

CURRICULUM VITAE

Theresa Stellwag Mayer

Associate Dean for Research and Innovation, College of Engineering
Distinguished Professor, Electrical Engineering and Materials Science and Engineering
The Pennsylvania State University,
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Education

Ph.D., Electrical Engineering, Purdue University, West Lafayette, IN, 1993
M.S., Electrical Engineering, Purdue University, West Lafayette, IN, 1989
B.S., Electrical Engineering, Minor, Mathematics, Va Tech, Blacksburg, VA, 1988

Professional Experience

Associate Dean for Research and Innovation, Pennsylvania State University, 2014 – present

Leads the College of Engineering Research and Innovation Office that supports 265 faculty, 70 research associates, 80 postdoctoral scholars, and >1300 graduate students with a diverse research portfolio that exceeded \$130M in expenditures in FY14. Responsible for defining and implementing the 5-year college research and innovation strategic plan goals to: increase research expenditures and multidisciplinary center-level programs; enhance national and global research impact; build new strategic industry partnerships; create a culture for innovation and entrepreneurship; and support research administration and compliance.

- Research and faculty development initiatives: Innovation Grants for multi-disciplinary seed programs; Entrepreneurship Grants for proof-of-concept technology demonstrations and proof-of-relevance market evaluations with Smeal College of Business; Research Instrument Grants for multi-investigator capital equipment; Young Investigator Workshops to enhance proposal preparation, leadership, and communication skills.
- Representative on university-level research and innovation committees: limited submission proposals and faculty awards; intellectual property selection committee; corporate and foundation relations council; university health sciences research council; industry partnership working group; Invent Penn State Innovation Fund executive committee.
- Oversees college research administration team responsible for pre-award processing, post-award management, cost-sharing, financial and regulatory compliance.
- Supports technical and administrative development of multidisciplinary center proposals.
- Increasing college-level industry engagement through strategic research partnerships, student internships and professional development, and philanthropic donations.
- Engaging college alumni to develop new industry partnerships and to assist in technology transition and entrepreneurship activities.
- Enhancing the innovation ecosystem to support faculty and graduate student education and engagement in intellectual property, commercialization, and start-up formation.
- Implementing an updated college-level research marketing strategy and web portal.
- Assisting with cross-college and college-institute co-funded faculty recruiting and hiring.

Distinguished Professor, Electrical Engineering, Pennsylvania State University, 2012 – present

Professor, Materials Science and Engineering, Pennsylvania State University, 2009 – present

Associate Director, Materials Research Institute, Pennsylvania State University, 2006 – 2014

Directed (co-directed after 2012) the campus-wide Nanofabrication Laboratory and served as the Director of the Penn State Site of the National Science Foundation-funded National Nanotechnology Infrastructure Network (NNIN). The Laboratory operated with 10 staff members, and it supported an average of 45 faculty investigators, 275 graduate students and post-docs, and over 100 external industry users. Developed and implemented strategic plan; led move to 18,000 sq. ft. cleanroom and support space in Millennium Science Complex; managed >\$1.3M annual operating budget with average >\$1M annual capital equipment budget.

Professor, Electrical Engineering, Pennsylvania State University, 2006 – 2012

Associate Professor, Electrical Engineering, Pennsylvania State University, 1999 – 2005

Assistant Professor, Electrical Engineering, Pennsylvania State University, 1994 – 1999

Research Assistant, Purdue University, 1988 – 1993

Engineering Co-op Staff Member, Allied-Signal, Inc., 1986 – 1988

Awards and Honors

CIC Academic Leadership Program Fellow, 2015

Outstanding Research Award, Penn State Engineering Society, 2009

AdvanceVT Scholar, 2006

Secret-Level Security Clearance, Penn State Applied Research Laboratory, 2006

Outstanding Teaching Award, Penn State Engineering Society, 2000

NSF CAREER Award, 1995

Kodak Fellow, 1991-1993

Violet B. Haas Award for the Advancement of Women, 1993.

Eta Kappa Nu

Tau Beta Pi

Professional Society Leadership

Institute of Electrical and Electronic Engineers (IEEE)

IEEE International Electron Device Meeting (IEDM)

Program Committee: Sensors, MEMS, and BioMEMS, 2015 – present

IEEE Electron Devices Society (EDS)

Education Award Committee, 2007 – present

IEEE Device Research Conference (DRC)

Board Member, 2007 – 2015

General Chair, 2005 – 2006

Technical Program Chair, 2004 – 2005

Technical Program Vice Chair, 2003 – 2004

Technical Program Committee Member, 2001 – 2003

Organizer, Best Student Paper Award, 2001 – 2003

IEEE International Symposium on Compound Semiconductors (ISCS)

Technical Program Committee Member 1997, 2000

Epitaxy and In-Situ Processing Subcommittee, 1997

Materials Integration Subcommittee, 2000

IEEE Conference on Lasers and Electro-optics (CLEO)

Technical Program Committee Member, 1998 – 2000

Optics and Sensors Subcommittee, 1998 – 1999
 Optics and Sensors Subcommittee Chair, 1999 – 2000

American Vacuum Society (AVS)

Electronic Materials and Processing Division
 Executive Committee, 2010 – 2013

Materials Research Society (MRS)

Materials Research Society Meetings
 Symposium Organizer, Nanowire Electronics, 2008, 2014

Gordon Research Conferences (GRC)

Gordon Research Conference on Nanostructure Fabrication
 Chair, 2004 – 2006
 Chair Elect, 2002 – 2004
 Gordon Research Conference Council Member, 2004 – 2006

The Minerals, Metals, and Materials Society (TMS/AIME)

Electronic Materials Conference
 Treasurer, 2003 – 2005
 Organizer, Best Student Paper Award 2003 – 2005
 Elected Committee Member, 1999 – 2010
 Technical Program Committee Member, 1997, 2010 – 2012

United Engineering Foundation (UEF)

Molecular-Scale Electronics Conference
 Vice-Chair, 2003

External Review Committees and Advisory Boards

NSF Nanoelectronics Computation Network (NCN and NanoHUB)

Advisory Board Member, 2012 – present

University of Michigan Lurie Nanofabrication Facility

External Evaluation Committee, 2013

Midwest Institute for Nanoelectronics Discovery

Executive Committee Member, 2007 – 2012

Department of Energy, Office of Science

Center for Integrated Nanotechnologies, Budget Review Panel, 2014
 Department of Energy STTR/SBIR Proposal Review, 2004, 2007

National Science Foundation Panel Reviews

Unsolicited Proposal Reviews, 1995 – present
 Scalable Nanomanufacturing Panel, 2013
 MRSEC White Paper and Reverse Site Visit Panel, 2011
 Johns Hopkins/Howard PREM Site Visit Panel, Washington, DC, 2009
 UMass NSEC Reverse Site Visit Panel, Amherst, MA, 2008
 Major Research Instrumentation Panel, 2006, 2007, 2013
 UVA MRSEC Reverse Site Visit Panel, Charlottesville, VA, 2003
 Columbia NSEC Reverse Site Visit Panel, New York, NY, 2003

Harvard NSEC Reverse Site Visit Panel, Boston, MA, 2003
 MIT MRSEC Reverse Site Visit Panel, Boston, MA, 2000
 CAREER Program Panel, 2000
 Small Business Innovative Research (SBIR) Initiative Panel, 1996, 1998, 1999
 Optical Science and Engineering Pre-proposal Panel, 1996
 NSF-EPSC Joint Collaborative Program Panel, 1995

National Institutes of Health Study Sections

Small Business: Instrumentation, Environmental, and Occupational Safety, 2015
 Instrument and Systems Development Study Section, 2008

Journal Reviews, last 5 years

Science, Nature, Nature Nanotechnology, Nature Communications, Nanoletters, ACS Nano, Advanced Materials, Electron Device Letters, Journal of American Chemical Society, Chemistry of Materials, Journal of Electronic Materials, Optics Letters.

Journal and Proceeding Editorships

Co-Editor, Symposium Proceedings on “Nanowire Electronics,” Materials Research Society Meeting, 2008, 2011
 Editor, Symposium Proceedings on “Self and Directed Assembly,” Materials Research Society Meeting, 2007.
 Co-Editor, Special Issue on “Compliant and Alternative Substrates,” Journal of Electronic Materials, 1999.

