

**STEVEN MARK ANLAGE**  
Center for Nanophysics and Advanced Materials  
Physics Department  
and Faculty Affiliate of the Department of Electrical and Computer Engineering  
and the Department of Materials Science and Engineering  
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### EDUCATION

- Ph.D., Applied Physics** June, 1988  
California Institute of Technology (Caltech), Pasadena  
Thesis Title: Icosahedral Order in Metastable Metallic Alloys  
Advisor: Professor William L. Johnson
- M.S., Applied Physics** June, 1984  
Caltech, Pasadena
- B.S., Physics (Magna Cum Laude)** May, 1982  
Rensselaer Polytechnic Institute (RPI), Troy, NY  
Thesis Title: Theory of Electron Mobility in Semiconductors  
Advisor: Professor Stephen J. Nettel  
Minor: Philosophy of Science and Logic

### RESEARCH AND TEACHING EXPERIENCE

- Interim Director** July, 2007 to June, 2009  
Center for Nanophysics and Advanced Materials  
Physics Department, University of Maryland
- Full Professor** July, 2002 to present  
Center for Superconductivity Research  
Physics Department, University of Maryland
- Associate Professor** July, 1997 to June, 2002  
Center for Superconductivity Research  
Physics Department, University of Maryland
- Assistant Professor** Oct 1990 to June, 1997  
Center for Superconductivity Research  
Physics Department, University of Maryland
- Postdoctoral Research Associate** Nov 1987 to Sept 1990  
Geballe-Beasley-Kapitulnik Superconductivity Group  
Applied Physics, Stanford University (Mac Beasley, supervisor)

**Graduate Research Fellow** Oct 1983 to Nov 1987  
Disordered Metals Group, Applied Physics, Caltech (W. L. Johnson, supervisor)

**Collaborating Scientist**, Los Alamos National Laboratory (LANL), NM  
Center for Materials Science, May and Oct 1986  
Semiconductor Exploratory Research and Development Group (E-11), Aug. 1985

**Teaching Assistant** 1982-3, 1987  
Applied Physics, Caltech

**Summer Research Intern** 1980, 81, 82  
General Telephone and Electronics Laboratories (GTEL), Waltham, MA

### OTHER APPOINTMENTS

**Visiting Fellow** May - June, 2019  
Institute of Advanced Studies  
Loughborough University  
Loughborough, UK

**Visiting Professor** Oct 2011 to March 2012  
Center for Functional Nanostructures  
Karlsruhe Institute of Technology  
Karlsruhe, Germany

**Research Professor** May 2008 to May 2010  
National Security Institute  
Naval Postgraduate School  
Monterey, California

**Affiliate Professor** 2005 to present  
Electrical and Computer Engineering Department  
University of Maryland

**Affiliate Professor** 2017 to present  
Materials Science and Engineering Department  
University of Maryland

### AWARDS AND FELLOWSHIPS

Outstanding Advising/Mentor Award, Physics Department, University of Maryland (2019)  
2016 Invention of the Year Award, University of Maryland (2017)  
University of Maryland Distinguished Scholar-Teacher (2016)  
Outstanding Mentor, College of Computer, Mathematical and Physical Science,  
University of Maryland (2008)  
2007 Invention of the Year Finalist, University of Maryland (2008)  
National Security Science and Engineering Faculty Fellowship Finalist (2008)  
NSF New Young Investigator Award, Maryland (1992-1998)

NATO Advanced Study Institute Fellowship, Stanford (1989)  
Hewlett Packard Research Instrumentation Grant, Stanford (1989)  
IBM Graduate Research Fellowship, Caltech (1986-87)  
Eastman Kodak Graduate Research Fellowship, Caltech (1983-86)  
G. H. Carragan Prize for outstanding scholarship in Physics, RPI (1982)  
ΣΠΣ Physics Honor Society (1982)  
NSF Undergraduate Research Grant, RPI (1980)

