automata Devices," presented at the *58th Annual Device Research Conf.*, Denver, June, 2000.
  161. **(Invited)** G. L. Snider, A. O. Orlov, I. Amlani, R. Kummamuru, G. H. Bernstein, C. S. Lent, W. Porod, and J. L. Merz, "Quantum-dot Cellular Automata," presented at the *197th Meeting of the Electrochemical Society*, Toronto, Ontario, Canada, May, 2000.
  162. **(Invited)** G. H. Bernstein, I. Amlani, C. Lent, J. L. Merz, A. O. Orlov, G. L. Snider, W. Porod, and G. Toth, "Quantum-dot Cellular Automata," plenary talk at the *Hewlett-Packard/Agilent ASIC Designers Workshop*, Monterey, April, 2000.
  163. I. Amlani, A. Orlov, R. Kummamuru, G. H. Bernstein, C. Lent, G. L. Snider, "Charging Diagram of a Leadless Double-dot," presented at the *American Physical Society March Meeting*, Minneapolis, March, 2000.
  164. R. Kummamuru, I. Amlani, Alexei Orlov, G. H. Bernstein, C. Lent, G. L. Snider, "Functional Characterization of a Leadless QCA Cell," presented at the *American Physical Society March Meeting*, Minneapolis, March, 2000.
  165. A. Orlov, I. Amlani, R. Kummamuru, G. Toth, G. H. Bernstein, C. Lent, G. L. Snider, "Experimental Studies of Quasi-Adiabatic Quantum-dot Cellular Automata," presented at the *American Physical Society March Meeting*, Minneapolis, March, 2000.

166. **(Invited)** J. B. Brockman, P. Kogge, G. L. Snider, B. Walvoord, and G. H. Bernstein, "A Multi-disciplinary Curriculum in Integrated Microelectronic Systems," presented at the *IEEE Microelectronic Systems Education Conf.*, Arlington, VA, July, 1999.
167. P. Fay, G. Bernstein, D. Chow, and P. Mazumder, "InAs/AlSb/GaSb Resonant Interband Tunneling Diodes and Heterostructure Field-Effect Transistors for Ultra-High-Speed Digital Circuit Applications," presented at the *1999 Great Lakes Symp. on VLSI*, Ann Arbor, MI, 1999.
168. G. L. Snider, A. O. Orlov, I. Amlani, G. H. Bernstein, C. S. Lent, J. L. Merz, and W. Porod, "Quantum-dot Cellular Automata," presented at the *Intl. Microprocess and Nanotechnology Conf.*, Yokohama, Japan, July, 1999.
169. A. O. Orlov, I. Amlani, C. S. Lent, G. H. Bernstein, and G. L. Snider, "Demonstration of a QCA binary wire," presented at the *American Physical Society March Meeting*, Atlanta, March, 1999.
170. I. Amlani, A. O. Orlov, C. S. Lent, G. L. Snider, and G. H. Bernstein, "Experimental Demonstration of a Functional QCA Cell," presented at the *American Physical Society March Meeting*, Atlanta, March, 1999.
171. G. L. Snider, A. O. Orlov, I. Amlani, G. H. Bernstein, C. S. Lent, J. L. Merz, and W. Porod, "Quantum-dot Cellular Automata," presented at the *Fourth Intl. Symp. on New Phenomena in Mesoscopic Structures*, Kauai, HI, December, 1998.
172. **(Invited)** G. L. Snider, A.O. Orlov, I. Amlani, G.H. Bernstein, C.S. Lent, "Demonstration of a Functional Cell for Quantum-dot Cellular Automata," presented at the *43rd Annual Conf. on Magnetism and Magnetic Materials (MMM98)* Miami, FL, November, 1998.
173. **(Invited)** I. Amlani, A. O. Orlov, G. H. Bernstein, G. L. Snider, G. Toth, C. S. Lent, and W. Porod, "Quantum-Dot Cellular Automata," presented at the *Symp. on Giga Scale Integration Technology at the 35th Annual Technical Meeting of the Society for Engineering Science*, Pullman, Washington, September, 1998.
174. I. Amlani, A.O. Orlov, G.L. Snider, C.S. Lent, W. Porod, and G.H. Bernstein, "Experimental Observation of Electron Switching in a Quantum-dot Cellular Automata Cell," presented at the *ICSM-11 (Intl. Conf. on Superlattices, Microstructures, and Microdevices)*, Egypt, July, 1998.
175. G. H. Bernstein, I. Amlani, A. O. Orlov, and G. L. Snider, "Demonstration of a Functional Quantum-dot Cellular Automata Cell," presented at the *Silicon Nanoelectronics Workshop*, Honolulu, HI, June, 1998.