Major Service to the University

University Park Campus

Vice President for Research

Chair, University Research Council, 2015 – 2016
 Chair, Industry Contract Negotiation Task Force, 2015 – present
 Member, University Research Council, 2014 – present
 Member, University Health Sciences Council, 2014 – present
 Member, Corporate and Foundation Relations Working Group, 2014 – present
 Member, Industrial Partnerships Working Group, 2014 – present

Materials Research Institute

Member, Board of Directors, 2015 – present
 Site Director, NSF National Nanotechnology Infrastructure Network, 2006 – 2015
 Co-Director, Nanofabrication Laboratory, 2012 – 2014
 Director, Nanofabrication Laboratory, 2006 – 2012
 Member, New Materials Building Planning Committee, 2006 – 2010
 Member, New Materials Building Vision Committee, 2005 – 2006

Penn State NSF Materials Research Science and Engineering Center

Member, Executive Committee, 2000 – 2001, 2003 – present
 Leader, Interdisciplinary Research Group, 2000 – 2001, 2006 – present
 Coordinator, Central Facilities Laboratory, 2003 – 2005

Intercollege Graduate Program in Materials

Associate Chair, 2003 – 2004
 Member, Curriculum Committee, 2002 – 2003

Search Committees

Member, Vice President for Research, 2015
 Member, College of Engineering Dean, 2013

College of Engineering

Member, Women Faculty Advisory Board, 2005 – present
 Member, Frontier Faculty Member Search Committee, 2014 – 2015
 Member, Electrical Engineering Department Head Search Committee, 2011
 Member, EE/CSE Merger Committee, 2010 – 2011
 Member, Electrical Engineering Department Head Search Committee, 1998 – 1999
 Member, Women in Engineering Advisory Board Member, 1993 – 2000
 Faculty Advisor, Society of Women Engineers, 1995 – 1997

Department of Electrical Engineering

Member, Electronics and Photonics Area Committee, 1993 – 2014
 Member, Electrical Engineering Strategic Planning Committee, 2007 – 2008
 Member, Electrical Engineering Executive Board, 2000 – 2004
 Member, Promotion and Tenure Committee, 2000 – 2002
 Member, Undergraduate Curriculum Committee, 1994 – 1998

Course Instruction and Development**Classroom Teaching**

EE 210: Sophomore-level undergraduate core course – “Circuits and Devices”
 EE 368 (310): Junior-level undergraduate core course, “Electronic Circuits I”
 EE 369 (311): Junior-level undergraduate core course, “Electronic Circuits II”
 EE 340: Junior-level undergraduate core course, “Electronic Devices and Circuits”
 EE 397: Junior-level undergraduate core course, “Introduction to Nanoelectronics”
 EE 418 (441): Senior/Graduate-level EE elective, “Solid State Device Technology”
 EE 419 (442): Senior/Graduate-level EE elective, “Solid State Device Physics”
 EE 519: Graduate-level EE core course, “Advanced Solid State Devices”

Overall Quality of Instruction (average out of a maximum of 7.00)

200-level core courses: 5.59
 300-level core courses: 5.51
 400-level elective courses: 5.57
 Graduate level courses: 6.20

Course Development*EE 210: Circuits and Devices, 1995 – 2000*

Designed and developed a sophomore-level core course in introductory circuit analysis with funding from the NSF Engineering Coalition of Schools for Excellence in Education and Leadership (ECSEL) Program and the NSF CAREER Education Plan Award. A series of modular lab assignments were implemented to allow the introduction of theoretical circuit concepts by relating them to the electronic components of a simple compact disk player.

EE 210H - Circuits and Devices - Honors Studio Section, 1995 – 2000

Designed and developed a “studio” version of EE 210 for University Scholars in Electrical Engineering and Computer Engineering with support from the General Electric Foundation. This

studio format was implemented to allow a closer integration of the lecture and lab components of EE 210, and to provide greater flexibility for advanced learning by University Scholars.

EE 210H – Instructional Outreach

EE 210 was cited for advancing learning by design in a paper entitled "Learning By Design - What Have We Learned," by Louis Bucciarelli, ECSEL Coalition Co-PI. Invited to present development activities at several workshops and meetings:

Innovation in *Engineering Education* EXPO, Penn State University, March 1996.

Learning By Design ECSEL Workshop, Howard University, October 1997.

Year 7 - 10 ECSEL Review Meeting, University of Maryland, April 1998.

Exhibit at Penn State Learning/Teaching Fair, Penn State University, October 1998.

ECSEL/MIT Workshop, Massachusetts Institute of Technology, April 1999.

EE 397: Introduction to Nanoelectronics, 2006 – 2010

Designed and implemented remote demonstrations of nanodevice characterization techniques and device measurements, include scanning electron microscopy, focused ion beam patterning, atomic force microscopy, diode and transistor electrical properties. The web-based interfaces allow scale up for delivery to over 250 students per semester.

K-12 through Undergraduate Research, Outreach, and Diversity

Undergraduate Teaching Intern Program Faculty Mentor

Bingqian Lu, EE 310, Fall 2013

Paul Shoytush, EE 297B, Fall 1996

Frank Bannon, EE 369, Fall 1994

Research Experience for Undergraduates Faculty Mentor

Frank Bannon (EE, 94), Roy Wotring (EE, 94), Christopher Nordquist (EE, 95, 96), Michael Markey (EE, 96), Jeremy Rowlette (EE, 97), Ruchi Grewal (EE, 98), Peter Smith (EE, 98, 99), Christopher Baiocco (EE, 98), Eric Rose (EE, 98), Isaac Lauer (EE, 98, 99), Amy Purdy (EE, 99, 00), Daniel Tiberio (EE, 00), Sarah Harding (EE, 02), Eric Krall (EE, 02), Brian Edwards (EE, 02, 03), Rahkee Kumar (EE, 02, 03), Andrew Stroffolino (EE, 03), Daniel Black (EE, 04), Antony Vydrin (EE, 04), Eric Dattoli (EE, 05), Jason Mantey (EE, 06), Travis Rosmos (EE, 09), Brent DeVetter (EE, 10), Jacob Cox (EE, 11), Jia Kuang (EE, 11), Matthew Bauer (EE, 13)

Outreach and Diversity Initiatives

Discovery-U TED talk, November 2013.

MRSEC Undergraduate/Graduate STEM Workshop Panel, 2013, 2014.

Middle and High-School Girl Mentoring Program, 2006 – 2010. Mentored ten middle and high school girls over four year period, including hands on science and engineering workshops.

Nanotechnology Showcase, 2007 – 2012. Introduction and hands-on nanotechnology tutorials at Society of Hispanic Professional Engineers National Meetings.

Summer Opportunities and Research for Space (SOARS) Program, Hosted two under-represented high school students for two weeks, June 1996.

Va Tech *Advance* Scholar, 2006.

Columbia University Nanoscale Science and Engineering Center, Women Graduate and Post-doctoral Mentoring, April 2006.

Women in Engineering Panel Sessions at Spend a Fall Day and College of Engineering Open House, 1994 - 1996.

Expanding Your Horizons Workshop Leader, March 1994. Introduced high-school women and parents to electrical engineering through hands on demonstrations and career opportunities.

Society of Women Engineers Faculty Advisor, 1995 – 1997.

Interviewed on “Time Out Penn State,” December 1995. Live televised interview to discuss the efforts of the College of Engineering to recruit and retain women in engineering.

Graduate Student and Post-Doctoral Scholar Advising

Ph.D. Thesis Chair or Co-Chair

Ph.D. Students Completed

Lisa Zavieh, “Nanofabrication and Characterization of Three-Dimensional Photonic Crystals,” Materials Science and Engineering, December 1999.

Christopher Nordquist, “Electrofluidic Assembly as a Route to Heterogeneously Integrated Circuits,” Electrical Engineering, December 2001.

Ivan Divliansky, “Fabrication of 2D and 3D Photonic Crystals and Templates,” Electrical Engineering, August 2004.

Yanfeng Wang, “Integration and Characterization of Silicon Nanowire Field Effect Devices,” Electrical Engineering, August 2006.

Marco Cabassi, “Electrical Transport in Nanoscale Oligo(Phenylene-Ethynylene) Junctions,” Electrical Engineering, May 2007.

Heayoung Yoon, “Nanoscale Cross-Wire Devices for In Situ Electrical and Spectroscopic Characterization of Molecular Junctions,” Electrical Engineering, December 2007.

Mingwei Li, “Directed Assembly of Nanowires for Integrated Biosensors,” Electrical Engineering, May 2008.

Tsung-ta Ho, “Vapor Liquid Solid Grown Silicon Nanowire Devices,” Electrical Engineering, May 2010.

Jaekyun Kim, “Deterministic Assembly of Functional Nanodevices onto Silicon Circuits,” Electrical Engineering, May 2010.

Wenchong Hu, “Nanowire Devices for Electronic and Optical Applications,” Electrical Engineering, December 2010.

Masato Maitani, “Electrical and Spectroscopic Characterization of Molecular Electronic Junctions,” Materials Science and Engineering, Co-Chair with David Allara, December 2010.