### **SYNERGISTIC ACTIVITIES**

1. Led a 12-undergraduate student 4-year Gemstone group (2013-2016) to develop a new long-range wireless power transfer technology using time-reversed electromagnetics techniques developed in my lab with DOD support. Among other accomplishments, we delivered wireless energy to a moving target inside a complex enclosure, and developed a novel method to direct energy selectively to several different targets in different locations simultaneously. Two students gave invited talks at the 2016 IEEE Wireless Power Transfer Conference in Portugal and won the Best Paper Award for the conference! We also won the University of Maryland Invention of the Year Award in 2017.
2. The PI has produced a number of excellent scientists and engineers who have joined the national defense workforce. These include Drs. Dong-Ho Wu, Dr. Alberto Pique, Dr. Enrique Cobas, and Dr. Bisrat Addissie, who are all staff members at the Naval Research Laboratory. A number of graduated students, including Abi Davis, Dr. Michael Ricci, and Dr. C. P. (Gus) Vlahacos, have worked for the NSA or their contractors. Recent Ph.D. graduates Jen-Hao Yeh and Tamin Tai are now post-docs at the NSA Laboratory for Physical Sciences in College Park, MD. Former wave chaos Ph.D. student Dr. Biniyam Taddese now runs an EMI/EMC medical devices testing lab at the US FDA Research Labs in Silver Spring, MD. Other students now work full time on DoD technical activities, including Dr. Sameer Hemmady (U. New Mexico, working extensively with AFRL/Kirtland), Dr. James Hart (MIT Lincoln Labs), and Dr. Michael Ricci (Johns Hopkins Applied Physics Labs).
3. Consultant to Nazarbayev University, a new university located in Astana, Kazakhstan. I have interviewed all of the Physics faculty candidates in the past 4 years, and act as an external expert on hiring in the sciences for the university. The department now has 12 excellent full-time faculty members from the assistant to the full-professor rank, and is embarking on an ambitious research effort that I believe will make it the pride of central Asia.
4. I assisted Prof. Alexey V. Ustinov (Physikalisches Institut, Karlsruhe Institute of Technology, Germany) in creating a new research group at the National University of Science and Technology MISiS, Moscow, Russia. The group was started from scratch using funding from a Russian ‘Mega-Grant’ and the research theme is superconducting and quantum metamaterials, and is patterned after my lab at the University of Maryland.
5. Mentored 33 undergraduate research students, 10 Masters students (to thesis), 28 Ph.D. students, and 14 post-doctoral researchers in 25 years at the University of Maryland. Selected “outstanding Mentor” in the College in 2008. Selected as a University of Maryland Distinguished Scholar-Teacher in 2016-17. Selected for the Outstanding Advising/Mentor Award, Physics Department, University of Maryland in 2019.
6. Organized and gave lectures at Short Courses on Superconducting Electronics at the 2000, 2010, 2012 and 2014 Applied Superconductivity Conferences. Attended by 30-50 students each time. Organizing committee for the High Frequency Properties of High Temperature

Superconductors Workshop. Co-organized a Workshop entitled "Quantum Correlated Matter and Chaos" at the Max Planck Institute for the Physics of Complex Systems in Dresden, Germany in June 2015. Co-organized a Conference on Quantum Metamaterials in Spetses Greece in June 2015 and 2016. Co-organized the High Frequency Scanning Probe Microscopy Workshop at NIST/Boulder in December, 2019.

### **PATENTS**

**US Patent #5,900,618**, "Near-Field Scanning Microwave Microscope Having a Transmission Line With An Open End," issued May 4, 1999.

**US Patent # 6,366,096**, "Apparatus and Method for Measuring of Absolute Values of Penetration Depth and Surface Resistance of Metals and Superconductors," issued 2 April, 2002.

**US Patent # 6,376,836**, "Disentangling Sample Topography and Physical Properties in Scanning Near-Field Microwave Microscopy," issued 23 April, 2002.

**US Patent #6,809,533**, "Quantitative imaging of dielectric permittivity and tunability," issued October 26, 2004.

**US Patent # 8,624,605**, "Apparatus and method to distinguish nominally identical objects through wave fingerprints," issued 6 January 2014.

