

## Theresa Stellwag Mayer

Executive Vice President for Research and Partnerships  
Professor, Electrical and Computer Engineering  
Purdue University  
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### Education

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

### Key Positions

2019 – pres. Executive Vice President for Research and Partnerships, Purdue University  
2019 – pres. Professor, Electrical and Computer Engineering, Purdue University  
2019 – pres. Research Professor, Electrical and Computer Engineering, Virginia Tech  
2016 – 2019 Vice President for Research and Innovation, Virginia Tech  
2016 – 2019 Professor, Electrical and Computer Engineering, Virginia Tech  
2016 – 2019 Adjunct Professor, Electrical Engineering, Penn State University  
2014 – 2016 Associate Dean for Research and Innovation, Penn State University  
2012 – 2016 Distinguished Professor, Electrical Engineering, Penn State University  
2009 – 2016 Professor, Materials Science and Engineering, Penn State University  
2006 – 2014 Associate Director, Materials Research Institute, Penn State University  
2006 – 2012 Professor, Electrical Engineering, Penn State University  
1999 – 2005 Associate Professor, Electrical Engineering, Penn State University  
1994 – 1999 Assistant Professor, Electrical Engineering, Penn State University  
1988 – 1993 Research Assistant, Purdue University  
1986 – 1988 Engineering Staff Member, Allied-Signal, Inc.

### Professional Summary

Theresa S. Mayer is the executive vice president for research and partnerships at Purdue University, where she oversees the \$670 million research enterprise of the university and supports holistic engagements with federal, industry, and global strategic partners. Prior to this role, she was the vice president for research and innovation at Virginia Tech. During her 22-years at Penn State University, she served as the associate dean for research and innovation in engineering, the site director of the NSF National Nanotechnology Infrastructure Network and director of the Materials Research Institute Nanofabrication Laboratory, which enabled cutting-edge materials and techniques to be shared among researchers in academia and industry. She is widely recognized for her work in advanced manufacturing of nanoscale electronic, optical, and biomedical devices, which has been supported by the NSF, DOD, DOE, NIH, and industry. Mayer has over 350 technical publications, invited presentations and tutorials, and holds ten patents in these areas. Several of her inventions have been transitioned into commercial and military systems. She is actively engaged in service to her profession and the nation, including the U.S. President's Council of Advisors on Science and Technology, PCAST. She is a fellow of the Institute for Electrical and Electronics Engineers, and has received numerous awards for her teaching and research, including the NSF CAREER award. Mayer received a B.S. in electrical engineering from Virginia Tech, and a M.S. and Ph.D. in electrical engineering from Purdue University. Throughout her career, she has supported the advancement of women in science and engineering.

## Leadership and Administrative Accomplishments

### Executive Vice President for Research and Partnerships, Purdue University

Purdue University is the state of Indiana's comprehensive land-grant university with over 1930 tenure-line faculty, 840 research faculty and postdocs, and 44,500 undergraduate and graduate students. The university reached a record \$670 million in research expenditures in fiscal year 2019. Currently, Purdue is ranked 39th in the National Science Foundation annual survey of higher education research expenditures out of over 600 private and public universities reporting, and 22nd among public research universities.

As the chief research officer, Mayer leads the Office of the Executive Vice President for Research and Partnerships, which supports Purdue's university-wide efforts in research as well as industry, global, federal, and state partnerships. The research enterprise spans ten academic colleges, more than 20 university-level interdisciplinary research institutes and centers, and research-related affiliated organizations with primary locations across the state: main campus in West Lafayette; regional campuses in Northwest and Fort Wayne; and Agriculture Research and Extension Centers throughout Indiana. The Office actively engages internal and external stakeholders as well as partners to define and implement Purdue's research and innovation strategic plan goals to:

- Increase extramural research funding across all sectors
- Expand public-impact interdisciplinary research and creative expression
- Promote and reward scholarly excellence and expression across all colleges
- Foster holistic industry, global, federal and state partnerships
- Create pathways to translate research discoveries into commercial products and services
- Provide effective and efficient research administration and compliance
- Support state-of-the-art infrastructure and accreditations

### *Primary Roles and Responsibilities*

- Provides fiscal oversight for the \$40+ million annual institutional budget (not including sponsored program funds) that support the divisions within the office, the research institutes and centers that report to the office, and the university-wide enterprise.
- Oversees the structure and staffing to support the university-wide research enterprise: sponsored programs strategy and administration; scholarly integrity and research compliance; animal care and use; communications, business operations, facilities units.
- Guides and supports strategic research program development and investments, including university-level research institutes, centers, core laboratories, and affiliated organizations.
- Oversees the divisions that create, grow, and steward holistic strategic partnerships with industry, federal and state agencies, and global in collaboration with the Offices of Provost, Development, Government Relations, Online, Research Foundation, and the Colleges.
- Represents Purdue's research and innovation enterprise internally and externally.
- Advises the president, executive vice president and provost, treasurer, and other members of president's leadership team in oversight and decision making on a broad range of research and innovation-related matters.
- Advocates for regional, state, and federal support and funding for strategic research and economic development initiatives in collaboration with Office of Government Relations.
- Supports the university's advancement priorities by developing pathways for corporate and private philanthropy in collaboration with the Office of University Development.

- Strengthens opportunities and experiences for undergraduate through post-graduate research in collaboration with the Offices of the Provost and Vice President for Graduate Studies.
- Member of the President's executive staff and leadership team.
- Representative to Purdue Board of Trustees.
- See full list of administrative board and committee memberships in academic CV.

### Vice President for Research and Innovation, Virginia Tech

Virginia Tech is the Commonwealth's comprehensive land-grant university with over 1490 tenure-line faculty, 690 research faculty and postdocs, and 34,950 undergraduate and graduate students. The university reached a record \$531.6 million in research expenditures in fiscal year 2018. Currently, Virginia Tech is ranked 46th in the National Science Foundation annual survey of higher education research expenditures out of over 600 private and public universities reporting, and 30th among public research universities.

As the chief research officer, Mayer led the Office of the Vice President for Research and Innovation, which supports Virginia Tech's university-wide efforts in research, creative expression, and translation. The research enterprise spans nine academic colleges (including a medical school integrated in 2018), eight university-level interdisciplinary research institutes, and three research-related affiliated corporations with primary locations across the state: main campus in Blacksburg; health science and technology campus with Carilion Clinic in Roanoke; science, technology, business, and design focused districts in Northern Virginia; and Agriculture Research and Extension Centers throughout Virginia.