176. A. O. Orlov, I. Amlani, G. L. Snider, G. H. Bernstein, C. S. Lent, J. L. Merz, and W. Porod, "Quantum-dot Cellular Automata – Experimental Demonstration of a Functional Cell," presented at the *Sixth Intl. Symp. on Nanostructures: Physics and Technology*, St. Petersburg, Russia, June, 1998.
177. I. Amlani, A. O. Orlov, G. L. Snider, and G. H. Bernstein, "Demonstration of a Functional Quantum-dot Cellular Automata Cell," presented at the *42<sup>nd</sup> Intl. Conf. on Electron, Ion, and Photon Beam Technology and Nanofabrication*, Chicago, May, 1998.
178. I. Derenyi, R. D. Astumian, J. M. Ziebarth, and G. H. Bernstein, "AC Separation of Particles by Biased Brownian Motion in a 2D Sieve," poster presented at the *Beckman Institute Symp. on the Frontiers of Mesoscale Systems and Microfabrication*, University of Illinois at Urbana-Champaign, May, 1998.
179. A. O. Orlov, I. Amlani, C. S. Lent, G. H. Bernstein, and G. L. Snider, "Electron Switching Dynamics in Coupled Metal Double-Dots," presented at the *American Physical Society March Meeting*, Los Angeles, CA, March, 1998.
180. I. Amlani, A. O. Orlov, C. S. Lent, G. L. Snider, and G. H. Bernstein, "Experimental Demonstration of a Functional QCA Cell," presented at the *American Physical Society March Meeting*, Los Angeles, CA, March, 1998.
181. **(Invited)** C. S. Lent, W. Porod, J. L. Merz, G. L. Snider, and G. H. Bernstein, "Nanoelectronics Using Quantum-dot Cellular Automata," presented at the *1998 Government Microcircuit Applications Conference - GOMAC'98*, Arlington, Virginia, March, 1998.
182. **(Invited)** G. L. Snider, A. O. Orlov, I. Amlani, G. H. Bernstein, C. S. Lent, J. L. Merz, and W. Porod, "Demonstration of a Functional Cell for Quantum-dot Cellular Automata," presented at the *2<sup>nd</sup> Intl. Workshop on Surfaces and Interfaces of Mesoscopic Devices*, Kaanapali, HI, December,

- 1997.
183. **(Invited)** C. S. Lent, W. Porod, J. L. Merz, G. L. Snider, and G. H. Bernstein, "Quantum-dot Cellular Automata," presented at the *3<sup>rd</sup> Intl. Workshop on Quantum Functional Devices*, Gaithersburg, MD, November, 1997.
  184. G. L. Snider, A. O. Orlov, I. Amlani, G. H. Bernstein, C. S. Lent, J. L. Merz, and W. Porod, "A Functional Cell for Quantum-dot Cellular Automata," presented at the *Intl. Workshop on Nano-Physics and Electronics*, Tokyo, Japan, September, 1997.
  185. X. Pang and G. H. Bernstein, "Electromigration in Ultranarrow Interconnects," presented at the *Fine Line Task Force Meeting*, Blue Mountain Lake, NY, September, 1997.
  186. G. L. Snider, A. O. Orlov, I. Amlani, G. H. Bernstein, C. S. Lent, J. L. Merz, and W. Porod, "Demonstration of a Functional Cell for Quantum-dot Cellular Automata," presented at the *DARPA ULTRA Program Review*, Santa Fe, September, 1997.
  187. **(Invited)** G. L. Snider, A. O. Orlov, I. Amlani, G. H. Bernstein, C. S. Lent, W. Porod, and J. L. Merz, "Experimental Demonstration of Quantum-dot Cellular Automata," presented at the *Adriatic Research Conf. on STM-Based Lithography and Atomic Electronics*, Trieste, Italy, July, 1997.
  188. A. O. Orlov, I. Amlani, G. H. Bernstein, C. S. Lent, J. L. Merz, W. Porod, and G. L. Snider, "Experimental Demonstration of Quantum-dot Cellular Automata," presented at the *1997 Device Research Conf.*, Fort Collins, CO, June, 1997.
  189. G. H. Bernstein, I. Amlani, A. O. Orlov, C. S. Lent, and G. L. Snider, "Si-Compatible Quantum-dot Cellular Automata," presented at the *Silicon Nanoelectronics Workshop*, Kyoto, Japan, June, 1997.
  190. I. Amlani, A. O. Orlov, G. L. Snider, and G. H. Bernstein, "Differential Charge Detection for Quantum-dot Cellular Automata," presented at the *41<sup>st</sup> Intl. Conf. on Electron, Ion, and Photon Beam Technology and Nanofabrication*, Dana Point, CA, May, 1997.