**US Patent # 9,424,665**, "System and method for signals transmission in complex scattering environments using interaction of the waves with a nonlinear object," issued 23 August, 2016.

### **PATENT APPLICATIONS**

Provisional US Patent Application, "Quantitative Imaging of Dielectric Permittivity and Tunability," September 10, 1999.

US Patent Application, "Disentangling Sample Topography and Physical Properties in Scanning Near-Field Microwave Microscopy," December 29, 1999.

International Patent Application, "Quantitative Imaging of Dielectric Permittivity and Tunability," April 5, 2000.

US Patent Application, "Apparatus and Method for Measuring of Absolute Values of Penetration Depth and Surface Resistance of Metals and Superconductors," August 4, 2000.

Provisional US Patent Application, "Magnetic Permeability Imaging with a Scanning Near-Field Microwave Microscope," August 16, 2000.

Provisional US Patent Application, "Imaging of Domains in Ferroelectric Crystals," October 5, 2000.

Provisional US Patent Application, "High Resolution Scanning Near-Field Microwave Microscopy," February 15, 2001.

Application for a provisional patent (60/463593) on 4/17/2003 for our disclosure, "Tunable Metamaterials".

Provisional Patent Application 60/471,696, entitled "Height Modulated Imaging in Near Field Microscopy," submitted 19 May, 2003 to the US Patent and Trademark Office.

Invention disclosure to the Office of Technology Commercialization, PS-2006-06, "Method to Generate Chaotic Electrical Signals at GHz Frequencies."

Invention disclosure to the Office of Technology Commercialization, PS-2007-006, "Wave Fingerprint of Complicated Enclosures."

Provisional Patent Application 60/885,265, entitled "Wave Fingerprint of Complicated Enclosures," submitted 8 February, 2007 to the US Patent and Trademark Office.

Provisional Patent Application 60/968,659, entitled “Chaotic Time-Reversal Sensor”, submitted 29 August, 2007 to the US Patent and Trademark Office

Patent Application entitled “Apparatus and Method to Distinguish Nominally Identical Objects Through Wave Fingerprints,” submitted to the US Patent and Trademark Office on Feb. 15, 2008.

Provisional Patent Application submitted to USPTO on 2 October, 2008, entitled “Exponential Amplification Chaotic Time Reversal Sensor (EACTRS)” by Steven Anlage, Thomas Antonsen and Biniyam Taddese, 61/102,065.

Invention Disclosure entitled “Sensing Small Changes in a Wave Chaotic Scattering System,” submitted to OTC on 28 June, 2010.

Invention Disclosure entitled “Communications by Means of Nonlinear Time-Reversal,” submitted to OTC on 22 December, 2011.

US Patent application submitted 7 Jan., 2014, titled "System and method for signals transmission in complex scattering environments using interaction of the waves with a nonlinear object."

Provisional Application Filed: April 25, 2016, “Method of Delivering Power to a Moving Target Wirelessly via Electromagnetic Time Reversal” (PS-2016-011). US Patent Application No.: 62/327,346.

Provisional Application Filed: April 25, 2016, “Selective Collapse of Nonlinear Time Reversed Electromagnetic Waves” (PS-2016-012). Application No.: 62/327,349.

US patent application filed: August, 2019, 2019/0140766, System and Method for Wireless Power Transfer Using Time Reversed Electromagnetic Wave Propagation.

#### **PROFESSIONAL AFFILIATIONS**

American Physical Society  
Materials Research Society  
Institute of Electrical and Electronics Engineers  
Directed Energy Professional Society  
Optical Society of America

#### **PROFESSIONAL ACTIVITIES**

Associate Editor for *IEEE Transactions on Applied Superconductivity* 2017 – present

Advisory Editor for *Reviews in Physics* 2015 – present

Chair of IEEE MTT-18 Technical Coordinating Committee “Microwave Superconductivity and Cryogenics,” 2017-2018

Referee for *Science*, *Nature* journals, *Physical Review Letters*, *Physical Review B*, *Applied Physics Letters*, *Journal of Applied Physics*, *IEEE Transactions on Applied Superconductivity*, *Review of Scientific Instruments*, *Physica C*, *European Journal of Physics*

Referee for Proposals from NSF, DOD, DOE, CRDF, US-Israel Binational Science Foundation, Canadian Foundation for Innovation, EPSRC, EU, and other foreign funding agencies

Member of the International Organizing Committees of the High Temperature Superconductors in High Frequency Fields Symposium, Quantum Metamaterials Conferences, etc.