### *Key Achievements*

#### *Office of the Vice President for Research and Innovation*

Led effort to position the Office of the Vice President for Research and Innovation as a forward-looking organization that provides both strategic direction and foundational support to accelerate Virginia Tech's growth in external research support, scholarly excellence, recognition and impact.

- Engaged faculty groups, external peers and consultants to evaluate and benchmark the effectiveness of the structure, operations, processes, and investments to enhance research competitiveness.
- Realigned the office into primary divisions with clear functional responsibilities, reporting structures, and matrixed leadership to support Virginia Tech's evolving research and innovation portfolio and priorities as well as external changes in higher education, state and federal government.
  - Integrated scholarly integrity and research compliance functions into a single division. Recruited an Associate Vice President with a three-year goal to establish a campus ethics consultation network, prepare the Human Research Protections Program for AAHRPP accreditation, and enhance Conflict of Interest for entrepreneurial activities.
  - Elevated and recruited an Associate Vice President for sponsored programs strategy and administration. Deploying matrixed model for pre-award services with colleges and for industry agreements with discovery-to-market division.
  - Elevated and recruited an Associate Vice President to oversee animal care and use, laboratory animal resources, and serve as the University Attending Veterinarian with a three-year goal of university-wide AAALAC accreditation.
  - Aligned finance, human resources, and information technology units to support the divisional director model with formal matrixed reporting structure to central divisions, migrating from a largely transactional business model to a strategic focus.

- Strengthened the electronic research administration (e-RA) unit and recruited a director, joint with Division of Information Technology, to oversee enhancements to the sponsored program, compliance, and shared experimental user laboratory platforms.
- Elevated and recruiting an Assistant Vice President for research communications and marketing, joint with University Relations, to align priorities across the university.
- Established and recruited a Chief of Staff to serve as a key liaison with internal and external constituencies, including state leaders and boards, and oversee continuous strategic planning.
- Forming a new division for Strategic Research Program Development and recruiting an Associate Vice President to proactively pursue strategic federal and foundation opportunities through a matrixed model that dynamically engages supporting groups from the research institutes, sponsored programs, Northern Virginia-based federal relations, and foundations relations team.
- Realigning an \$8 million annual institutional investment to integrate two research institutes with overlapping missions into a single interdisciplinary research institute that houses co-funded faculty from multiple colleges and university-wide shared user labs to enhance reputation and impact.
- Established a cohesive structure to advance national security and technology research profile by elevating the Hume Center to university-level center and coordinating business development with VT-ARC. Secured funding and completed construction on a new 45,000 sq. ft. Applied Research Building to support a rapidly growing restricted research portfolio in these areas.

#### *Growing the Size and Diversity of the Externally Sponsored Research Portfolio*

After five years of stagnant external research expenditures, Virginia Tech has reemerged with strong growth in expenditures from an increasingly diverse portfolio of external sponsors. The growth aligns with areas of strategic investment through research institutes, faculty recruitment, shared labs, and partners.

- Large increase in FY18 federal funding of 8% over previous year, with major support from DoD, NIH, and NSF. Projections are for similar to larger growth this fiscal year.
- Large increase in FY18 direct funding from industry of 9% over previous year, accounting for a record 16% of Virginia Tech's total external funding, and ranking the university 32nd nationally. Projections for this fiscal year are an additional 10% growth over 2018.
- Awarded 15 NSF CAREER grants in 2018, with 34 currently active. Only three other universities exceed this number of new awards in 2018.
- Awarded an NSF Molecular Sciences Software Institute, a \$19 million hub to strengthen the scientific software ecosystem. Also a NSF National Nanotechnology Coordinated Infrastructure site.
- Received a record number of NIH R01 and equivalent awards, and a NIH Clinical and Translational Science Award (CTSA) with University of Virginia.
- Received a record number of new awards valued at over \$1 million/year from non-traditional federal sponsors such as DARPA, I-ARPA, DTRA, Pentagon, etc.
- Joined the Systems Engineering Research Center UARC led by Stephens Institute, and awarded new IDIQ contract with \$5 million/year ceiling from NRO to support next generation space technologies.
- Formed new partnerships with federal laboratories in the metro-DC area and across the country, including ARL Open Campus, NIST and PNNL joint faculty.

#### *Supporting the Commonwealth's Initiatives in Research and Economic Development*

The Commonwealth passed legislation in 2016 to establish a Virginia Research Investment Fund to support the academic research enterprise in the state. The fund is overseen by a committee of leaders from state

government and industry. The chief research officers serve as liaisons to the committee, and were actively engaged in a comprehensive state-wide research asset assessment conducted by TEconomy partners.

- Provided leadership to implementation advisory team to make recommendations on priorities for support of several multi-university translational research centers and enhancements to technology transfer and entrepreneurial ecosystems near major research universities.
  - Finalist for \$1.5 million pilot funding for each of four translational research centers in space and satellite systems, autonomous systems, big data, and cardiovascular health.
  - Responded to a request for up to \$800K in annual match to support tech transfer, including non-reimbursed patent expenses, entrepreneurs in residence, and proof-of-concept.
  - Engaging in regional entrepreneurial ecosystem development that leverages support from the state-wide Go Virginia initiative to stimulate regional economic growth and startups.
- Supported the creation of the \$25 million Commonwealth Cyber Initiative (CCI), leveraging the established strengths of the Hume Center for National Security and Technology, to serve as an engine for research, innovation, and commercialization of cybersecurity technologies, and address the need for growth of advanced degrees within the cyber workforce. Subsequent legislation was passed to provide a recurring base of \$20 million for the Hub and state-wide network of nodes.
  - Led the preparation of CCI implementation blueprint, which was adopted by VRIC. Engaged over 100 stakeholders from 16 public and private universities, industry, and nonprofits.
  - With an initial \$15 million investment and \$10 million recurring base, Virginia Tech is creating a CCI Hub in Northern Virginia with a highly concentrated group of co-located faculty, state-of-the-art shared research lab, instructional, partnership and innovation space.
  - With an initial \$10 million investment and \$10 million recurring base, Virginia Tech is providing leadership to coordinate the state-wide network of regional CCI nodes, each led by a university in the region.
  - Leading an executive search to recruit the CCI director, who will report to the Virginia Tech VPRI and be accountable to the VRIC and external board for network metrics.
- Led Virginia Tech's engagement with the Virginia Economic Development Partnership (VEDP) in support of all stages of Northern Virginia's Amazon HQ2 proposal process, from concept development through the on-site visit and final negotiation.
  - Collaborated with the VEDP president and his team to develop a comprehensive strategic and financial plan to address Amazon's tech talent, research, and innovation needs aligned with an incentive package that gained support from the state MEI project committee. This plan formed the basis of the state-wide \$1.1 billion higher-ed package to fund faculty start-ups, facilities, and E&G for 25,000 new computational science degrees over 20 years.
  - Supported the development of the Virginia Tech Innovation Campus in Northern Virginia as a central component of the package. With a \$250 million state commitment, it will fund start-up for 40 new faculty in computer-science related fields. An additional \$344 million is committed to support the undergraduate tech talent pipeline on the Blacksburg campus, funding start-up for 135 additional new faculty across multiple colleges. This support in new faculty and facilities will have a transformation impact on Virginia Tech's national and global brand.
  - Serving as a member of the executive team overseeing the implementation for both campuses, and guiding the alignment with strategic research and innovation goals.