Aaron Vallett, “Fabrication and Characterization of Semiconducting Nanowires for Tunnel Field Effect Transistors,” Electrical Engineering, May 2011.

Seokho Yun, “Novel Optical Metamaterials, Absorbers, and Filters Based on Periodic Nanostructures,” Electrical Engineering, August 2011.

Meng-wei Kuo, “Bottom-Up and Top-Down Fabrication of Nanowire-Based Devices,” Electrical Engineering, August 2013.

Xin Wang, “Integration and Characterization of Individual Radial Junction Silicon Nanowires for Photovoltaic Applications,” Electrical Engineering, May 2014.

Yu Yuwen, “Modulating the Response of Optical Nanostructures by Integrating Novel Plasmonic Building Blocks,” Electrical Engineering, December 2014.

Xiahua Zhong, “Directed Assembly of Metal Oxide Nanowire Sensors for Low-Power CMOS-Enabled Gas Sensing Arrays,” Electrical Engineering, August 2015.

Ph.D. Students in Progress

Scott Levin (MSE, exp. 15), Lan Lin (EE, exp. 15), Andrew Swisher (EE, exp. 16), Liu Liu (EE, exp. 16), Donna Deng (MSE, exp. 17), Xuexue Guo (EE, exp. 18)

M.S. Thesis Committee Chair

Rohit Kochhar (EE, 95), Meena Madhav (EE, 95), Yueying Ren (EE, 97), Jason Neal (EE, 97), Chungyu Zhang (EE, 98), Christopher Nordquist (EE, 98), Shuhui Lu (EE, 00), Donna Furanage (EE, 00), Karthik Rajagopalan (EE, 01), Peter Smith (EE, 01), Steven Vogt (EE, 01), Robert Drupp (EE, 04), Richard Geiger (EE, 04), Rebeca Diaz (EE, 07)

B.S. Honors Thesis Committee Chair

Frank Bannon (EE, 94), Roy Wotring (EE, 94), Christopher Nordquist (EE, 96), Isaac Lauer (EE, 99), Amy Purdy (EE, 00), Brian Edwards (EE, 03), Rahkee Kumar (EE, 03), Dominique Zwiebel (EE, 12)

Post-Doctoral Scholars and Research Associates

Ludmil Zambov (98–00), Irena Kratochvilova (99–01), Yong-Hong Ye (07–09), Lintao Cai (02–05), Rustom Bhiladvala (05–08), Alexey Kovalev (05–08), Yan Tang (06–08), Heayoung Yoon (07–09), Jian Wu (09–11), Seokho Yun (11–12), Jie Li (11–13), Xiaoming Liu (11–13), Anupama Ghosh (13), Oren Gall (14–pres.), Alexej Pogrebnyakov (10–pres.), Myungkoo Kang (13–pres.)

Student Awards and Honors

Best Student Paper Award at *64th IEEE Device Research Conference*, Yanfeng Wang, 2006.
 Best Student Paper Award at *64th IEEE Device Research Conference*, Mingwei Li, 2006.
 Best Student Paper Award at *2004 USA-Argentina Workshop on Molecular Electronics*, Marco Cabassi, 2004.

Sponsored Research Programs

1. Principle Investigator, (with Co-Investigator Carlo Pantano), “Broadband Gradient Index Optical Materials,” Lockheed Martin, \$178,000, 03/01/14 – 12/30/15.
2. Principle Investigator, (with Co-Investigator Carlo Pantano), “Characterization of Broadband Optical Materials,” Lockheed Martin (subcontract from University of Central Florida), \$200,000, 03/01/14 – 12/30/15.
3. Principle Investigator, “Subwavelength Nanostructured Optical Coatings,” Lockheed Martin MFC, \$150,000, 03/01/13 – 12/30/15.
4. Principle Investigator, “Directed Self Assembly of Core-Shell Nanoparticles for Contact Hole Replication,” Intel Corporation, \$270,000, 01/01/14 – 12/31/16.
5. Principle Investigator, “Integration of Plasmonic Devices on Focal Plane Array,” Air Force Research Laboratory (subcontract from UES), \$36,000, 01/01/15 – 06/30/2015.
6. Principle Investigator (with Co-Principle Investigators Doug Werner; Kathleen Richardson, University of Central Florida; Clara Rivero-Baleine, Lockheed Martin), “Manufacturable Gradient Index Transformation Optics Lenses,” Defense Advanced Research Projects Agency, \$2,007,400, 04/01/12 – 06/30/16.
7. Principle Investigator, “Collaborative Research: GOALI-FRG: Engineered Crystallization Behavior of Phase Change Materials,” with Kathleen Richardson, University of Central Florida, National Science Foundation, \$87,500, 08/01/13 – 07/31/15.
8. Co-Principle Investigator, (with Principle Investigator Christine Keating), “Three-Dimensional Co-Assembly of Functional Nano/Microparticles for Reconfigurable Multicomponent Structures,” Charles. E. Kaufman Foundation, \$300,000, 08/01/13 – 07/31/16.

9. Principle Investigator, “Development of a Reconfigurable Metamaterial Mask,” Lockheed Martin MFC, \$75,000, 01/01/13 – 12/31/13.
10. Principle Investigator, “Fabrication of a Semiconductor-based GRIN Lens,” Lockheed Martin MFC, \$20,000, 01/01/12 – 12/31/13.
11. Principle Investigator, “Development of a Tunable Metamaterial Filter,” Lockheed Martin MFC, \$98,695, 01/01/13 – 12/31/13.
12. Principle Investigator, “Development of Radio Frequency Beam Steering Device,” Lockheed Martin MFC, \$10,000, 01/13/13 – 12/31/13.
13. Principle Investigator, “Deterministic Assembly of Nano/Microstructures,” Northrop Grumman, \$7,000, 03/01/12 – 02/28/15.
14. Co-Principle Investigator, (with Principle Investigator Doug Werner), “Integrated Metamaterial Microlenses,” Lockheed Martin MFC, \$200,000 and \$40,000 State Match, 02/01/12 – 12/31/12.
15. Co-Principle Investigator, (with Principle Investigator Tom Mallouk; Co-Principle Investigators Aklesh Lakhtakia; Peter Monk, University of Delaware), “SOLAR Collaborative: Multiplasmonic Light Harvesting for Thin Film Solar Cells,” National Science Foundation, \$1,050,000, 09/01/11 – 08/31/15.
16. Co-Principle Investigator, (with Principle Investigator Doug Werner), “Metamaterials Enhanced Applications,” Air Force Research Laboratory (subcontract from Lockheed Martin), \$1,265,000, 06/01/11 – 05/28/13.
17. Principle Investigator, “Nanofabrication of 1D Au Nanoparticle Arrays,” Air Force Research Laboratory (subcontract from UES), \$20,000, 03/01/11 – 02/28/2012.
18. Principle Investigator, (with Co-Principle Investigator Doug Werner), “Active Electro-Optical Metamaterial Filters,” Air Force Research Laboratory, \$200,000, 01/01/2010 – 03/15/2011.
19. Principle Investigator, (with Co-Investigator Doug Werner), “Multi-color Wide-Field-of-View Focal Plane Array,” Raytheon Corporation, \$10,000, 11/15/09 – 02/28/10.
20. Co-Principle Investigator, (with Principle Investigator Doug Werner), “Frequency Selective Surfaces on Glass,” Army Research Laboratory (subcontract from PPG Industries), \$40,000, 10/30/09 – 04/30/11.
21. Co-Principle Investigator, (with Principle Investigator David Swanson, Applied Research Laboratory; Co-Principle Investigator, Doug Werner), “Radio Frequency Detection of Thermal Neutrons on the Ground,” Defense Threat Reduction Agency, \$1,357,534, 08/01/09 – 12/31/11.
22. Principle Investigator, “Multilayer Metamaterial Coating,” Lockheed Martin ATC, \$80,000, 07/15/09 – 12/30/11.
23. Principle Investigator, “Metal Frequency Selective Surface on Glass,” Lockheed Martin ATC, \$15,000, 07/15/09 – 03/30/10.
24. Co-Principle Investigator, (with Principle Investigator Gary Clawson; Co-Principle Investigator Christine Keating), “Aptamer-Based Nanotechnology for Plasma Melanoma Markers,” National Institutes of Health, \$403,241, 07/01/09 – 06/30/12.
25. Principle Investigator, (with Co-Principle Investigator Doug Werner), “Passive Infrared Stand-off Detection Platform,” ICx Nomadics, \$250,000, 06/01/09 – 06/01/10.
26. Co-Investigator, (with Principle Investigator Suzanne Mohney), “Nanoscale Contacts,” Army Research Laboratory, \$270,000, 03/31/09 – 04/22/12.
27. Co-Principle Investigator, (with Principle Investigator Doug Werner), “Multispectral Infrared Mirror,” Lockheed Martin MFC, \$60,000, 03/26/09 – 03/26/10.