APS March Meeting Abstract sorting 1993, 1997, 2001-2008, 2011-2012, 2015-2016

Team Leader for Superconductivity (Category 5) abstract sorting for the 2004 March Meeting of the American Physical Society

Organized a session on Materials Challenges for Applications of HTSC, 1996 Spring Materials Research Society Meeting

Co-chair of the Electronics Program Committee for the 2000 Applied Superconductivity Conference.  
Organized and ran a Short Course entitled "Superconducting Electronics" at the 2000 Applied Superconductivity Conference.  
Delivered a Short Course on Superconducting Electronics at the 2010, 2012 and 2014 Applied Superconductivity Conferences.  
Member of the Electronics Program Committee for the 2002 Applied Superconductivity Conference.  
Session chair for APS March Meetings, Materials Research Society Meetings, Applied Superconductivity Conferences, etc.

#### **SELECTED INVITED TALKS SINCE 2007**

Invited Talk, International Superconducting Electronics Conference, Riverside, CA USA, 1 August, 2019.  
Invited Talk, Symposium in Honor of the 60th Birthday of Giorgos P. Tsironis, The 12th CHAOS 2019 International Conference, Chania, Crete, Greece, 21 June, 2019.  
Invited Talk, 2019 IEEE International Microwave Symposium, Workshop WSA "Microwave Materials: Enabling the Future of Wireless Communication," Boston, MA, 2 June, 2019.  
Invited Talk, 9th Workshop on Quantum Chaos and Localisation Phenomena, Warsaw, Poland, 26 May, 2019.  
Invited Talk, Landau Seminar, Physics Department, Loughborough University, Loughborough, UK, 23 May, 2019.  
Physics Colloquium, Temple University, Philadelphia, PA, USA, 14 January, 2019.  
Invited Talk, The 49th Winter Colloquium on the Physics of Quantum Electronics, Snowbird, UT, USA, 8 January, 2019.  
Physics Colloquium, Wesleyan University, Middletown, CT, USA, 29 November, 2018.  
Invited Talk, Applied Superconductivity Conference, Seattle, WA, USA, 29 October, 2018.  
Invited Talk, Laboratory for Physical Sciences Seminar, College Park, MD, USA, 24 October, 2018.  
Invited Talk, Workshop on Thin Films and New Ideas for SRF, INFN, Legnaro, Italy, 10 October, 2018.  
Colloquium at SUNY Polytechnic Institute, Albany, NY, USA, 28 September, 2018.  
Invited Talk, Northrup-Grumman Advanced Technology Laboratory, Linthicum, MD, USA, 20 September, 2018.  
Invited Talk, American Electromagnetics Conference 2018, Santa Barbara, CA, USA, 29 August, 2018.  
Invited Talk, 2018 IEEE International Symposium on Electromagnetic Compatibility, Signal and Power Integrity, Long Beach, CA, USA, 30 July, 2018.  
Invited Talk, IEEE Photonics Society Summer Topical Meeting on Non-Hermitian and Topological Photonics, Waikoloa, Hawaii, USA, 10 July, 2018.  
Invited Talk, Conference on Nonlinear Localization in Lattices, Spetses, Greece, 20 June, 2018.  
Invited Talk, Conference on High Temperature Superconductors in High Frequency Fields, Yamagata, Japan, 6 June, 2018.  
Invited Talk, NASA Goddard Spaceflight Center Engineering Colloquium, Greenbelt, MD USA, 16 April, 2018.  
Invited Talk, Workshop on Topological Dynamics, Quantum and Classical, Keck Center for Topological Materials, Newark, NJ, USA, 7 November, 2017.