*Increasing the scale and impact of industry partnerships, tech transfer, and new ventures*

Increasing the scale and impact of industry partnerships and new ventures is a high priority shared by the president, the Board of Visitors, the Commonwealth, and alumni and donors. An integrated model has been deployed to align our structures and investments to the changing needs of industry and investors.

- Established a new division that forms an integrated Discovery-to-Market platform, joint with the Office of the Vice President for Advancement, and recruited an Associate Vice President.
  - Center for advancing industry partnerships, LINK, which nurtures a holistic approach to industry partnerships, streamlining the path to partnership for research, philanthropy, talent and more by matching company needs to Virginia Tech's assets and strengths.
  - Center for new ventures, LAUNCH, which provides a university-wide approach to translate research into start-ups by supporting a proof-of-concept grant program, alumni mentor network, angel and venture investor network, and interface to regional hubs and incubators.
  - Technology Transfer Affiliated Corporation (VTIP) that supports all aspects of intellectual property evaluation, protection, licensing, and equity.
  - Integrate functional teams from LINK, VTIP, Sponsored Programs to lower barriers for intellectual property on industry contracts and streamline operations.
- Executed a record number of master research agreements with strategic industry partners to reach or exceed \$1 million in direct research expenditures annually, and a comparable or larger amount in corporate philanthropy, and include Ford, Lockheed Martin, Rolls Royce, HII, and Boeing.
- Organizing strategic industry engagement events, from multi-day research and talent recruitment visits to roundtable events with C-Suite executives, to increase participation.
- Continued growth industry affiliate and NSF IUCRC's, reaching \$7+ million annual memberships.
- Implemented a new industry affiliate model that leverages the unique facilities and data at the VT Transportation Institute with 10+ Tier 1 partners contributing \$1 million each over two years.
- Secured two \$3 million research gifts and others approaching \$1 million in FY18, which represents a significant increase in gift size (not including corporate sponsorship).
- Retained RTI to evaluate Virginia Tech's tech transfer structure and operation, conduct a portfolio assessment, and make recommendations for enhancements. Anticipate VRIF to increase support for non-reimbursed patent expenses and supporting personnel and programs.
- Secured funding to establish a \$400K proof-of-concept grant program that will leverage matching support from colleges and institutes. Anticipate VRIF to increase support in targeted areas.
- Partnered with the VT Foundation and Carilion to establish a \$15 million Innovation Fund and a \$5 million Seed Fund to support the regional entrepreneurial ecosystem. The Seed Fund will allow investment by alumni and friends of both organizations.

#### Associate Dean for Research and Innovation, College of Engineering, Penn State University

Led the College of Engineering Research and Innovation Office that supported 265 faculty, 70 research associates, 80 postdoctoral scholars, and >1300 graduate students with a diverse research portfolio that exceeded \$130 million 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. Served as the Chair of the University Research Council.
- Oversaw college research administration team responsible for pre-award processing, post-award management, cost-sharing, financial and regulatory compliance.
- Supported technical and administrative development of multidisciplinary center proposals.
- Increased college-level industry engagement through strategic research partnerships, student internships and professional development, and philanthropic donations.
- Engaged college alumni to develop new industry partnerships and to assist in technology transition and entrepreneurship activities.
- Enhanced the innovation ecosystem to support faculty and graduate student education and engagement in intellectual property, commercialization, and start-up formation.
- Implemented an updated college-level research marketing strategy and web portal.
- Assisted with cross-college and institute co-funded faculty recruiting and hiring, including the College of Medicine/College of Engineering memorandum of understanding for co-funded faculty.
- Served as the research liaison to the Penn State Applied Research Laboratory, a University Affiliated Research Laboratory and state initiatives with the Ben Franklin Technology Partnership and the Philadelphia Navy Yard.

#### Associate Director, Materials Research Institute, Penn State University

Directed (co-directed after 2012) the campus-wide Nanofabrication Laboratory and served as the Director of the Penn State Site of the 18 university NSF-funded National Nanotechnology Infrastructure Network (NSF-NNIN).

- Moved the administrative home of the Nanofabrication Laboratory from the College of Engineering, where it had accumulated over \$1M in debt, to the Materials Research Institute.
- Reorganized the operational structure and implemented an investment strategy to serve the research and instructional needs of Penn State faculty and external academic, industry, and government users through the NSF NNIN.
- Developed and implemented strategic plan; led move to 18,000 sq. ft. cleanroom and support space in state-of-the-art Millennium Science Complex; >\$1.3M annual operating budget with average >\$1M annual capital equipment budget.
- Migrated academic coursework to state-of-the-art Nanofabrication Laboratory.
- Served on the executive leadership team of the NSF-funded Materials Research Science and Engineering Center (NSF-MRSEC) and as an Interdisciplinary Research Group leader for three consecutive six year cycles of the program.

- Participated on the leadership team of multiple center-level initiatives supported by the Semiconductor Research Corporation (SRC) and the Defense Advanced Research Projects Agency (DARPA).