28. Co-Principle Investigator, (with Principle Investigator Doug Werner), “Engineering Materials with Customized Electromagnetic Properties,” Lockheed Martin University Research Initiative, \$800,000, 01/01/09 – 12/31/11.
29. Co-Principle Investigator, (with Principle Investigator Gary Clawson; Co-Principle Investigator Christine Keating), “CTSA-Adapting an RNA Sensor Platform to Protein Detection Using Aptamers,” PA Tobacco Settlement Fund, \$109,279, 11/24/08 – 06/30/11.
30. Principle Investigator, “Enabling the Convergence of Chemistry and Biology with Chip-Scale Electronics by Directed Nanowire Assembly,” Semiconductor Research Corporation, \$40,000, 09/01/08 – 08/30/09.
31. Co-Principle Investigator, (with Principle Investigator Joan Redwing), “STTR Phase II: Direct Growth of Microwire Solar Cells on Glass,” Illuminex Inc., \$250,000, 08/15/08 – 08/14/10.
32. Principle Investigator, (with Co-Principle Investigator Doug Werner), “Negative Index Metamaterials,” Lockheed Martin ATC, \$50,000, 06/01/08 – 12/31/08.
33. Co-Principle Investigator, (with Principle Investigator Amy Bell, Va Tech; Co-Principle Investigator Tom Mallouk), “Multi-analyte Wireless Chemical Sensor Microsystems using Assembled Microbeads,” Defense Advanced Research Projects Agency (subcontract from Va Tech), \$109,279, 03/01/08 – 02/28/09.
34. Co-Principle Investigator, (with Principle Investigator Joan Redwing; Co-Principle Investigators Tom Mallouk, Elizabeth Dickey, Chris Wronski), “High Aspect Ratio Semiconductor Heterojunction Solar Cells,” Department of Energy, \$900,000, 02/01/08 – 01/30/12.
35. Co-Principle Investigator, (with Principle Investigator Doug Werner), “Wavelength-Selective All-Dielectric Infrared Mirrors,” Lockheed Martin, \$95,000, 06/01/2007 – 12/31/2008.
36. Principle Investigator, (with Co-Principle Investigator Doug Werner), “Infrared Chaff for Remote Chemical Detection,” Northrup Grumman, \$25,000, 09/01/06-12/31/06.
37. Co-Principle Investigator, (with Principle Investigator Joan Redwing; Co-Principle Investigators Suzanne Mohney, Elizabeth Dickey; Mark Lundstrom, Purdue) “NIRT: Nanowire Electronics,” National Science Foundation, \$1,000,000, 07/01/2006 – 6/30/2011.
38. Co-Principle Investigator, (with Principle Investigator Gary Clawson and Co-Principle Investigator Christine Keating), “IMAT: An RNA Sensor for Detection of Circulating Tumor Cells,” National Institutes of Health, \$879,000, 01/01/06 – 12/30/08.
39. Co-Principle Investigator, (with Principle Investigator Doug Werner), “Navy Counter IED Basic Research Program,” Office of Naval Research, \$900,000, 09/01/05 – 08/30/08.
40. Co-Investigator, (with Principle Investigator Suzanne Mohney), “Contacts to Semiconductor Nanowires,” Army Research Office, \$251,000, 06/01/05 – 05/31/08.
41. Co-Principle Investigator, (with Principle Investigator Mike Roan, Penn State Applied Research Laboratory; Co-Principle Investigator Doug Werner) “Reconfigurable Frequency Selective Surfaces for Explosives Detection,” Defense Advanced Research Projects Agency, \$350,000, 10/15/04 – 02/15/05.
42. Principle Investigator, “Nanowires for Radar Applications,” Lockheed Martin, \$15,000, 10/15/04 – 01/14/05.
43. Co-Principle Investigator, (with Principle Investigator Gary Clawson; Co-Principle Investigator Christine Keating), “Chip-based Nanosensors for Early Cancer Diagnosis by RNA Detection,” Tobacco Settlement Funds, \$197,960, 06/01/04 – 05/31/06.

44. Co-Principle Investigator, (with Principle Investigator Gary Clawson; Co-Principle Investigator Christine Keating), “Biosensor Chips for RNA Detection,” Pennsylvania Lifesciences Greenhouse, \$100,000, 09/01/03 – 08/31/04.
45. Co-Principle Investigator, (with Principle Investigator Tom Mallouk; Co-Principle Investigators Mary Jane Irwin, Vijay Narayanan; Stefan Evoy, University of Pennsylvania), “NIRT: Heterogeneous Integration of Nanowires for Chemical Sensor Arrays,” National Science Foundation, \$1,200,000, 07/01/03 – 06/30/07.
46. Co-Principle Investigator, (with Principle Investigator Darrell Velegol; Co-Principle Investigators Kristen Fichthorn, Christine Keating), “NIRT: Bottom-up Assembly of Metal and Semiconductor Nanowires: Fundamental Forces to Nanoelectronic Circuits,” National Science Foundation, \$1,000,000, 07/01/03 – 06/30/07.
47. Co-Principle Investigator, (with Principle Investigator Gary Clawson; Co-Principle Investigator Christine Keating), “Chip-based Biosensors for Early Cancer Detection,” Materials Research Institute, Huck Institute, Gittlen Cancer Research Institute, \$200,000, 07/01/03 – 06/30/05.
48. Co-Principle Investigator, (with Principle Investigator Christine Keating), “NER: Bottom-up Assembly of Biosensor Arrays,” National Science Foundation, \$100,000, 07/01/03 – 06/30/04.
49. Principle Investigator, (with Co-Principle Investigators Joan Redwing, Suzanne Mohny), “Electron-Beam Lithography for Synthesis and Characterization of Metal and Semiconducting Nanowires,” Materials Research Institute, \$50,000, 07/01/02 – 03/30/04.
50. Co-Principle Investigator, (with Principle Investigator Joan Redwing; Co-Principle Investigators Suzanne Mohny, Ari Mizel), “NIRT: Semiconductor Nanowires: Building Blocks for Nanoscale Electronics,” National Science Foundation, \$1,450,000, 07/01/01 – 06/30/05.
51. Principle Investigator, (with Co-Principle Investigators Tom Mallouk, Tom Jackson, Christine Keating; Seth Goldstein, Carnegie Mellon University), “Directed Assembly of Molecular Logic Architectures using Functionalized Metallic Nanowires,” Defense Advanced Research Projects Agency, \$5,195,108, 03/21/01-03/20/05
52. Principle Investigator, “Fabrication of Thermophotovoltaic Cells,” Bechtel Bettis, Inc., \$99,427, 03/01/00 – 08/30/01.
53. Principle Investigator, “Development of Fabrication Techniques for InGaAs Thermophotovoltaic Cells,” Bechtel Bettis, Inc., \$70,000, 06/01/99 – 12/31/99.
54. Co-Principle Investigator, (with Principle Investigator David Miller), “InP-based 77 Ghz Power HEMT Devices,” M/A Com - AMP, \$100,000, 10/01/98 – 09/30/99.
55. Co-Principle Investigator, (with Principle Investigators Tom Mallouk; Co-Principle Investigators Tom Jackson, Mike Natan; Brosl Hasslacher, Los Alamos), “Inorganic Self-Assembly Routes to Three-Dimensional Memories and Logical Mesostructures,” Defense Advanced Research Projects Agency, \$2,800,000, 09/25/98 – 10/31/00.
56. Co-Principle Investigator, (with Principle Investigator David Miller), “Novel Optoelectronic Hybrid Receiver,” Ben Franklin with C-Cor Electronics, Inc., \$136,000, 07/01/98 – 06/30/00.
57. Co-Principle Investigator, (with Principle Investigator David Miller), “Development of High Power Semiconductor Devices,” C-Cor Electronics, Inc., \$80,000, 02/01/98 – 06/30/98.
58. Co-Principle Investigator, (with Principle Investigator David Miller), “Interfacial Bonding Research for Compliant Substrates,” Office of Naval Research, \$165,000, 07/01/97 – 06/30/00.
59. Co-Principle Investigator, (with Principle Investigator David Miller), “Improved III-V Optoelectronic Performance and Reliability Through Carbon Tetrabromide Doping, including Re-