Invited talk, Workshop on Photonic Topological Insulators, Banff International Research Station, Banff, Canada, 13 September, 2017.

Invited talk, Exploring the Energetic Universe 2017, Nazarbayev University, Astana, Kazakhstan, 12 August, 2017.

Invited talk, International Metamaterials Conference 2017, Incheon, Korea, 27 July, 2017.

Invited talk, Innovations in Wave Modelling 2017, Nottingham Trent University, Nottingham, UK, 13 July, 2017.

Physik der Kondensierten Materie Seminar, Physikalisches Institut, Karlsruhe Institute of Technology, Germany, 23 May, 2017.

Invited Talk, 8th International Workshop on Quantum Chaos and Localisation Phenomena, Institute of Physics, Polish Academy of Sciences, Warsaw, Poland, 21 May, 2017.

Invited talk, Fundamentals of Quantum Materials Workshop, Greenbelt, MD, USA, 15 January, 2017.

Invited talk. Physics of Quantum Electronics, Snowbird, Utah, 13 January, 2017.

University of Maryland Distinguished Scholar Teacher Lecture, Physics Department, University of Maryland, 29 November, 2016.

Physics Colloquium, Missouri University of Science and Technology, Rolla, MO, 27 October, 2016.

Invited talk, Metamaterials 2016, Chania, Greece, 20 September, 2016. Talk given by collaborator George Tsironis.

Invited talk, Dynamics Days Central Asia, Astana, Kazakhstan, 2 September, 2016.

Invited talk, EUROEM 2016, Imperial College, London, UK, 11 July, 2016.

Invited talk, Quantum Metamaterials & Quantum Technology Conference, Spetses, Greece, 22 June, 2016.

Invited talks (2), International Conference on High Temperature Superconductors in High Frequency Fields, Tiburon, CA, 19, 20 May, 2016.

Invited talk, E-COST IC1407 (ACCREDIT) Meeting, “Advanced wave modelling and measurement techniques for stochastic fields,” University of Nottingham, UK, 5 April, 2016.

Physics Colloquium, CUNY / Queens College, New York, NY, 28 March, 2016.

Invited talk, Directed Energy Symposium, Albuquerque, NM, 8 March, 2016.

Invited talk, Applied Dynamics Seminar, IREAP, University of Maryland, 3 March, 2016.

Invited talk, Physics of Quantum Electronics, Snowbird, Utah, 4 January, 2016.

Invited talk, SPIE Optics + Photonics 2015 Conference, San Diego, CA, 9 August, 2015.

Condensed Matter Seminar, Physics Department, Seoul National University, Seoul, South Korea, 7 August, 2015.

Invited talks (2), 1st Asia Electromagnetics Conference, Jeju, South Korea, 3 August, 2015.

Invited talk, Workshop on Quantum Metamaterials, Spetses, Greece, 3 June, 2015.

Invited talk, 7th Workshop on Quantum Chaos and Localisation Phenomena, Institute of Physics, Polish Academy of Sciences, Warsaw, Poland, 30 May, 2015.

Invited talk, URSI AT-RASC Meeting, Gran Canaria, Spain, 21 May, 2015.

Invited talk, Physics Department Seminar, Nazarbayev University, Astana, Kazakhstan, 8 May, 2015.

Physics Colloquium, Nazarbayev University, Astana, Kazakhstan, 6 May, 2015.

Invited talk, Department of Energy / MSE Physical Behavior of Materials PI's Meeting, Gaithersburg, MD, 31 March, 2015.

Invited talk, The 5th International Conference on Nanophotonics and Metamaterials, Seefeld, Austria, 7 January, 2015.

Invited talk, The 9th International Symposium on Intrinsic Josephson Effects and THz Plasma Oscillations in High-Tc Superconductors, Kyoto, Japan, 1 December, 2014.

Physics Colloquium, University of Crete, Heraklion, Crete, Greece, 16 October, 2014

Invited talks (2), Crete Center for Quantum Complexity and Nanotechnology Seminar, Physics Department, University of Crete, Heraklion, Greece, 14 October, 2014.