  191. X. Pang, R. Frankovic, and G. H. Bernstein, "Lifetime Study of Sub-Tenth-Micrometer Al-Alloy Interconnects," poster presented at the *Materials Reliability in Microelectronics VII*, Materials Research Society, San Francisco, CA, March, 1997.
  192. I. Amlani, A. O. Orlov, G. L. Snider, and G. H. Bernstein, "Control and Characterization of Single Electron Charging in a Double Dot System," presented at the *American Physical Society March Meeting*, Kansas City, MO, March, 1997.
  193. G. H. Bernstein, J. L. Merz, G. L. Snider, W. Porod, and C. S. Lent, "Silicon Nanoelectronics," presented at the *ARPA ULTRA Program Review*, Estes Park, CO, October 1996.
  194. R. Frankovic and G. H. Bernstein, "Pulsed Current Testing of Al Interconnects," *Fine Line Task Force Meeting*, Blue Mountain Lake, NY, September, 1996.
  195. R. Frankovic and G. H. Bernstein, "In-Situ Observations of Electromigration-Induced Void Dynamics," in *In-Situ Electron and Tunneling Microscopy of Dynamic Processes*, ed. by R. Sharma, M. G.-Josifovska, P. L. Gai, R. Sinclair, and L. J. Whitman, presented at the *MRS Pittsburgh Symposium Proceedings*, no. **404**, p. 163-169 (1996).
  196. R. Frankovic and G. H. Bernstein, "Electromigration Drift and Threshold in Cu Thin-Film Interconnects," presented at the *Fine Line Task Force Meeting*, Blue Mountain Lake, NY, September, 1996.
  197. A. O. Orlov, X. Zuo, G. Bazan, G. H. Bernstein, C. S. Lent, J. L. Merz, W. Porod, and G. L. Snider, "SiGe Quantum-dot Cellular Automata," presented at the *Silicon Nanoelectronics Workshop*, Honolulu, HI, June, 1996.
  198. G. H. Bernstein, G. Bazan, M. Chen, C. S. Lent, J. L. Merz, A. O. Orlov, W. Porod, G. L. Snider, and P. D. Tougaw, "Quantum-dot Cellular Automata: Theory and Experiment," presented at the *Third Intl. Symp. on Nanostructures and Mesoscopic Sys.*, Santa Fe, NM, May, 1996.
  199. G. Bazan, A. O. Orlov, G. L. Snider, and G. H. Bernstein, "Charge Detector Realization for AlGaAs/GaAs Quantum-dot Cellular Automata," poster presented at the *40th Int. Conf. on Electron, Ion, and Photon Beam Technology and Nanofabrication*, Atlanta, GA, May, 1996.
  200. G. H. Bernstein, "Scanning Electron Microscopy, Electron Beam Lithography, and X-Ray Lithography," tutorial, *American Physical Society March Meeting*, St. Louis, March, 1996.

201. R. Frankovic and G. H. Bernstein, "In-Situ Observations of Pre-Patterned Void Interactions Under Electromigration-Induced Stress," presented at the *Materials Reliability in Microelectronics VI*, Materials Research Society, San Francisco, CA, March, 1996.
202. R. Frankovic and G. H. Bernstein, "Duty Cycle and Frequency Effects of Pulsed-dc Currents on Electromigration-Induced Stress in Al Interconnects," presented at the *Materials Reliability in Microelectronics VI*, Materials Research Society, San Francisco, CA, March, 1996.
203. R. Frankovic and G. H. Bernstein, "In-Situ Observations of Electromigration-Induced Void Dynamics," presented at the *Fall Meeting of the Materials Research Society*, Boston, MA, December, 1995.
204. J. L. Merz, G. H. Bernstein, C. S. Lent, G. L. Snider, and W. Porod, "Silicon Nanoelectronics," presented at the *ARPA ULTRA Program Review*, Denver, Colorado, October, 1995.
205. R. Frankovic and G. H. Bernstein, "Grain Structure And Electromigration Testing Of Deep Sub-Micrometer Cu Interconnects," presented at the *Materials Reliability in Microelectronics V*, A. S. Oates, W. F. Filter, R. Rosenberg, A. L. Greer, and K. Gadepally eds. (MRS, Pittsburgh, PA) **391**, pp. 403-408 (1995).
206. G. H. Bernstein, B. Gilbert, W. Williamson, and D. Chow, "RTD Applications in Ultra-High-Speed Digital Logic Gates," presented at the *ARPA ULTRA Program Review*, Denver CO, October, 1995.