- search Experience for Undergraduates Supplement,” National Science Foundation, \$346,802, 08/01/96 – 07/31/99.
60. Co-Principle Investigator, (with Principle Investigator David Miller), “STTR Phase II: Development of a Molecular Beam Epitaxy Growth Technique for High Quality 1.5-2.5 μm Near Infrared Sensing Devices” Office of Naval Research, (subcontract from Sensors Unlimited, Inc.), \$153,000, 05/15/96 – 12/31/97.
 61. Co-Principle Investigator, (with Principle Investigator David Miller), “SBIR Phase II: Carbon-Doped HBT's for Power Applications,” Army Research Office, (subcontract from Quantum Epitaxial Designs, Inc.), \$163,844, 02/01/96 – 01/31/98.
 62. Principle Investigator, “CAREER: Fabrication of Two- and Three-Dimensional Photonic Crystals, including Research Experience for Undergraduates Supplement,” National Science Foundation, \$250,000, 08/01/95 – 07/31/00.
 63. Principle Investigator, “Industrial Matching to CAREER Award,” National Science Foundation, \$100,000, 08/01/95 – 07/31/00.
 64. Co-Principle Investigator, (with Principle Investigator David Miller), “Phase I STTR: Development of Molecular Beam Epitaxy Growth Technique for High Quality 1.5-2.5 μm Near Infrared Sensing Devices,” Office of Naval Research (subcontract from Sensors Unlimited, Inc.), \$32,709, 10/01/94 – 05/31/95.
 65. Co-Principle Investigator, (with Principle Investigator David Miller, Co-Principle Investigator Mukunda Das), “High Speed Heterostructure Devices for Optoelectronic Receiver Applications, include Research Experience for Undergraduate Supplement” National Science Foundation, \$167,000, 09/01/94 – 09/01/95.

Sponsored Research Centers

1. Co-Investigator, Interdisciplinary Research Group Co-Leader, (with Principle Investigator Vincent Crespi; Co-Principle Investigators Tom Mallouk; 30 Penn State Co-Investigators), “Materials Research Science and Engineering Center (MRSEC): Center for Nanoscale Science,” National Science Foundation, \$16,000,000, 09/01/15 – 8/31/21.
2. Principle Investigator, Site Director, (with Co-Principle Investigator Susan Trolier-McKinstry), “NNIN: National Nanotechnology Infrastructure Network; including Research Experience for Undergraduate and Research Experience for Teachers Supplements,” National Science Foundation (subcontract to Cornell), \$6,790,422, 3/1/09 – 8/30/15.
3. Co-Principle Investigator, (with Penn State Principle Investigator Suman Datta; Co-Principle Investigators Vijay Narayanan, Josh Robinson), “Semiconductor Technology Advanced Research network (STARnet) Center for Low-Energy Systems Technology (LEAST),” Semiconductor Research Corporation and Defense Advanced Research Projects Agency (subcontract from Notre Dame), \$3,974,604, 01/15/13 – 10/31/17.
4. Co-Investigator, (with Penn State Principle Investigator Susan Trolier-McKinstry; Co-Investigators Tom Jackson, Clive Randall, Vijay Narayanan, Suman Datta, Chris Rahn, Doug Werner, Amy Snipes) “NSF Nanosystems Engineering Research Center (ERC) on Advanced Self-Powered Systems of Integrated Sensor Technologies (ASSIST),” National Science Foundation (subcontract from NC State), \$3,833,798, 09/01/12 - 08/31/17.
5. Co-Investigator, Interdisciplinary Research Group Leader, (with Principle Investigator Tom Mallouk; Co-Principle Investigators Vincent Crespi, Moses Chan; 30 Penn State Co-Investigators), “Materials Research Science and Engineering Center (MRSEC): Center for Nanoscale Science,” National Science Foundation, \$13,320,000, 9/1/08 – 8/31/14.

6. Co-Principle Investigator, (with Penn State Principle Investigator Suman Datta; Co-Principle Investigator Vijay Narayanan), “Nanoelectronics Research Initiative Midwest Institute for Nanoelectronics Discovery (MIND),” Semiconductor Research Corporation and Congressional Funding (subcontract to Notre Dame), \$915,000, 06/01/08 – 05/30/13.
7. Co-Principle Investigator, (with Penn State Principle Investigator Suman Datta; Co-Principle Investigator Christine Keating), “Focus Center Research Program (FCRP) Center for Materials, Structures, and Devices: Combining Biology with CMOS through Programmed Assembly,” Semiconductor Research Corporation and Defense Advanced Research Projects Agency (subcontract to MIT), \$407,336, 3/1/10 – 2/29/13.
8. Co-Investigator, Interdisciplinary Research Group Leader, (with Principle Investigator Moses Chan; Co-Principle Investigators Tom Mallouk, Vincent Crespi; 30 Penn State Co-Investigators), “Materials Research Science and Engineering Center: Center for Nanoscale Science,” National Science Foundation, \$8,440,000 with COP: Department of Community and Economic Development” matching funds, 9/01/00 – 8/30/08.
9. Principle Investigator, (with Co-Principle Investigator Steve Fonash), “NNIN: National Nanotechnology Infrastructure Network,” National Science Foundation, \$3,776,750, 03/01/04 – 02/28/09.

Infrastructure and Equipment Grants

1. Principle Investigator, (with Co-Investigators Nitin Samarth, Jun Zhu), “MRI-R2: Acquisition of a Versatile Electron Beam Nanolithography Instrument for Patterning on Planar and Curved Substrates,” National Science Foundation, \$750,000, 03/01/10 – 02/29/12.
2. Principle Investigator, “ARRA: Nanotechnology Research Instrumentation in Support of NNIN,” National Science Foundation (subcontract to Cornell), \$648,000, 09/01/09 – 09/01/10.
3. Principle Investigator, “Nanotechnology Research Instrumentation in Support of NNIN,” National Science Foundation, \$192,500, 06/01/08 – 05/30/09.
4. Principle Investigator, (with Co-Investigator Doug Werner), “DOD DURIP: RF Sensor Devices Measurement Test System,” Office of Naval Research, \$119,920, 3/1/06-2/30/07.
5. Principle Investigator, (with Co-Investigators Moses Chan, Susan Trolier-McKinstry), “IMR: Acquisition of Cryogenic Micromanipulated Probe Station for Nanoscale Materials and Device Characterization,” National Science Foundation, \$91,000, 10/1/04-9/30/05.
6. Principle Investigator, “DOD DURIP: Enhancement of Instrumentation for Fabrication and Characterization of Devices Formed by Wafer Bonding and Self-Assembly,” Office of Naval Research and Ballistic Missile Defense Organization, \$180,000, 04/01/99-12/31/99.

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Refereed Publications in Archival Journals

Google Scholar: *h*-index = 42; *i10*-index = 86; *m*-index = 1.6

1. Boehm, S. J., L. Lin, K. Betancourt, R. Emery, J. S. Mayer, T. S. Mayer, and C. D. Keating, “Formation and Frequency Response of Two-Dimensional Nanowire Lattices in an Applied Electric Field,” *Langmuir*, 31(21), pp. 5779-5786 (2015).
2. Panaretos, A., Y. Yuwen, D. H. Werner, and T. S. Mayer, “Tuning the Optical Response of a Dimer Nanoantenna Using Plasmonic Nanoring Loads,” *Scientific Reports*, 5, 9813 (2015).