## Honors and Awards

2020	US President's Council on Science and Technology, member
2019	Women Making History, White House National Nanotechnology Initiative
2018	Outstanding Alumni Award, Electrical and Computer Engineering, Purdue University
2016	Fellow, Institute for Electronic and Electrical Engineers (IEEE)
2015	Fellow, CIC/Big 10 Alliance, Academic Leadership Program
2009	Outstanding Research Award, Penn State Engineering Society
2006	NSF Advance Scholar
2000	Outstanding Teaching Award, Penn State Engineering Society
1995	NSF CAREER Award
1993	Violet B. Haas Award for the Advancement of Women
1991	Kodak Graduate Fellow, through 1993
1989	Member, Eta Kappa Nu
1987	Member, Tau Beta Pi

## External Leadership and Service

### Regional, State, National Boards and Committees (representing Purdue)

- Member, Board of Directors, National Defense Industry Association, 2019 – present.
- Member, Senior Research Officer Committee, American Association of Universities, 2019 – present.
- Member, Senior Research Officer Committee, BigTen Academic Alliance, 2019 – present.
- Member, Board of Directors, Biocrossroads, 2019 – present.
- Member, Board of Directors, Regenstrief Foundation, 2019 – present.
- Member, Strategic Advisory Group, Indiana Innovation Network, 2019 – present.
- Member, Board of Directors, Indiana Biosciences Research Institute, 2020 – present.

### Regional, State, National Boards and Committees (representing Virginia Tech)

- Board of Directors, Valley Innovation Council (regional tech economy and investment)
- Member, Chief Research Officer Group, State Council on Higher Education in Virginia (SCHEV)
- Representative, Virginia Research Investment Committee (VRIC) and Fund (VRIF)
- Member, VRIC Implementation Advisory Team for Translational Research Centers and Regional Entrepreneurial Ecosystem Development
- Executive Committee, Association of Public and Land Grant University (APLU), Council on Research
- Representative, Universities Research Association (URA)
- Board of Directors, National Institute for Aerospace

## Professional Societies

### *Institute of Electrical and Electronic Engineers (IEEE)*

- IEEE Transactions on Nanotechnology  
Senior Editor, 2015 – 2020
- IEEE International Electron Device Meeting (IEDM)



Program Committee: Sensors, MEMS, and BioMEMS, 2015 – 2016

IEEE Electron Devices Society (EDS)

Education Award Committee, 2007 – 2016

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

**Professional Review Committees and Advisory Boards**

*Hong-Kong University Grant Committee Research Assessment Panel Review*

Remote Review, Electrical Engineering Panel Assessment for Hong Kong Universities, 2020.

*Wissenschaftsrat (WR) and Deutsche Forschungsgemeinschaft (DFG) Panel Reviews*

On-site Panel Review, Universities of Excellence Program, Berlin University Alliance, 2019  
 Panel Review, Clusters of Excellence Program, 2017

*University Program Reviews and Boards*

External Evaluator, University of Washington Nanofabrication Facility, 2016  
 External Evaluator, University of Michigan Lurie Nanofabrication Facility, 2013  
 External Advisory Board, Nanoelectronics Computation Network, Purdue University, 2012 – 2016  
 Executive Committee, Midwest Institute for Nanoelectronics Discovery, 2007 – 2012

*Department of Energy, Office of Science*

Budget Review Panel, Sandia and Los Alamos, Center for Integrated Nanotechnologies, 2014  
 Small Business Innovative Research (SBIR) Proposal Review, 2004, 2007

*National Science Foundation Panel Reviews and Site Visits*

Unsolicited Proposal Reviews, 1995 – present  
 MRSEC Reverse Site Visit Panel, University of Minnesota, 2016  
 NIRT Scalable Nanomanufacturing Panel, 2013  
 MRSEC White Paper and Reverse Site Visit Panel, 2011  
 PREM Site Visit Panel, Johns Hopkins/Howard University, Washington, DC, 2009  
 NSEC Site Visit Panel, University of Massachusetts, Amherst, MA, 2008  
 Major Research Instrumentation Panel, 2006, 2007, 2013  
 MRSEC Site Visit Panel, University of Virginia, Charlottesville, VA, 2003  
 NSEC Site Visit Panel, Columbia University, New York, NY, 2003  
 NSEC Site Visit Panel, Harvard University, Boston, MA, 2003  
 MRSEC Site Visit Panel, MIT, 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-EPDS Joint Collaborative Program Panel, 1995

*National Institutes of Health Study Sections*

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

**Expert Panels and Workshops**

Testify at the House Science, Space, and Technology Subcommittee on Research and Technology Hearing on the Impact of COVID-19 on University Research, 2020  
 OSTP Joint Committee on Research Environment, 2019  
 APLU COR Annual Meeting, Centers and Institute Models Panel, 2019.  
 Defense Advanced Research Projects Agency, Research Protections Roundtable, 2019  
 APLU COR Annual Meeting, Research Data Uses Panel, 2018.  
 APLU National Meeting, HIBAR and Grand Challenges Panel, 2017.  
 M-Foresight Alliance for Manufacturing, Metamaterials Manufacturing Workshop, 2017  
 National Science Foundation, Beyond CMOS Workshop, 2013  
 National Institutes of Standards and Technology, Self and Directed Assembly Workshop, 2008

**Journal Review and Editorships**

*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 Editorships*

Senior Editor, IEEE Transactions on Nanotechnology, 2015 – present  
 Co-Editor, Proceedings on “Nanowire Electronics,” Materials Research Society, 2008, 2011  
 Editor, Proceedings on “Self and Directed Assembly,” Materials Research Society, 2007.  
 Co-Editor, Special Issue on “Compliant and Alternative Substrates,” Journal of Electronic Materials, 1999.

**Institutional Leadership and Service****Purdue University***University and Foundation*

Member, President’s Executive Staff and Leadership Team, 2019 – present.  
 Representative, Purdue Board of Trustees, 2019 – present.  
 Member, Board of Directors, Purdue Research Foundation, 2019 – present.

**Virginia Tech***University and Foundation*

Member, President’s Executive Staff and Leadership Team, 2016 – 2019.  
 Member, Provost’s Academic Affairs Council, 2016 – 2019.  
 Chair, Virginia Tech Board of Visitors, Research Committee, 2016 – 2018  
 Representative, Virginia Tech Board of Visitors, Academic, Research, Student Affairs; Finance and Resource Management; Compliance, Audit, Risk Committees, 2018 – 2019.  
 Member, University Space Committee, 2016 – 2019.  
 Member, University Budget Committee, 2019 – 2019.  
 Member, University Safety, Security, and Policy Executive Committee, 2016 – 2019.  
 Member, University Enterprise Risk and Compliance Executive Committee, 2017 – 2019.  
 Member, University Inclusion and Diversity Executive Committee, 2016 – 2019.  
 Member, Virginia Tech Commission on Research and University Council, 2016 – 2019.  
 Board of Directors, Virginia Tech’s research-related affiliated corporations: Virginia Tech Applied Research Corporation (Chair), Virginia Tech Intellectual Properties (Chair), and Virginia Tech Innovation and Economic Development Corporation, 2016 – 2019.  
 Board of Directors, Virginia Tech Carilion (VTC) Innovation and Seed Funds, 2017 – 2019.  
 Board of Directors, Virginia Tech Corporate Research Center, 2016 – 2019.