207. G. H. Bernstein, "Quantum Cellular Automata," presented at the *Fine Line Task Force Meeting*, Blue Mountain Lake, NY, September, 1995.
208. R. Frankovic and G. H. Bernstein, "Sub-Half-Micron Cu Interconnects," presented at the *Fine Line Task Force Meeting*, Blue Mountain Lake, NY, September, 1995.
209. R. Frankovic and G. H. Bernstein, "Grain Structure And Electromigration Testing Of Deep Sub-Micrometer Cu Interconnects," poster presented at the *Materials Research Society Symp. on Materials Reliability V*, San Francisco, April, 1995.
210. R. E. Bartolo, N. Giordano, X. Huang, And G. H. Bernstein, "Studies of Aharonov-Bohm Oscillations in the Mesoscopic Photovoltaic Effect," presented at the *March Meeting of the American Physical Society*, San Jose, CA, March, 1995.
211. B. Campbell, G. H. Bernstein X. Huang, and G. Bazan, "A Novel Method for Producing Nanostructures in Silicon Inversion Layers," presented at the *Third Intl. Conf. on Nanometer-Scale Science and Technology*, Denver, CO, October, 1994.
212. W. Porod, C. S. Lent, and G. H. Bernstein, "Quantum Cellular Automata," presented at the *ARPA ULTRA Program Review*, Boulder, Colorado, October, 1994.
213. B. Campbell, G. H. Bernstein X. Huang, and G. Bazan, "A Novel Method for Producing Nanostructures in Silicon Inversion Layers," presented at the *American Physical Society March Meeting*, Pittsburgh, PA, March, 1994.
214. R. E. Bartolo, X. Huang, N. Giordano, and G. H. Bernstein, "Observation of Aharonov-Bohm Oscillations in the Mesoscopic Photovoltaic Effect," presented at the *American Physical Society March Meeting*, Pittsburgh, PA, March, 1994.
215. R. Frankovic and G. H. Bernstein, "Electromigration Testing of Ultra-Narrow Al Interconnects," presented at the *March American Physical Society March Meeting*, Pittsburgh, PA, March, 1994.
216. R. R. Schultz, H. M. Zayed, R. L. Stevenson, R. J. Minniti, and G. H. Bernstein, "ASIC Design for Robust Signal and Image Processing," presented at the *Great Lakes Symp. on VLSI*, Notre Dame, IN, November, 1994.
217. G. Bazan and G. H. Bernstein, "Nanolithography over Very Large Scan Fields," poster presented at the *Great Lakes Symp. on VLSI*, Notre Dame, IN, November, 1993.
218. X. Huang, G. Bazan, and G. H. Bernstein, "Proximity Effects in Ultradense Patterns Exposed by Electron Beam Lithography," poster presented at the *Great Lakes Symp. on VLSI*, Notre Dame, IN, November, 1993.
219. W. Porod, C. S. Lent, and G. H. Bernstein, "Quantum Cellular Automata," presented at the *ARPA ULTRA Program Review*, Santa Fe, October, 1993.
220. **(Invited)** C. S. Lent, P. D. Tougaw, W. Porod, and G. H. Bernstein, "Quantum Cellular Automata," presented at the *Midwest Solid State Theory Symp.*, Detroit, MI, October, 1993.

221. G. H. Bernstein, X. Huang, G. Bazán, D. A. Hill, C. S. Lent, and W. Porod, "New Technique for Computation and Challenges for Electron Beam Lithography," poster presented at the *37th Int. Conf. on Electron, Ion, and Photon Beam Technology and Nanofabrication*, San Diego, CA, June, 1993.
222. C. S. Lent, P. D. Tougaw, W. Porod, and G. H. Bernstein, "Quantum Cellular Automata," presented at the *Int. Workshop on Quantum Structures*, Santa Barbara, CA, March, 1993.
223. C. S. Lent, P. D. Tougaw, W. Porod, and G. H. Bernstein, "Quantum Cellular Automata," presented at the *Int. Symp. on New Phenomena in Mesoscopic Structures*, Hawaii, December, 1992.
224. G. H. Bernstein, D. A. Hill, X. Huang, and G. Bazán, "Failure Mechanisms of Very Narrow PMMA Walls," presented at the *39th National Symp. of the American Vacuum Society* Chicago, IL, November, 1992.
225. G. Bazán and G. H. Bernstein, "Electron Beam Lithography Over Large Scan Fields," presented at the *39th National Symp. of the American Vacuum Society*, Chicago, IL, November, 1992.
226. R. Frankovic and G. H. Bernstein, "Observation of Current-Induced Failures of Ultra-Narrow Metal Interconnects," poster presented at the *39th National Symp. of the American Vacuum Society*, Chicago, IL, November, 1992.