3. Madan, H., M. Jerry, A. Pogrebnyakov, T. S. Mayer, and S. Datta, "Quantitative Mapping of Phase Coexistence in Mott-Peierls Insulator during Electronic and Thermally Driven Phase Transition," *ACS Nano*, 9(2), pp. 2009-2017 (2015).
4. Eichfeld, S. M., L. Hossain, Y-C. Lin, A. F. Piasecki, B. Kupp, A. G. Birdwell, R. A. Burke, N. Lu, X. Pen, J. Li, A. Azcatl, S. McDonnell, R. M. Wallace, M. J. Kim, T. S. Mayer, J. M. Redwing, and J. A. Robinson, "Highly Scalable, Atomically Thin WSe₂ Grown via Metal-Organic Chemical Vapor Deposition," *ACS Nano*, 9(2), pp. 2080-2087 (2015).
5. Liu, L., M. Faryad, A. S. Hall, G. D. Barber, S. Erten, T. E. Mallouk, A. Lakhtaka, T. S. Mayer, "Experimental Excitation of Multiple Surface-Plasmon-Polariton Waves and Waveguide Modes in a One-Dimensional Photonic Crystal Atop a Two-Dimensional Metal Grating," *Journal of Nanophotonics*, 9(1), 093593 (2015).
6. Wang, X., Y. Ke, C. E. Kendrick, X. Weng, H. Shen, M. Kuo, T. S. Mayer, and J. M. Redwing, "The Effects of Shell Layer Morphology and Processing on the Electrical and Photovoltaic Properties of Silicon Nanowire Radial Junctions," *Nanoscale*, 7, pp. 7267-7274 (2015).
7. Jiang, Z., L. Lin, D. Ma, S. Yun, D. Werner, Z. Liu, and T. S. Mayer, "Broadband Wide Field-of-View Plasmonic Metasurface-Enabled Waveplates," *Scientific Reports*, 4, 7511 (2014).
8. Lin, Y-C., C-Y. Chang, R. K. Ghosh, J. Lie, H. Zhu, R. Addou, B. Diaconescu, T. Ohata, X. Peng, N. Lu, M. J. Kim, J. T. Robinson, R. M. Wallace, T. S. Mayer, S. Datta, L-J. Li, J. A. Robinson, "Atomically Thin Heterostructures Based on Single-Layer Tungsten Diselenide and Graphene," *Nanoletters*, 14(12), pp. 6936-6941 (2014).
9. Lin, Y.-C., N. Lu, N. Perea-Lopez, J. Li, Z. Lin, X. Peng, C. H. Lee, C. Sun, L. Calderin, P. N. Browing, M. S. Bresnehan, M. J. Kim, T. S. Mayer, M. Terrones, and J. A. Robinson, "Direct Synthesis of van der Waals Solids," *ACS Nano*, 8(4), pp. 3715-3723 (2014).
10. Bossard, J., L. Lin, S. Yun, L. Liu, D. H. Werner, and T. S. Mayer, "Near-Ideal Infrared Metamaterial Absorbers with Super-Octave Bandwidth" *ACS Nano*, 8(2), pp. 1517-1524 (2014).
11. Yun, S., Z. H. Jiang, D. Ma, Z. W. Liu, D. H. Werner, and T. S. Mayer, "Experimental Verification of Substrate-Induced Bianisotropy in Optical Metamaterials," *Applied Physics Letters*, 103(23), pp. 233109 (2013).
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15. Yun, S., F. Namin, D. H. Werner, T. S. Mayer, C. Bungay, C. Rivero-Baleine, and L. Zhang, "Demonstration of a Nearly Ideal Wavelength-Selective Optical Mirror using a Metamaterial-Enabled Dielectric Coating," *Applied Physics Letters*, 102(17), pp. 171114 (2013).
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21. Mayer, T. S., W. Hu, B. Liu, and S. Mohny, “1D and 2D Metallodielectric Nanostructures: Self-Organized and Lithographic Nanofabrication,” *Photonics West*, San Francisco, CA, January 2010.
22. Keating, C. D. and T. S. Mayer, “Heterogeneous Integration of Bioprobe-Coated Nanowires,” *237th American Chemical Society National Meeting*, Salt Lake City, UT, March 2009; presented by C. D. Keating.
23. Mayer, T. S., D. H. Werner, S. Yun, Y. Tang, M. Li, J. Kim, J. A. Smith, J. A. Bossard, and M. Pellen, “Metallo- and All-dielectric Nanostructures: Top-down and Bottom-up Nanofabrication,” *Metamaterials Workshop*, Estes Park, CO, September 2008.
24. Mayer, T. S., H. Yoon, M. Maitani, L. Cai, M. Cabassi, Y. Selzer, C. McGuinness, T. Mallouk, D. Allara, “Probing the Electrical and Spectroscopic Properties of Nanoscale Metal-Molecule-Metal Junctions,” *Electron-Donor Interactions Gordon Research Conference*, Newport, RI, August 2008.

25. Mayer, T. S., T. T. Ho, M. Li, S. Eichfeld, P. Nimmatoori, B. Liu, T. Morrow, S. Mohny, C. D. Keating, and J. M. Redwing, "Silicon Nanowires: Growth, Integration, and Field Effect Properties," *Silicon Nanoelectronics Workshop*, Honolulu, HI, June 2008.
26. Mayer, T. S., "Bottom-up Integration Strategies for NEMS," *Nanomechanics for NEMS: Scientific and Technological Challenges*, Grenoble-Minatec, France, June 2008.
27. Mayer, T. S., M. Li, J. Kim, J. Sioss, T. Morrow, Y. Cao, T. E. Mallouk, C. D. Keating, "Electric-field Directed Assembly of Nanowires for Heterogeneous Integration of On-chip Electronic Systems," *National Institutes of Standards and Technologies Directed Assembly of Functional Materials and Devices Workshop*, Gaithersburg, MD, March 2008.
28. Mohny, S. E., B. Liu, N. S. Dellas, S. M. Woodruff, S. M. Dilts, J. M. Redwing, T. S. Mayer, "Nickel Silicide Formation in Nickel Contacts to Silicon Nanowires," *Physics and Chemistry of Semiconductor Interfaces*, Santa Fe, NM, February 2008; presented by S. E. Mohny.
29. Mayer, T. S., M. Li, J. Kim, T. Morrow, and C. D. Keating, "Electric-field Directed Assembly of Nanowires for Heterogeneous Integration of On-chip Electronic System," *Material Research Society Fall Meeting*, Boston, MA, November 2007.
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33. Mayer, T. S., "Metal-Molecule-Metal Devices and Measurements," *National Science Foundation Building Electronic Function into Molecular Architectures Workshop*, Arlington, VA, June 2007.
34. Mayer, T. S., M. Li, R. Bhiladvala, J. Sioss, T. Morrow, G. Clawson, J. M. Redwing, and C. D. Keating, "Bottom-up Assembly of Multi-Analyte SiNW-based Biosensor Arrays," *American Vacuum Society Michigan Chapter*, Ann Arbor, MI, May 2007.
35. Mayer, T. S., H. Yoon, M. Maitani, Y. Selzer, M. Cabassi, L. Cai, and D. Allara, "Electrical and Spectroscopic Characterization of Nanoscale Metal-Molecule-Metal Junctions," *American Vacuum Society Western Pennsylvania Chapter - Nanoelectronic Devices and Materials Symposium*, Pittsburgh, PA, April 2007.
36. Mayer, T. S., H. Yoon, L. Cai, M. Maitani, D. Allara, A. Flatt, J. Tour, "Inelastic Electron Tunneling Spectroscopy of Nanoscale Metal-Molecule-Metal Junctions," *CECAM Molecular Conduction Conference*, Lyon, FR, December 2006.
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38. Mayer, T. S., J. Bossard, Y. Tang, and D. H. Werner, "Low-loss Infrared and Visible Negative Index Metamaterials Designed by Genetic Algorithm Optimization," *Nanomaterials for Defense Conference*, Virginia Beach, VA, May 2006.

39. Mayer, T. S., M. Li, J. A. Sioss, and C. D. Keating, "Electric-field Directed Assembly of Nanoscale Devices for Heterogeneous Integration of On-chip Electronic Systems," *Foundations of Nanoscience Conference: Self-Assembled Architectures and Devices Technical Program*, Snowbird, UT, April 2006.
40. Mayer, T. S., L. Cai, H. Yoon, C. McGuinness, D. Allara, A. Flatt, and J. Tour, "Bistable Switching in Nanoscale Molecular Junctions," *American Chemical Society Spring Meeting*, Atlanta, GA, March 2006.
41. Mayer, T. S., "Semiconducting and Molecular Electronic Nanowires as Nanoelectronic Building Blocks," *National Science Foundation USA/China Nanotechnology Workshop*, Arlington, VA, March 2006.
42. Y. Wang, B. Liu, D. Shir, K. Lew, J. M. Redwing, and T. S. Mayer, "Thermally-oxidized Silicon Nanowires: Interfacial Properties and Field Effect Devices," *Physics and Chemistry of Semiconductor Interfaces Technical Program*, Cocoa Beach FL, February 2006.
43. Mayer, T. S., "Directed Assembly for Integration of Nanoelectronic Building Blocks," *Semiconductor Research Corporation/National Science Foundation Workshop on Nanoelectronics*, Arlington, VA, December 2005.
44. Mayer, T. S., L. Cai, M. Cabassi, C. McGuinness, D. Allara, A. Flatt, and J. Tour, "Electrical and Spectroscopic Characterization of Metal-Molecule-Metal Junctions," *230th American Chemical Society National Meeting*, Washington, DC, August 2005.
45. Mayer, T. S., Y. Wang, T.-T. Ho, K. K. Lew, L. Pan, E. C. Dickey, and J. M. Redwing, "Progress Towards Silicon Nanowire-based Complementary Logic," *American Vacuum Society 51st International Symposium and Exposition*, Anaheim, CA, November 2004.
46. Mayer, T. S., "Semiconducting and Molecular Electronic Nanowires as Nanoelectronic Building Blocks," *Nanomaterials 2004*, October 2004.
47. Mallouk, T. E. and T. S. Mayer, "Electrical Transport Properties of Nanoscale Molecular Junctions," *Electron-Donor Acceptor Interactions Gordon Conference*, Newport, RI, August 2004; presented by T. E. Mallouk.
48. Mayer, T. S., "Nanoscale Molecular Junctions," *Molecular Conduction Workshop*, Evanston, IL, July 2004.
49. Mayer, T. S., "Molecular Devices and Architectures?," *SRC/NASA Ames Workshop on Novel Materials and Assembly Methods for Extending Charge Based Technology and Beyond*, San Jose, CA, July 2004.
50. Redwing, J. M., K. K. Lew, T. E. Bogart, Ling Pan, E. C. Dickey, A. H. Carim, Y. Wang, M. Cabassi, T. S. Mayer, S. Dey and S. E. Mohny, "Vapor-Liquid-Solid Growth and Characterization of Semiconductor Nanowires," *12th International Conference on Metal Organic Vapor Phase Epitaxy*, Lahaina, HI, May 2004; presented by J. M. Redwing.
51. Mayer, T. S., L. Cai, Y. Selzer, M. Cabassi, T. Mallouk, and D. Allara, "Electrical Transport Properties of Nanoscale Molecular Junction," *Materials Research Society Spring Meeting*, San Francisco, CA, April 2004.
52. Mayer, T. S., L. Cai, M. Cabassi, Y. Selzer, D. Allara, T. E. Mallouk, J. Naciri, J. Kushmerick, and R. Shashidhar, "In-wire Molecular Electronic Devices: Synthesis and Electrical Characterization," *Foundations of Nanoscience Conference: Self-Assembled Architectures and Devices*, Snowbird, UT, April 2004.