*Executive Search Committees*

Member, Executive Director, Commonwealth Cyber Initiative, 2019  
 Member, Vice President, Innovation Campus, 2019  
 Member, Senior Vice President for Finance and Administration, 2017  
 Member, Dean for College of Engineering, 2016

**Penn State University**

*Vice President for Research*

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

*Executive Search Committees*

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

*Materials Research Institute*

- Member, Board of Directors, 2014 – 2016
- 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

*NSF Materials Research Science and Engineering Center for Nanoscale Science*

- Member, Executive Committee, 2000 – 2001, 2003 – 2016
- Leader, Interdisciplinary Research Group, 2000 – 2001, 2006 – 2016
- Coordinator, Central Facilities Laboratory, 2003 – 2005

*Intercollege Graduate Program in Materials*

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

**College of Engineering**

- Member, Women Faculty Advisory Board, 2005 – 2015
- 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, Inclusion 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)

#### *Inclusion 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 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**

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 Maitaini, “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.
- Scott Levin, “Heterogenous Integration of III-V and II-IV Semiconductor Sheets onto Silicon Substrates through Electric-Field Assisted Assembly for Device Applications,” Materials Science and Engineering, May 2015.
- Lan Lin, “Top-Down and Bottom-Up Integration of Engineered Nanostructures for Metamaterials,” Electrical Engineering, December 2015.
- Liu Lu, “Engineering Optical Materials with Metal Nanostructures,” Electrical Engineering, February 2016.

#### 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 Furnanage (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

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 (14–16), Alexej Pogrebnyakov (10–16), Myungkoo Kang (13–16)

### Research Scientists and Associates

Ludmil Zambov (98–00), Irena Kratochvilova (99–01), Alexey Kovalev (05–08), Alexej Pogrebnyakov (10–16), Robert Bruce (18–present)

### Best Student Paper Awards

Best Student Paper Award at *64<sup>th</sup> IEEE Device Research Conference*, Yanfeng Wang, 2006.

Best Student Paper Award at *64<sup>th</sup> 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, “Scalable Manufacturing of Nanoscale Optical Coatings,” Lockheed Martin, \$680,000, pending.
2. Principle Investigator, “High Performance Surface-Engineered Gradient Refractive Index (GRIN) Coatings,” Lockheed Martin, \$450,000, 11/01/17 – 10/31/20.
3. Principle Investigator, (with Co-Investigator Carlo Pantano), “Broadband Gradient Index Optical Materials,” Lockheed Martin, \$178,000, 03/01/14 – 12/30/15.
4. 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.
5. Principle Investigator, “Subwavelength Nanostructured Optical Coatings,” Lockheed Martin MFC, \$150,000, 03/01/13 – 12/30/15.
6. Principle Investigator, “Directed Self Assembly of Core-Shell Nanoparticles for Contact Hole Replication,” Intel Corporation, \$270,000, 01/01/14 – 12/31/16.
7. 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.
8. 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.
9. 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.
10. 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.
11. Principle Investigator, “Development of a Reconfigurable Metamaterial Mask,” Lockheed Martin MFC, \$75,000. 01/01/13 – 12/31/13.



12. Principle Investigator, "Fabrication of a Semiconductor-based GRIN Lens," Lockheed Martin MFC, \$20,000, 01/01/12 – 12/31/13.
13. Principle Investigator, "Development of a Tunable Metamaterial Filter," Lockheed Martin MFC, \$98,695, 01/01/13 – 12/31/13.
14. Principle Investigator, "Development of Radio Frequency Beam Steering Device," Lockheed Martin MFC, \$10,000, 01/13/13 – 12/31/13.
15. Principle Investigator, "Deterministic Assembly of Nano/Microstructures," Northrop Grumman, \$7,000, 03/01/12 – 02/28/15.
16. 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.
17. 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.
18. 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.
19. Principle Investigator, "Nanofabrication of 1D Au Nanoparticle Arrays," Air Force Research Laboratory (subcontract from UES), \$20,000, 03/01/11 – 02/28/2012.
20. 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.
21. Principle Investigator, (with Co-Principle Investigator Doug Werner), "Multi-color Wide-Field-of-View Focal Plane Array," Raytheon Corporation, \$10,000, 11/15/09 – 02/28/10.
22. 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.
23. 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.
24. Principle Investigator, "Multilayer Metamaterial Coating," Lockheed Martin ATC, \$80,000, 07/15/09 – 12/30/11.
25. Principle Investigator, "Metal Frequency Selective Surface on Glass," Lockheed Martin ATC, \$15,000, 07/15/09 – 03/30/10.
26. 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.
27. Principle Investigator, (with Co-Principle Investigator Doug Werner), "Passive Infrared Standoff Detection Platform," ICx Nomadics, \$250,000, 06/01/09 – 06/01/10.
28. Co-Principle Investigator, (with Principle Investigator Suzanne Mohny), "Nanoscale Contacts," Army Research Laboratory, \$270,000, 03/31/09 – 04/22/12.
29. Co-Principle Investigator, (with Principle Investigator Doug Werner), "Multispectral Infrared Mirror," Lockheed Martin MFC, \$60,000, 03/26/09 – 03/26/10.

30. 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.
31. 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.
32. 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.
33. 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.
34. Principle Investigator, (with Co-Principle Investigator Doug Werner), “Negative Index Metamaterials,” Lockheed Martin ATC, \$50,000, 06/01/08 – 12/31/08.
35. 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.
36. 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.
37. Co-Principle Investigator, (with Principle Investigator Doug Werner), “Wavelength-Selective All-Dielectric Infrared Mirrors,” Lockheed Martin, \$95,000, 06/01/2007 – 12/31/2008.
38. Principle Investigator, (with Co-Principle Investigator Doug Werner), “Infrared Chaff for Remote Chemical Detection,” Northrup Grumman, \$25,000, 09/01/06-12/31/06.
39. Co-Principle Investigator, (with Principle Investigator Joan Redwing; Co-Principle Investigators Suzanne Mohny, Elizabeth Dickey; Mark Lundstrom, Purdue) “NIRT: Nanowire Electronics,” National Science Foundation, \$1,000,000, 07/01/2006 – 6/30/2011.
40. 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.
41. 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.
42. Co-Investigator, (with Principle Investigator Suzanne Mohny), “Contacts to Semiconductor Nanowires,” Army Research Office, \$251,000, 06/01/05 – 05/31/08.
43. 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.
44. Principle Investigator, “Nanowires for Radar Applications,” Lockheed Martin, \$15,000, 10/15/04 – 01/14/05.
45. 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.