227. R. E. Bartolo, N. Giordano, X. Huang, and G. H. Bernstein, "Giant Oscillations in Mesoscopic Photovoltaic Effect," poster presented at the *40th Midwest Solid State Conf.*, Urbana-Champaign, IL, October, 1992. (Judged Second-Best Poster at Conference.)
228. G. H. Bernstein and X. Huang, "Fabrication of Interconnect Structures for Quantum Based Architectures," presented at the *American Physical Society March Meeting*, Indianapolis, IN, March, 1992.
229. S. Subramaniam, S. Bandyopadhyay, B. Das, and G. H. Bernstein, "Anomalous Magnetoresistance due to Possible Correlations Between Impurity Scattering Events in a Two-Dimensional Electron Gas," presented at the *American Physical Society March Meeting*, Indianapolis, IN, March, 1992.
230. W. Porod, H. K. Harbury, and G. H. Bernstein, "A Study of Cellular Automata Architectures for Integrated Quantum Device Arrays Using the Helmholtz Equations as a Computational Model," presented at the *American Physical Society March Meeting*, Indianapolis, Indiana, March, 1992.
231. X. Huang, S. Subramaniam, G. H. Bernstein, and S. Bandyopadhyay, "Low Temperature Magnetotransport in Ultranarrow/Ultrashort Au Wires," presented at the *American Physical Society March Meeting*, Indianapolis, IN, March, 1992.
232. B. Das, S. Subramaniam, G. H. Bernstein, S. Bandyopadhyay, and M. R. Melloch, "Study of Leakage Currents in Backgated GaAs/AlGaAs Heterostructure Devices Fabricated Using Electron Beam Lithography," presented at the *American Physical Society March Meeting*, Indianapolis, IN, March, 1992.
233. P. D. Tougaw, C. S. Lent, W. Porod, and G. H. Bernstein, "Cellular Automata Rules Derived from Quantum Dot Coupling," presented at the *American Physical Society March Meeting*, Indianapolis, IN, March 1992.
234. W. Porod, H. K. Harbury, and G. H. Bernstein, "A Study of Cellular Automata Architectures for Integrated Quantum Device Arrays Using the Helmholtz Equations as a Computational Model," presented at the *American Physical Society March Meeting*, Indianapolis, IN, March, 1992.
235. G. H. Bernstein and D. A. Hill, "On the Attainment of Optimum Development Parameters for PMMA Resist," poster presented at the *Int. Symp. on Nanostructures and Mesoscopic Systems*, Santa Fe, NM, May, 1991.
236. N. M. Jisrawi, S. J. Koester, Q. Lu, M. J. Honkanen, W. Porod, G. H. Bernstein, and S. T. Ruggiero, "Microwave Studies of Single Electron Charging Effects," presented at the *American Physical Society March Meeting*, Cincinnati, OH, March, 1991.
237. G. H. Bernstein and A. M. Kriman, "A Novel Electron Diffraction Transistor," presented at the *SPIE Symp. on Adv. in Semic. and Superconductors: Physics Toward Device Applications*, San Diego, CA, March, 1990.
238. G. H. Bernstein and A. M. Kriman, "Electron-Diffraction Transistors," presented at the *Twelfth Biennial Conf. on Advanced Concepts in High Speed Semiconductor Dev. and Circ.*, Ithaca, NY, August, 1989.
239. S. Krause, J. Mohr, G. Bernstein, D. K. Ferry and D. C. Joy, "A New Method for Measuring the

- Thickness of Thin Film Insulators,” presented at the 14<sup>th</sup> Mtg. of the Microbeam Analysis Soc., Asheville, NC, August, 1989.
240. R. Puechner, J. Ma, R. Mezzener, W. P. Liu, A. M. Kriman, G. N. Maracas, G. Bernstein, D. K. Ferry, P. Chu, H. H. Wieder, and P. Newman, “Magnetoconductance in Lateral Surface Superlattices,” presented at the *Fourth Int. Conf. on Modulated Semiconductor Structures*, Ann Arbor, MI, July, 1989.
  241. S. Bandyopadhyay, G. H. Bernstein, and W. Porod, “Quantum Devices Based on Phase-Coherent Lateral Transport,” poster presented at the *Int. Symp. on Nanostructure Physics and Fabrication*, College Station, TX, March, 1989.
  242. A. M. Kriman and G. H. Bernstein, “The QUADFET - A Novel Quantum Device,” presented at the *AFOSR Workshop on Quantum Devices*, Atlanta, GA, October, 1988.
  243. M. N. Kozicki, Y. N. Khawaja, J. L. Edwards, B. Qurashi, G. Bernstein, and A. E. Owen, “Alternative Materials and Processes for Integrated Optics,” presented at the *Fall meeting of the Electrochemical Society*, Chicago, IL, October, 1988.