Invited talk, Echoes in Complex Systems, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, 22 September, 2014.

Invited talk, Electromagnetics Seminar Series, University of Waterloo, Waterloo Canada, 17 September, 2014

Invited talk, The Eighth International Congress on Advanced Electromagnetic Materials in Microwaves and Optics, Copenhagen, Denmark, 28 August, 2014.

Invited talk, International Conference on Electromagnetics in Advanced Applications, Aruba, 7 August, 2014.

Invited talks (3), International Workshop on High Temperature Superconductors in High Frequency Fields, Fréjus, France, 10 June, 2014.

Invited talk, NanoCore Research Institute, Physics Department, National University of Singapore, Singapore, 23 May, 2014

Invited talk at the 5th International Conference on Metamaterials, Photonic Crystals and Plasmonics, Nanyang Technological University, Singapore, 21 May, 2014

Invited talk, Electromagnetic Effects Research Laboratory, EEE Department, Nanyang Technological University, Singapore, 20 May, 2014

Invited talk, Laboratory for Physical Sciences Seminar, College Park, MD, 23 April, 2014.

Invited talk, UK EPSRC Metamaterials Retreat, Chamonix, France, 20 March, 2014.

Invited talk, NASA/Goddard Space Flight Center Scientific Colloquium, Greenbelt, MD, 10 January, 2014.

Invited talk, 2014 Physics of Quantum Electronics Conference, Snowbird, Utah, 8 January, 2014.

Invited talk, 2013 Fall Materials Research Society Meeting, Boston, MA, 2 December, 2013.

Invited talk, Zepler Institute International Lecture, Optoelectronics Research Centre, University of Southampton, UK, 25 November, 2013.

Invited talk, Theoretical Physics Colloquium, Institute for Theoretical Physics, Technical University of Dresden, Germany, 21 November, 2013

Invited talk, 7th International Congress on Advanced Electromagnetic Materials in Microwaves and Optics, Bordeaux, France, 17 September, 2013.

Invited talk, SPIE Optics and Photonics Conference, San Diego, CA, 28 August, 2013.

Invited talk, SPIE Optics and Photonics Conference, San Diego, CA, 27 August, 2013.

Invited talk, 6th Workshop on Quantum Chaos and Localisation Phenomena, Warsaw, Poland, 25 May, 2013.

Invited talk, High Energy Physics Seminar, University of Maryland, 27 March, 2013.

Invited talk, International Conference, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, 22 October, 2012.

Invited talk at Innovations in Wave Modeling, University of Nottingham, United Kingdom, 4 September, 2012.

Invited talk, Institute for Solid State Physics, Chernogolovka, Russia, 21 August, 2012.

Invited talk, Moscow University of Science and Technology, Moscow, Russia, 17 August, 2012.



Invited lecture at the Summer School Propagation D'ondes En Milieux Complexes, at the Institut d'Etudes Scientifiques de Cargèse, in Corsica France, 14 August, 2012.

Invited lecture at the Summer School Propagation D'ondes En Milieux Complexes, at the Institut d'Etudes Scientifiques de Cargèse, in Corsica France, 13 August, 2012.

Invited talk, 7th Superconducting Radio Frequency Materials Workshop, Thomas Jefferson National Accelerator Facility, Newport News, VA, 17 July, 2012.

Invited talk, Tenth International Symposium on Photonic and Electromagnetic Crystal Structures, Santa Fe, NM, 8 June, 2012.

Invited talk, SPIE Europe, Brussels, Belgium, 18 April, 2012.

Invited talk, Fifth International Workshop on Electromagnetic Metamaterials, Albuquerque, NM, 26 March, 2012.

Invited talks (2), Fifth International Congress on Advanced Electromagnetic Materials in Microwaves and Optics, Barcelona, Spain, 11 October, 2011.

Invited talk, Seventh International Conference on Vortex Matter in Nanostructured Superconductors, Rhodes, Greece, 15 September, 2011.

Invited talk, 5th Workshop on Quantum Chaos and Localisation Phenomena, Institute of Physics, Polish Academy of Sciences, Warsaw, Poland, 21 May, 2011.