46. 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.
47. 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.
48. 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.
49. 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.
50. 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.
51. Principle Investigator, (with Co-Principle Investigators Joan Redwing, Suzanne Mohney), “Electron-Beam Lithography for Synthesis and Characterization of Metal and Semiconducting Nanowires,” Materials Research Institute, \$50,000, 07/01/02 – 03/30/04.
52. Co-Principle Investigator, (with Principle Investigator Joan Redwing; Co-Principle Investigators Suzanne Mohney, Ari Mizel), “NIRT: Semiconductor Nanowires: Building Blocks for Nanoscale Electronics,” National Science Foundation, \$1,450,000, 07/01/01 – 06/30/05.
53. 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
54. Principle Investigator, “Fabrication of Thermophotovoltaic Cells,” Bechtel Bettis, Inc., \$99,427, 03/01/00 – 08/30/01.
55. Principle Investigator, “Development of Fabrication Techniques for InGaAs Thermophotovoltaic Cells,” Bechtel Bettis, Inc., \$70,000, 06/01/99 – 12/31/99.
56. 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.
57. 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.
58. 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.
59. 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.
60. 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.

61. Co-Principle Investigator, (with Principle Investigator David Miller), “Improved III-V Optoelectronic Performance and Reliability Through Carbon Tetrabromide Doping, including Research Experience for Undergraduates Supplement,” National Science Foundation, \$346,802, 08/01/96 – 07/31/99.
62. 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  $\mu\text{m}$  Near Infrared Sensing Devices” Office of Naval Research, (subcontract from Sensors Unlimited, Inc.), \$153,000, 05/15/96 – 12/31/97.
63. 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.
64. 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.
65. Principle Investigator, “Industrial Matching to CAREER Award,” National Science Foundation, \$100,000, 08/01/95 – 07/31/00.
66. 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  $\mu\text{m}$  Near Infrared Sensing Devices,” Office of Naval Research (subcontract from Sensors Unlimited, Inc.), \$32,709, 10/01/94 – 05/31/95.
67. 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, (with Co-Investigators Doug Werner and Nik Podraza), DOD DURIP: Infrared Variable Angle Spectroscopic Ellipsometer, Office of Naval Research, \$150,000, 3/1/09 – 2/28/10.
3. Principle Investigator, “ARRA: Nanotechnology Research Instrumentation in Support of NNIN,” National Science Foundation (subcontract to Cornell), \$648,000, 09/01/09 – 09/01/10.
4. Principle Investigator, “Nanotechnology Research Instrumentation in Support of NNIN,” National Science Foundation, \$192,500, 06/01/08 – 05/30/09.
5. 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.
6. 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.
7. 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.

### **Bibliography**

#### **Refereed Publications in Archival Journals**

Google Scholar: *h*-index = 57; *i10*-index = 125; *m*-index = 1.9

1. Famularo, N. R., R. S. Hendley, S. J. Boehm, X. Guo, T. S. Mayer, M. A. Bevan, C. D. Keating, "Segmentation-Dependent Dielectrophoretic Assembly of Multisegment Metal/Dielectric Particles," *The Journal Physical Chemistry*, 124(34), pp. 18755 (2020).
2. Richardson, K. A., M. Kang, L. Sisken, A. Yadav, S. Novak, A. Lepicard, Is. Martin, H. Francois-Saint-Cyr, C. M. Schwarz, T. S. Mayer, C. Rivero-Baleine, A. J. Yee, I. Mingareev, "Advances in Infrared Gradient Refractive Index (GRIN) Materials: A Review," *Optical Engineering*, 59(11), pp. 112602 (2020).
3. Kang, M., L. Sisken, C. Lonergan, A. Buff, A. Yadav, C. Goncalves, C. Blanco, P. Wachtel, J. D. Musgraves, A. V. Pogrebnyakov, E. Baleine, C. Rivero-Baleine, T. S. Mayer, C. G. Pantano, K. A. Richardson, "Monolithic Chalcogenide Optical Nanocomposites Enable Infrared System Innovation: Gradient Refractive Index Optics," *Advanced Optical Materials*, 8(10), pp. 2070040 (2020).
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23. Keating, C. D. and T. S. Mayer, "Heterogeneous Integration of Bioprobe-Coated Nanowires," 237<sup>th</sup> *American Chemical Society National Meeting*, Salt Lake City, UT, March 2009; presented by C. D. Keating.
24. 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.
25. 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.
26. Mayer, T. S., T. T. Ho, M. Li, S. Eichfeld, P. Nimmatoori, B. Liu, T. Morrow, S. Mohnney, C. D. Keating, and J. M. Redwing, "Silicon Nanowires: Growth, Integration, and Field Effect Properties," *Silicon Nanoelectronics Workshop*, Honolulu, HI, June 2008.
27. Mayer, T. S., "Bottom-up Integration Strategies for NEMS," *Nanomechanics for NEMS: Scientific and Technological Challenges*, Grenoble-Minatec, France, June 2008.
28. 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.
29. Mohnney, 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. Mohnney.
30. 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.
31. Mayer, T. S., Y. Wang, T.-T. Ho, S. Dilts, P. Nimmatoori, B. Liu, T. Morrow, M. Li, S. Mohnney, C. D. Keating, and J. M. Redwing, "Silicon Nanowires: Synthesis, Integration, and Devices," 397<sup>th</sup> *Wilhelm and Else Heraeus Seminar on Semiconducting Nanowires: Physics, Materials and Devices*, Bad Honnef, Germany, October 2007.
32. Mayer, T. S., Y. Wang, T. Ho, S. Dilts, P. Nimmatoori, B. Liu, T. Morrow, M. Li, S. Mohnney, C. D. Keating, and J. M. Redwing, "Silicon Nanowire Field Effect Transistors," *Workshop on Nanoscale Epitaxial Semiconductor Structures*, Albuquerque, NM, September 2007.