  244. D. K. Ferry, G. Bernstein, R. Puechner, J. Ma, A. M. Kriman, R. Mezzener, W. P. Liu, G. N. Maracas, and R. Chamberlin, “Magnetoconductance in Lateral Surface Superlattices,” presented at the *Int. Conf. on the Applications of High Magnetic Fields in Semiconductors*, Wurzburg, Germany, August, 1988.
  245. A. M. Kriman, G. H. Bernstein, B. S. Haukness, and D. K. Ferry, “Analysis of Electron Diffraction in a Novel Field-Effect Transistor,” *4th Int. Conf. on Superlattices, Microstructures and Microdevices*, Trieste, Italy, August, 1988.
  246. G. Bernstein, W. P. Liu, Y. N. Khawaja, M. N. Kozicki, D. K. Ferry, and L. Blum, “High Resolution Electron Beam Lithography with Negative Organic and Inorganic Resists,” presented at the meeting of the *Society of Photo-Optical Instrumentation Engineers*, Fort Lauderdale, FL, May, 1988.
  247. D. K. Ferry, G. Bernstein, and W. P. Liu, “Electron Beam Lithography of Ultra-Submicron Devices,” Fifth Intl. Winter School on New Developments in Solid State Physics, presented at the *Physics and Technology of Submicron Structures*, Mauterndorf, Austria, February, 1988.
  248. **(Invited)** G. Bernstein, N. C. Kluksdahl, and D. K. Ferry, “BlochFETs and Other Tunneling Heterostructure Devices,” presented at the *Conf. on Adv. Heterostructure Transistors*, Keauhou-Kona, HI, 1988.
  249. R. Puechner, A. M. Kriman, G. Bernstein, J. Ma, W. P. Liu, D. K. Ferry, and G. N. Maracas, “Conductance Oscillations in Lateral Surface Superlattices,” presented at the *Inst. of Phys. Conf. Ser. No. 96: Chapt. 9, Intl. Symp. on GaAs and Related Compounds*, pp. 581-586, IOP Publishing Ltd., Bristol, England (1988).
  250. G. Bernstein and D. K. Ferry, “Negative Differential Conductivity in Lateral Surface Superlattices,” poster presented at the *14th Annual Conf. on the Physics and Chemistry of Semiconductor Interfaces*, Salt Lake City, UT, January, 1987.
  251. G. Bernstein and D. K. Ferry, “Fabrication of Ultra-Short Gate MESFETs and Nanostructures by Electron Beam Lithography,” presented at the *Second Int. Conf. on Superlattices, Microstructures and Microdevices*, Goteborg, Sweden, August, 1986.
  252. G. Bernstein and D. K. Ferry, “Fabrication of Short-Gate GaAs MESFETs by Electron Beam Lithography,” poster presented at the *Les Houches Winter School*, Les Houches, France, April, 1986.
  253. G. H. Bernstein and D. K. Ferry, “E-Beam Lithography - Materials Processing and Characterization,” presented at the *22nd Annual Workshop on Compound Semiconductor Microwave Materials and Devices*, San Francisco, CA, February, 1986.
  254. G. Bernstein and D. K. Ferry, “Electron Beam Lithographic Fabrication of Ultra-Submicron Gate GaAs MESFETs,” presented at the *Workshop on Ultrasmall and Quantum-Structured Devices*, Tempe, AZ, December, 1985.

#### Other Invited Talks and Seminars

1. D. Kopp, W. Buckhanan, M. A. Khan, J. Kulick, C. Liang, M. Padberg, R. Savino, P. Fay, and G. H. Bernstein, “Quilt Packaging of RF Systems with Ultrawide Bandwidths,” presented at the Indiana RF Alliance Workshop, W. Lafayette, IN, April, 2010.
2. G. H. Bernstein, “Quilt Packaging – An Ultrahigh Performance Interchip Interconnect,” presented at

- Air Force Research Laboratory, Albuquerque, NM, February, 2010.
3. G. H. Bernstein, J. B. Brockman, P. Fay, and G. Snider, "Ultrawide-Bandwidth Contiguous Superconnects for Advanced Computing Systems," poster presented at the DoD Advanced Computing Systems Workshop, Annapolis, MD, September, 2009.