53. Mayer, T. S., “Nanostructures and CMOS: Nanofabrics for Logic and Sensing,” *Integration of Scalable CMOS Systems with Novel Nanostructure Workshop*, Fairfax, VA, Arlington 2004.
54. Mayer, T. S., “Synthesis, Assembly, and Characterization of Molecular Junctions for Nanoscale Electronics,” *Workshop France-USA Molecular-Scale Electronics*, Paris, FA, December 2003.
55. Mayer, T. S. “Molecular Logic Architectures using Functionalized Nanowires,” *Workshop on Nanoscale Materials and Processes*, Ottawa, CA, August 2003.
56. Mayer, T. S., “Nanoscale Molecular Electronic Junctions,” *Workshop on Molecular Conduction*, West Lafayette, IN, July 2003.
57. Mayer, T. S., “Nanoelectronic Building Blocks: Synthesis, Assembly and Characterization,” *USA-Argentina Workshop on Molecular Electronics*, Quilmes, AR, May 2003.
58. Mayer, T. S., “Synthesis and Electrical Characterization of Metal-Molecule-Metal Junctions for Nanoscale and Molecular Electronics,” *American Physical Society March Meeting*, Austin, TX, March 2003.
59. Mayer, T. S., “Nanoelectronic Building Blocks: Metallic, Semiconducting, and Molecular Electronic Nanowires,” *US-Japan Symposium on Tools and Metrology for Nanotechnology*, Ithaca, NY, January 2003.
60. Redwing, J. M., K.K. Lew, T. Bogart, M. Cabassi, Y. Wang, and T. Mayer, “Synthesis, Doping and Characterization of Semiconductor Nanowires,” *Workshop on Selective, Patterned and Self-assembled Growth of Nanostructures*, Hong Kong University of Science and Technology, January 2003; presented by J. M. Redwing.
61. Mayer, T. S., Cai, L., H. Skulason, J. Mattzela, J. Kushmeric, S. K. Pollack, J. Naciri, R. Shashidhar, T. E. Mallouk, “In-wire Molecular Electronic Devices: Template Synthesis and Electrical Characterization,” *United Engineering Foundation Conference on Molecular-Scale Electronics*, Key West, FL, December 2002.
62. Mayer, T. S., “Molecular Electronics Activities at Penn State,” *Pennsylvania Nanotechnology Workshop*, Harrisburg, PA, October 2002.
63. Mayer, T. S., “Template Directed Growth, Assembly, and Characterization of Nanoelectronic Components: Metallic, Semiconducting, and Molecular Electronic Nanowires,” *Physics and Chemistry of Nanostructure Fabrication Gordon Research Conference*, Tilton, NH, July 2002.
64. Mayer, T. S., “Heterogeneous Integration of Nanosensors,” *Heterogeneous Integration Workshop*, Arlington, VA, July 2002.
65. Mayer, T. S., “Hybrid Integration – Molecular and Silicon,” *Information Science and Technology Nanometer Computing Workshop*, Pittsburgh, PA, April 2002.
66. Mayer, T. S., “Molecular Electronic Devices and Architectures,” *US-Japan Joint Moletronics Workshop*, Phoenix, AZ, March 2002.
67. Mayer, T. S., “Synthesis, Assembly, and Characterization of Molecular Electronic Devices and Architectures,” *Human/Robotic Exploration Workshop*, Hampton, VA, November 2001.
68. Mayer, T. S., S. C. Goldstein, T. E. Mallouk, C. D. Keating, and T. N. Jackson, “Molecular Electronic Building Blocks: Functional Metal Nanowires,” *American Chemical Society National Meeting*, Chicago, IL, August 2001.

69. Mayer, T. S., T. N. Jackson, C. D. Keating, and T. E. Mallouk, "Electrical Characterization of Molecular Electronic Devices Integrated with Metallic Nanowires," *Materials Research Society Spring Meeting*, San Francisco, CA, April 2001.
70. Mayer, T. S., T. N. Jackson, C. D. Keating, and T. E. Mallouk, "Electric Field Assisted Assembly of Metallic Nanowires for Characterization of Molecular Electronic Devices," *Materials Research Society Fall Meeting*, Boston, MA, November 2000.
71. Mallouk, T. E., B. R. Martin, D. L. Dermody, J. K. N. Mbindyo, B. D. Reiss, D. Furnanage, M. Cabassi, P. Smith, N. I. Kovtyukhova, C.D. Keating, and M. Natan, "Electrically Useful Materials from Self-Assembly Interactions," *American Chemical Society National Meeting*, Washington DC, August 2000; presented by T. E. Mallouk.
72. Keating, C. D., M. Natan, T. E. Mallouk, and T. S. Mayer, "High Aspect Ratio, Segmented Metal Nanoparticles for Bioassays and Nanoscale Electronics," *American Chemical Society National Meeting*, Washington, DC, August 2000; presented by C. D. Keating.
73. Mallouk T. E., B. K. Kelley, B. R. Martin, J. K. N. Mbindyo, P. A. Smith, T. S. Mayer, T. N. Jackson, and M. Chan, "Synthesis of Metal Nanowires and Low Temperature Electron Transport Properties," *American Chemical Society National Meeting*, Washington DC, August 2000; presented by T. E. Mallouk.
74. Mayer, T. S., "Self Assembly of Metallic Nanowires for Nanoscale and Molecular Electronics," *Chemistry and Physics of Nanostructure Fabrication Gordon Research Conference*, Tilton NH, July 2000.
75. Mayer, T. S., T. Jackson, M. Natan, T. Mallouk, "Self-Assembly of Nanometer-Scale Metallic Wires for Molecular Electronics," *Electronic Materials Conference*, Denver, CO, June 2000.
76. Mayer, T. S. "Self-Assembly of Nanoscale Devices for Molecular Electronics," *CZ-US Moletronics Workshop*, Institute of Chemical Technology, Prague, CZ Republic, June 2000.
77. Mayer, T. S., J. Mattzela, C. D. Nordquist, P. A. Roman, and J. Ruzyllo, "Heterogeneous Materials Integration: From Wafer Bonding to Self-Assembly," *Seventeenth Conference on Crystal Growth and Epitaxy*, Fallen Leaf Lake, CA, June 2000.
78. Mayer, T. S., "Self-Assembly of Nanoscale Devices for Molecular Electronics," *Nanoscale and Molecular Electronics Workshop*, Arlington, VA, May 2000.
79. Mayer, T. S., T. N. Jackson, M. J. Natan, T. E. Mallouk, "Self-Assembly of Nanoscale Components for Molecular Electronics," *Materials Research Society Fall Meeting*, Boston, MA, November 1999.
80. Mayer, T. S., "Bottom-up Assembly of Nanowires for Sensitive Skin Applications," *Sensitive Skin Workshop*, Alexandria, VA, October 1999.
81. Mayer, T. S., "Development and Implementation of a Design-Oriented Laboratory for the Introductory Circuits Core Course at Penn State University," *ECSEL/MIT Engineering Education Workshop*, Boston, MA, April 1999.
82. Mayer, T. S., "Overcoming Dislocations in Lattice Mismatched Devices using Compliant Substrates," *Advanced Heterostructure Workshop*, Kohala, HI, November 1998.
83. Mayer, T. S., "Growth of the $\text{In}_x\text{Ga}_{1-x}\text{As}$ Epitaxial Layers and Devices on GaAs-Based Compliant Substrates," *Workshop on Bonded and Compliant Substrates*, San Juan, PR, Jan. 1998.
84. Mayer, T. S., "A Design-Oriented Laboratory for the Introductory Circuits Core Course at Penn State University," *Learning By Design Workshop*, Washington, DC, October 1997.