33. Mayer, T. S., Y. Wang, T. Ho, S. Dilts, B. Liu, T. Morrow, M. Li, S. Mohny, C. D. Keating, and J. M. Redwing, "Silicon Nanowire Field Effect Transistors and their Assembly," *Gordon Research Conference on Chemistry of Electronic Materials*, South Hadley, MA, July 2007.
34. Mayer, T. S., "Metal-Molecule-Metal Devices and Measurements," *National Science Foundation Building Electronic Function into Molecular Architectures Workshop*, Arlington, VA, June 2007.
35. 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.
36. 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.
37. 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.
38. Mayer, T. S., H. Yoon, L. Cai, M. Maitani, D. Allara, A. Flatt, J. Tour, J. Bossard, Y. Tang, and D. H. Werner, "Molecular Devices and Optical Metamaterials," *2006 Institute for Nanotechnology Symposium*, Evanston, IL, October 2006.
39. 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.
40. 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.
41. 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.
42. Mayer, T. S., "Semiconducting and Molecular Electronic Nanowires as Nanoelectronic Building Blocks," *National Science Foundation USA/China Nanotechnology Workshop*, Arlington, VA, March 2006.
43. 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.
44. Mayer, T. S., "Directed Assembly for Integration of Nanoelectronic Building Blocks," *Semiconductor Research Corporation/National Science Foundation Workshop on Nanoelectronics*, Arlington, VA, December 2005.
45. 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," *230<sup>th</sup> American Chemical Society National Meeting*, Washington, DC, August 2005.
46. 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 51<sup>st</sup> International Symposium and Exposition*, Anaheim, CA, November 2004.

47. Mayer, T. S., "Semiconducting and Molecular Electronic Nanowires as Nanoelectronic Building Blocks," *Nanomaterials 2004*, October 2004.
48. 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.
49. Mayer, T. S., "Nanoscale Molecular Junctions," *Molecular Conduction Workshop*, Evanston, IL, July 2004.
50. 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.
51. 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," *12<sup>th</sup> International Conference on Metal Organic Vapor Phase Epitaxy*, Lahaina, HI, May 2004; presented by J. M. Redwing.
52. 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.
53. 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.
54. Mayer, T. S., "Nanostructures and CMOS: Nanofabrics for Logic and Sensing," *Integration of Scalable CMOS Systems with Novel Nanostructure Workshop*, Fairfax, VA, Arlington 2004.
55. Mayer, T. S., "Synthesis, Assembly, and Characterization of Molecular Junctions for Nanoscale Electronics," *Workshop France-USA Molecular-Scale Electronics*, Paris, FA, December 2003.
56. Mayer, T. S. "Molecular Logic Architectures using Functionalized Nanowires," *Workshop on Nanoscale Materials and Processes*, Ottawa, CA, August 2003.
57. Mayer, T. S., "Nanoscale Molecular Electronic Junctions," *Workshop on Molecular Conduction*, West Lafayette, IN, July 2003.
58. Mayer, T. S., "Nanoelectronic Building Blocks: Synthesis, Assembly and Characterization," *USA-Argentina Workshop on Molecular Electronics*, Quilmes, AR, May 2003.
59. 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.
60. 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.
61. 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.
62. 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.
63. Mayer, T. S., “Molecular Electronics Activities at Penn State,” *Pennsylvania Nanotechnology Workshop*, Harrisburg, PA, October 2002.
  64. 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.
  65. Mayer, T. S., “Heterogeneous Integration of Nanosensors,” *Heterogeneous Integration Workshop*, Arlington, VA, July 2002.
  66. Mayer, T. S., “Hybrid Integration – Molecular and Silicon,” *Information Science and Technology Nanometer Computing Workshop*, Pittsburgh, PA, April 2002.
  67. Mayer, T. S., “Molecular Electronic Devices and Architectures,” *US-Japan Joint Moletronics Workshop*, Phoenix, AZ, March 2002.
  68. Mayer, T. S., “Synthesis, Assembly, and Characterization of Molecular Electronic Devices and Architectures,” *Human/Robotic Exploration Workshop*, Hampton, VA, November 2001.
  69. 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.
  70. 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.
  71. 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.
  72. 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.
  73. 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.
  74. 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.
  75. 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.
  76. 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.
  77. Mayer, T. S. “Self-Assembly of Nanoscale Devices for Molecular Electronics,” *CZ-US Moletronics Workshop*, Institute of Chemical Technology, Prague, CZ Republic, June 2000.

78. 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.
79. Mayer, T. S., "Self-Assembly of Nanoscale Devices for Molecular Electronics," *Nanoscale and Molecular Electronics Workshop*, Arlington, VA, May 2000.
80. 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.
81. Mayer, T. S., "Bottom-up Assembly of Nanowires for Sensitive Skin Applications," *Sensitive Skin Workshop*, Alexandria, VA, October 1999.
82. 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.
83. Mayer, T. S., "Overcoming Dislocations in Lattice Mismatched Devices using Compliant Substrates," *Advanced Heterostructure Workshop*, Kohala, HI, November 1998.
84. 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.
85. 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. "University-Industry Partnerships in Rural Areas," University-Industry Development Partnership, Fayetteville, AK, June 2019.
2. "University-Industry-Government Partnerships," University-Industry Development Partnership (UIDP), Nationally Broadcast Webinar, April 2018.
3. "Directed Assembly Strategies for Nanoelectronic and Photonic Devices," University of Virginia, Charlottesville VA, May 2014.
4. "Field-Assisted Directed Assembly of Nanoparticle Arrays to Advance Lithography," Intel Corp, Portland, OR, February 2014.
5. "Directed Assembly Strategies for Nanoelectronic and Photonic Devices," Engineering, Chemistry, Physics Seminar Series, Portland State University, Portland, OR, February 2014.
6. "Adding New Capabilities to Silicon CMOS via Deterministic Nanowire Assembly," Engineering Physics Seminar, Ecole Polytechnique de Montreal, Montreal, CA, October 2013.
7. "Adding New Capabilities to Silicon CMOS via Deterministic Nanowire Assembly," Materials Science and Engineering Seminar, University of Delaware, Newark, DE, April 2013.
8. "Adding New Capabilities to Silicon CMOS via Deterministic Nanowire Assembly," Materials Science and Engineering Seminar, University of Michigan, Ann Arbor, MI, February 2012.
9. "Deterministic Nanowire Assembly to Enable 'More than Moore' Applications," Nanoelectronics Seminar, IBM Zurich, Zurich, Switzerland, September 2012.
10. "Programmed Deterministic Assembly for Multianalyte Biological and Chemical Sensor Integration, University of Illinois, Urbana, IL, April 2011.
11. "Programmed Deterministic Assembly for Multianalyte Biological and Chemical Sensor Integration," Birck Nanotechnology Center, Purdue University, West Lafayette, IN, April 2011.
12. "Nanowire Tunnel FETs," Intel Corp., Portland, OR, March 2011.