  4. G. H. Bernstein, "Computing with Nanomagnets," presented at Army Research Laboratory, Adelphi, MD, June, 2009.
  5. G. H. Bernstein, "RF Research at Notre Dame," presented at the Indiana RF Alliance Workshop, Indianapolis, May, 2008.
  6. G. H. Bernstein and P. Fay, "Quilt Packaging," Sandia National Laboratory, August, 2007.
  7. G. H. Bernstein, Q. Liu, J. Kulick, W. Buckhanan, A. Tong, G. Snider, and P. Fay, "Interchip Interconnects and Transistorless Computing," University of Tennessee at Knoxville, Knoxville, TN, March, 2007.
  8. G. H. Bernstein, Q. Liu, J. Kulick, W. Buckhanan, A. Tong, G. Snider, and P. Fay, "Interchip Interconnects and Transistorless Computing," University of Alabama in Huntsville, February, 2007.
  9. G. H. Bernstein, Q. Liu, J. Kulick, W. Buckhanan, A. Tong, G. Snider, and P. Fay "Interchip Interconnects and Transistorless Computing," University of Texas at Dallas, Dallas, TX, January, 2007.
  10. G. H. Bernstein, Q. Liu, Z. Sun, A. Tong, G. Snider, and P. Fay, "Quilt Packaging: A New Paradigm in Interchip Communications," Raytheon Corporation, Santa Barbara, CA, February, 2006.
  11. G. H. Bernstein, "Quantum-dot Cellular Automata: Computing by Field Polarization," Old Dominion University, March, 2005
  12. G. H. Bernstein, P. Fay and Q. Liu, "Quilt Packaging: A New Paradigm in Heterogeneous Integration," Cray, Inc., Chippewa Falls, WI, December, 2004.
  13. G. H. Bernstein and J. Wu, "Inductively Coupled Deep Brain Stimulator," IBM Industry Solutions Lab, Hawthorne, NY, October, 2004.
  14. G. H. Bernstein, "Nanotechnology: How Far Can We See?," keynote address to the 56<sup>th</sup> Annual Indiana Academy of Science Talent Search, Kokomo, Indiana, October, 2003.
  15. G. H. Bernstein, "Quantum-dot Cellular Automata: Toward Molecular Electronics," Oak Ridge National Laboratory, Oak Ridge, Tennessee, July, 2003.
  16. G. H. Bernstein, "Applications of Electron Beam Lithography to Nanoelectronics Research," Rose Hulman Institute of Technology, March, 2003.
  17. G. H. Bernstein, "Applications of MEMS Technology," Rose Hulman Institute of Technology, February, 2002.
  18. G. H. Bernstein, "Applications of Electron Beam Lithography to Nanoelectronics Research," Duke University, October, 2001.
  19. G. H. Bernstein, "Electronics: Past, Present, and Future," Forever Learning Seniors Group, South Bend, IN, October, 2001.
  20. G. H. Bernstein, "Electron Beam Lithography and Applications to Nanofabrication," Illinois Institute of Technology, Chicago, October, 2001.
  21. G. H. Bernstein, "Applications of Electron Beam Lithography to Nanoelectronics Research," University of California San Diego, March, 2001.
  22. G. H. Bernstein, I. Amlani, C. Lent, J. L. Merz, A. O. Orlov, G. L. Snider, W. Porod, and G. Toth "Digital Logic and Switching in a Quantum-dot Cellular Automata Cell," University of Connecticut, Storrs, November, 2000.
  23. G. H. Bernstein, I. Amlani, C. Lent, J. L. Merz, A. O. Orlov, G. L. Snider, W. Porod, and G. Toth, "Quantum-dot Cellular Automata," Intel Corp., Chandler, AZ, August, 2000.
  24. G. H. Bernstein, I. Amlani, C. Lent, J. L. Merz, A. O. Orlov, G. L. Snider, W. Porod, and G. Toth, "Quantum-dot Cellular Automata," Motorola, Tempe, AZ, August, 2000.
  25. G. H. Bernstein, I. Amlani, C. Lent, J. L. Merz, A. O. Orlov, G. L. Snider, W. Porod, and G. Toth, "Quantum-dot Cellular Automata," Intel Corp., Hillsboro, OR, May, 2000.
  26. "University/Industry Relations: My Perspective," presented to the Advisory Council of the Graduate School, University of Notre Dame, September, 1999.
  27. "Experimental Demonstration of Operational QCA Cell," University of Wisconsin, Madison, March,

- 1998.
28. "Demonstration of QCA Cell Operation," Graduate Seminar Series, Department of Chemistry, University of Notre Dame, Notre Dame, IN, February, 1998.
  29. "Design and Fabrication of RTD-Base Logic Gates Operating at 12-GHz," University of Wisconsin, Madison, April, 1996.
  30. "Design and Fabrication of RTD-Base Logic Gates Operating at 12-GHz," State University of New York, Buffalo, April, 1996.