Colloquia Presentations, Public Lectures, and Short Courses

1. “Directed Assembly Strategies for Nanoelectronic and Photonic Devices,” University of Virginia, Charlottesville VA, May 2014.
2. “Field-Assisted Directed Assembly of Nanoparticle Arrays to Advance Lithography,” Intel Corp, Portland, OR, February 2014.
3. “Directed Assembly Strategies for Nanoelectronic and Photonic Devices,” Engineering, Chemistry, Physics Seminar Series, Portland State University, Portland, OR, February 2014.
4. “Adding New Capabilities to Silicon CMOS via Deterministic Nanowire Assembly,” Engineering Physics Seminar, Ecole Polytechnique de Montreal, Montreal, CA, October 2013.
5. “Adding New Capabilities to Silicon CMOS via Deterministic Nanowire Assembly,” Materials Science and Engineering Seminar, University of Delaware, Newark, DE, April 2013.
6. “Adding New Capabilities to Silicon CMOS via Deterministic Nanowire Assembly,” Materials Science Engineering Seminar, University of Michigan, Ann Arbor, MI, February 2012.
7. “Deterministic Nanowire Assembly to Enable ‘More than Moore’ Applications,” Nanoelectronics Seminar, IBM Zurich, Zurich, Switzerland, September 2012.
8. “Programmed Deterministic Assembly for Multianalyte Biological and Chemical Sensor Integration, University of Illinois, Urbana, IL, April 2011.
9. “Programmed Deterministic Assembly for Multianalyte Biological and Chemical Sensor Integration,” Birck Nanotechnology Center, Purdue University, West Lafayette, IN, April 2011.
10. “Nanowire Tunnel FETs,” Intel Corp., Portland, OR, March 2011.
11. “Deterministic Nanowire Assembly to Enable ‘More than Moore’ Applications,” IBM T. J. Watson, NY, February 2011.
12. “Enabling the Convergence of Life Sciences with Chip-Scale Electronics by Deterministic Nanowire Assembly,” NSF More Than Moore Workshop, Arlington, VA, August 2010.
13. Outreach: “Enabling the Convergence of Chemistry and Biology with Chip-Scale Electronics by Deterministic Nanowire Assembly,” NanoTeach, Denver, CO, July 2010.
14. “Fabrication of Metallodielectric Nanostructures for Optical and Infrared Metamaterials: Top-Down Meets Bottom-Up,” Air Force Research Laboratory, Dayton, OH, March 2010.
15. “Electromagnetically-coupled nanostructures: Channeling and manipulating RF through visible,” Taylor Lecture, Penn State University, University Park, PA, 2010.
16. “Directed Assembly of Nanoelectronic and Nanoelectromechanical Devices,” CNRS National Center for Scientific Research, Grenoble, FR, August 2008.
17. “Recent Advances in Nanomanufacturing for Electronic and Optical Device Technology,” NTI Workshop, Philadelphia, PA, October 28, 2008.
18. Undergraduate outreach: “Introduction to Nanoscience and Nanotechnology,” Resnick Lecture, Lafayette College, Lafayette, PA, October 27, 2008.
19. “Reconfigurable Metallodielectric Nanostructures,” Johns Hopkins Applied Physics Laboratory, Baltimore, MD, March 27, 2008.
20. Outreach: “Nanoscience and Technology: Fundamentals to Applications,” Society of Hispanic Professional Engineers Eastern Regional Conference, Washington DC, February 22, 2008.
21. Outreach: “Nanoscience and Technology: Fundamentals to Applications,” Society of Hispanic Professional Engineers National Conference, Philadelphia, PA, November 1, 2007.

22. Outreach: “Commercializing Nanotechnology: Materials Applications,” Ben Franklin Nanomaterials Forum, Philadelphia, PA, March 11, 2007.
23. “Silicon Nanowire Electronics,” Department of Materials Science and Engineering Seminar Series, Johns Hopkins University, February 28, 2007.
24. “Electrical and Spectroscopic Characterization of Metal-Molecule-Metal Junctions,” Virginia Tech *Advance Scholar*, May 21, 2006.
25. “Electrical and Spectroscopic Characterization of Metal-Molecule-Metal Junctions,” Columbia University Nanoscale Science and Engineering Center Seminar Series, Columbia University, April 22, 2006.
26. “Silicon Nanowires as Nanoelectronic Building Blocks,” Chemical and Physical Sciences Seminar Series, Sandia National Laboratory, September 2004.
27. “Directed Assembly of Molecular Logic Architectures using Functionalized Nanowires,” Materials Science and Engineering Colloquium Series, Penn State University, October 2003.
28. “Directed Assembly of Molecular Logic Architectures using Functionalized Nanowires,” at the Molecular Electronics Workshop, Arlington, VA, July 2003.
29. “Synthesis and Characterization of Metal-Molecule-Metal Nanowire Junctions,” School of Electrical and Computer Engineering Seminar Series, Cornell University, April 2003.
30. Short Course: “Synthesis and Integration of Functional Nanostructures: The Path Towards Integrated Nanosystems,” American Physical Society March Meeting, March 2003.
31. “Nanoelectronic Building Blocks: Metallic, Semiconducting, and Molecular Electronic Nanowires” CORE Seminar Series, University of Canterbury, New Zealand via teleconference, November 2002.
32. “Nanoelectronic Building Blocks: Metallic, Semiconducting, and Molecular Electronic Nanowires” Nanotechnology Seminar Series, Purdue University, September 2002.
33. “Directed Assembly of Molecular Logic Architectures using Functionalized Nanowires,” Molecular Electronics Workshop, Phoenix, AZ, September 2002.
34. “Integrated Biosensor Arrays for Medical Applications” Medical Advances Seminar Series, Dartmouth College, May 2002.
35. “Molecular Electronic Building Blocks,” Naval Research Laboratory, Laboratory for Molecularly Engineered Materials and Surfaces, February 2002.
36. “Directed Assembly of Molecular Logic Architectures using Functionalized Nanowires,” Molecular Electronics Workshop, Arlington, VA, July 2001.
37. Public Lecture: “Molecular Computers that Build Themselves? Molecular Electronics and Directed Assembly,” NASA Langley Sigma Series Lecture, Air and Space Museum, Hampton, VA, July 2001.
38. “Molecular Computers that Build Themselves?: Molecular Electronics and Directed Assembly,” NASA Langley Research Center, Hampton, VA, July 2001.
39. “Self-Assembly of Anisotropic Metallic Wires for Nanoscale and Molecular Electronics,” Electrical Engineering Seminar, Princeton University, Princeton, NJ, November 2000.
40. “Self-Assembly of Nanometer-Scale Metallic Wires for Molecular Electronics” Technical Seminar Series, Lucent Technologies, Murray Hill, NJ, October 2000.
41. “Inorganic Self-Assembly Routes to Three-Dimensional Memories and Logical Mesostuctures,” Molecular Electronics Workshop, Santa Fe, NM, July 2000.

42. Short Course: “Integration of Dissimilar Materials,” Indium Phosphide and Related Materials Conference, Williamsburg, VA, May 2000.
43. “Self-Assembly of Anisotropic Metallic Wires for Nanoscale and Molecular Electronics,” Frontiers in Materials Science Seminar Series, Penn State University, University Park, PA, April 2000.
44. “Fabrication and Characterization of a 3-D Simple Cubic Photonic Crystal,” Electrical Engineering Seminar, University of Minnesota, Minneapolis, MN, November 1999.
45. “Inorganic Self-Assembly Routes to Three-Dimensional Memories and Logical Mesostuctures,” Molecular Electronics Workshop, George Mason University, Fairfax, VA, July 1999.
46. “Fabrication and Analysis of 3D GaAs-based Photonic Crystals,” NSF CAREER Review, Arlington, VA, January 1999.
47. “Use of Lateral AlGaAs Oxidation to Fabricate GaAs-Based Compliant Substrates,” Compliant and Alternative Substrate Workshop, University of Wisconsin, Madison, WI, April 1998.
48. “Wafer Bonding for Novel Lattice-Mismatched Devices,” Electrical Engineering Department Seminar, Carnegie Mellon University, Pittsburgh, PA, December 1997.
49. “Compliant Substrates and Wafer Bonding for Novel Lattice-Mismatched Devices,” Northrup Grumman, Pittsburgh, PA, November 1997.
50. “Compliant Substrates and Wafer Bonding for Novel Lattice-Mismatched Devices,” Hughes Research Laboratory, Malibu, CA, September 1997.