13. “Deterministic Nanowire Assembly to Enable ‘More than Moore’ Applications,” IBM T. J. Watson, NY, February 2011.
14. “Enabling the Convergence of Life Sciences with Chip-Scale Electronics by Deterministic Nanowire Assembly,” NSF More Than Moore Workshop, Arlington, VA, August 2010.
15. Outreach: “Enabling the Convergence of Chemistry and Biology with Chip-Scale Electronics by Deterministic Nanowire Assembly,” NanoTeach, Denver, CO, July 2010.
16. “Fabrication of Metallodielectric Nanostructures for Optical and Infrared Metamaterials: Top-Down Meets Bottom-Up,” Air Force Research Laboratory, Dayton, OH, March 2010.
17. “Electromagnetically-coupled nanostructures: Channeling and manipulating RF through visible,” Taylor Lecture, Penn State University, University Park, PA, 2010.
18. “Directed Assembly of Nanoelectronic and Nanoelectromechanical Devices,” CNRS National Center for Scientific Research, Grenoble, FR, August 2008.
19. “Recent Advances in Nanomanufacturing for Electronic and Optical Device Technology,” NTI Workshop, Philadelphia, PA, October 28, 2008.
20. Undergraduate outreach: “Introduction to Nanoscience and Nanotechnology,” Resnick Lecture, Lafayette College, Lafayette, PA, October 27, 2008.
21. “Reconfigurable Metallodielectric Nanostructures,” Johns Hopkins Applied Physics Laboratory, Baltimore, MD, March 27, 2008.
22. Outreach: “Nanoscience and Technology: Fundamentals to Applications,” Society of Hispanic Professional Engineers Eastern Regional Conference, Washington DC, February 22, 2008.
23. Outreach: “Nanoscience and Technology: Fundamentals to Applications,” Society of Hispanic Professional Engineers National Conference, Philadelphia, PA, November 1, 2007.
24. Outreach: “Commercializing Nanotechnology: Materials Applications,” Ben Franklin Nanomaterials Forum, Philadelphia, PA, March 11, 2007.
25. “Silicon Nanowire Electronics,” Department of Materials Science and Engineering Seminar Series, Johns Hopkins University, February 28, 2007.
26. “Electrical and Spectroscopic Characterization of Metal-Molecule-Metal Junctions,” Virginia Tech *Advance* Scholar, May 21, 2006.
27. “Electrical and Spectroscopic Characterization of Metal-Molecule-Metal Junctions,” Columbia University Nanoscale Science and Engineering Center Seminar Series, Columbia University, April 22, 2006.
28. “Silicon Nanowires as Nanoelectronic Building Blocks,” Chemical and Physical Sciences Seminar Series, Sandia National Laboratory, September 2004.
29. “Directed Assembly of Molecular Logic Architectures using Functionalized Nanowires,” Materials Science and Engineering Colloquium Series, Penn State University, October 2003.
30. “Directed Assembly of Molecular Logic Architectures using Functionalized Nanowires,” at the Molecular Electronics Workshop, Arlington, VA, July 2003.
31. “Synthesis and Characterization of Metal-Molecule-Metal Nanowire Junctions,” School of Electrical and Computer Engineering Seminar Series, Cornell University, April 2003.
32. Short Course: “Synthesis and Integration of Functional Nanostructures: The Path Towards Integrated Nanosystems,” American Physical Society March Meeting, March 2003.

33. "Nanoelectronic Building Blocks: Metallic, Semiconducting, and Molecular Electronic Nanowires" CORE Seminar Series, University of Canterbury, New Zealand via teleconference, November 2002.
34. "Nanoelectronic Building Blocks: Metallic, Semiconducting, and Molecular Electronic Nanowires" Nanotechnology Seminar Series, Purdue University, September 2002.
35. "Directed Assembly of Molecular Logic Architectures using Functionalized Nanowires," Molecular Electronics Workshop, Phoenix, AZ, September 2002.
36. "Integrated Biosensor Arrays for Medical Applications" Medical Advances Seminar Series, Dartmouth College, May 2002.
37. "Molecular Electronic Building Blocks," Naval Research Laboratory, Laboratory for Molecularly Engineered Materials and Surfaces, February 2002.
38. "Directed Assembly of Molecular Logic Architectures using Functionalized Nanowires," Molecular Electronics Workshop, Arlington, VA, July 2001.
39. 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.
40. "Molecular Computers that Build Themselves?: Molecular Electronics and Directed Assembly," NASA Langley Research Center, Hampton, VA, July 2001.
41. "Self-Assembly of Anisotropic Metallic Wires for Nanoscale and Molecular Electronics," Electrical Engineering Seminar, Princeton University, Princeton, NJ, November 2000.
42. "Self-Assembly of Nanometer-Scale Metallic Wires for Molecular Electronics" Technical Seminar Series, Lucent Technologies, Murray Hill, NJ, October 2000.
43. "Inorganic Self-Assembly Routes to Three-Dimensional Memories and Logical Mesostructures," Molecular Electronics Workshop, Santa Fe, NM, July 2000.
44. Short Course: "Integration of Dissimilar Materials," Indium Phosphide and Related Materials Conference, Williamsburg, VA, May 2000.
45. "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.
46. "Fabrication and Characterization of a 3-D Simple Cubic Photonic Crystal," Electrical Engineering Seminar, University of Minnesota, Minneapolis, MN, November 1999.
47. "Inorganic Self-Assembly Routes to Three-Dimensional Memories and Logical Mesostructures," Molecular Electronics Workshop, George Mason University, Fairfax, VA, July 1999.
48. "Fabrication and Analysis of 3D GaAs-based Photonic Crystals," NSF CAREER Review, Arlington, VA, January 1999.
49. "Use of Lateral AlGaAs Oxidation to Fabricate GaAs-Based Compliant Substrates," Compliant and Alternative Substrate Workshop, University of Wisconsin, Madison, WI, April 1998.
50. "Wafer Bonding for Novel Lattice-Mismatched Devices," Electrical Engineering Department Seminar, Carnegie Mellon University, Pittsburgh, PA, December 1997.
51. "Compliant Substrates and Wafer Bonding for Novel Lattice-Mismatched Devices," Northrup Grumman, Pittsburgh, PA, November 1997.
52. "Compliant Substrates and Wafer Bonding for Novel Lattice-Mismatched Devices," Hughes Research Laboratory, Malibu, CA, September 1997.