  31. "Electromigration Testing Of Deep Sub-Micrometer Interconnects," R. Frankovic and G. H. Bernstein, Rome AFB, Rome, NY, September, 1995.
  32. "Aspects of Electron Beam Lithography for Nanostructure Fabrication," Rice University, Houston, TX, May, 1995.
  33. "Aspects of Electron Beam Lithography for Nanostructure Fabrication," Purdue University, West Lafayette, IN, December, 1994.
  34. "Aspects of Electron Beam Lithography for Nanostructure Fabrication," Raytheon, Inc., Andover, MA, September, 1994.
  35. "Microelectronics at the University of Notre Dame," Meeting of the Indiana Electronics Manufacturers Association, South Bend, IN, September, 1994.
  36. "Resonant Tunneling Diode Based Logic Circuits," Motorola, Inc., Tempe, AZ, June, 1994.
  37. "Nanofabrication," local chapter of the American Chemical Society, South Bend, IN, April, 1994.
  38. "Nanostructure Fabrication by Electron Beam Lithography," Wayne State University, Detroit, MI, December, 1992.
  39. "Nanostructure Fabrication by Electron Beam Lithography," State University of New York, Buffalo, NY, September, 1992.
  40. "Microelectronics Education at Notre Dame," sectional meeting of the Intl. Society of Hybrid Microelectronics, South Bend, IN, March, 1992.
  41. "Nanostructure Fabrication," Miles Laboratories, Elkhart, IN, August, 1991.
  42. "Electron Beam Lithography," IBM, Burlington, VT, March, 1991.
  43. "Nanostructure Electronics at Notre Dame," U. S. Army Electronics Technology and Devices Laboratory, Fort Monmouth, NJ, September, 1989.
  44. "Electron Beam Lithographic Fabrication of Nanometer Structures," Texas Instruments, Dallas, TX, February, 1988.
  45. "Electron Beam Lithography," Purdue University, West Lafayette, IN, March, 1987.
  46. "Electron Beam Lithographic Fabrication of Ultra-Submicron Gate GaAs MESFETs and Quantum Devices," Hewlett-Packard Microwave Technology Division, Santa Rosa, CA, April, 1986.
  47. "Electron Beam Lithographic Fabrication of Ultra-Submicron Gate GaAs MESFETs and Quantum Devices," Army Electronics Technology and Devices Laboratory, Fort Monmouth, NJ, April, 1986.
  48. "Electron Beam Lithographic Fabrication of Ultra-Submicron Gate GaAs MESFETs and Quantum Devices," IBM T. J. Watson Research Laboratory, Yorktown Heights, NY, April, 1986.
  49. "Electron Beam Lithographic Fabrication of Ultra-Submicron Gate GaAs MESFETs and Quantum Devices," IBM, Endicott, NY, April, 1986.
  50. "Electron Beam Lithographic Fabrication of Ultra-Submicron Gate GaAs MESFETs and Quantum Devices," IBM, East Fishkill, NY, April, 1986.
  51. "Electron Beam Lithographic Fabrication of Ultra-Submicron Gate GaAs MESFETs and Quantum Devices," Motorola Semiconductor Research and Development Laboratory, Phoenix, AZ, April, 1986.
  52. "Electron Beam Lithographic Fabrication of Ultra-Submicron Gate GaAs MESFETs and Quantum Devices," MIT Lincoln Laboratory, Lexington, MA, April, 1986.
  53. "Electron Beam Lithographic Fabrication of Ultra-Submicron Gate GaAs MESFETs and Quantum Devices," Lawrence Livermore Laboratory, Livermore, CA, March, 1986.
  54. "Electron Beam Lithographic Fabrication of Ultra-Submicron Gate GaAs MESFETs and Quantum Devices," Hewlett-Packard, Fort Collins, CO, March, 1986.
  55. "Electron Beam Lithographic Fabrication of Ultra-Submicron Gate GaAs MESFETs and Quantum Devices," General Electric Electronics Laboratory, Syracuse, NY, January, 1986.

56. "Electron Beam Lithographic Fabrication of Ultra-Submicron Gate GaAs MESFETs and Quantum Devices," Jet Propulsion Laboratory, Pasadena, CA, January, 1986.
57. "Electron Beam Lithographic Fabrication of Ultra-Submicron Gate GaAs MESFETs and Quantum Devices," Naval Research Laboratory, Washington, D.C., January, 1986.
58. "Electron Beam Lithography of Ultra-Submicron Gate GaAs FETs at ASU," Arizona State University, Tempe, AZ, December, 1985.
59. "Ge/Au/Ni Ohmic Contacts to GaAs," Motorola Semiconductor Research and Development Laboratory, Phoenix, AZ, July, 1983.