Physics Colloquium, University of Florida, 7 April, 2011.

Physics Colloquium, Georgetown University, Washington, DC, 19 October, 2010.

Electromagnetics Seminar, University of Waterloo, Ontario, Canada, 23 September, 2010.

Invited talk, Fourth International Congress on Advanced Electromagnetic Materials in Microwaves and Optics, Karlsruhe, Germany, 14 September, 2010.

Invited presentation to the JASON summer study on 'Optical Metamaterials,' La Jolla, CA, 28 June, 2010.

Plenary Talk, Experimental Chaos and Complexity Conference, Lille, France, 1 June, 2010.

Invited Talk, 40<sup>th</sup> Colloquium on the Physics of Quantum Electronics, Snowbird, Utah, 4 January, 2010.

Invited seminar, NSU Center for Materials Research Seminar, Norfolk State University, Norfolk, VA, 12 November, 2009.

Applied Dynamics Seminar, University of Maryland, College Park, MD, 29 October, 2009.

Plenary Talk, Superconducting RF 2009 (SRF 2009), Berlin, Germany, 22 September, 2009.

Keynote (Invited) Talk, SPIE Conference, San Diego, 2 August, 2009.

Invited Seminar, Sensors Directorate, Wright-Patterson AFB, Dayton, OH, 8 July, 2009.

Invited talk, 2009 Workshop on Quantum Chaos and Localisation Phenomena, Institute of Physics, Polish Academy of Sciences, Warsaw, Poland, 24 May, 2009.

Invited Talk, 2009 Dynamics Days International Conference on Chaos and Nonlinear Dynamics, San Diego, CA, January 11, 2009.

Breakthrough (Invited) Talk, Nano-Meta 2009, Seefeld, Austria, January 5, 2009.

Gathering on the Physics of Billiard Systems, Centro Internacional de Ciencias, Cuernavaca, Mexico, 20 August, 2008.

Physics Colloquium, Instituto de Ciencias Físicas Universidad Nacional Autónoma de México Cuernavaca, Morelos, México, 19 August, 2008.

Invited Talk, Conference on Precision Electromagnetic Measurements, Broomfield, CO, 12 June, 2008.

Physics Colloquium, Drexel University, Philadelphia, PA, May 22, 2008.

Progress in Electromagnetics Research, Hangzhou, China, 26 March, 2008.

American Physical Society March Meeting, Denver, CO, 8 March, 2007.

### GRADUATED STUDENTS

Alp Findikoglu, Ph.D. 1994 (T. Venkatesan principal advisor), Staff, Los Alamos National Lab  
Jian Mao, Ph.D. 1995, Member of the Technical Staff, PRC, Inc. McLean, VA  
Michael S. Pambianchi, Ph.D. 1995; MBA, 2000, Harvard Business School, now at Dow-Corning  
Paul So, Ph.D. 1995 (E. Ott principal advisor), Professor of Physics, George Mason University  
James C. Booth, Ph.D., 1996, Staff Member, NIST, Boulder, CO  
Alberto Pique, Ph.D. Materials Science 1996 (R. Ramesh principal advisor), NRL, Wash., DC  
Lucia Mercaldo, Ph.D. Physics, 1998 (Salerno), Staff, Solar Energy Institute, Naples Italy  
David E. Steinhauer, Ph.D. Physics, 2000, Scientist, Tripath Medical Imaging, Seattle  
Ashfaq Thanawalla, Ph.D. Physics, 2000 (jointly advised with F. Wellstood)  
Claudio Cardoso, Ph.D. Physics, 2001 (University of Campinas, Brazil) Post-Doc in Campinas  
Doug Strachan, Ph.D. Physics, 2002 (jointly advised with C. Lobb) Post-Doc Univ. of Penn.  
Sheng-Chiang Lee, Ph.D. Physics, 2004. Professor of Physics, Mercer University  
Atif Imtiaz, Ph.D. Physics, 2005. NRC Post-Doc, NIST/Boulder  
Sameer Hemmady, Ph.D. 2006 (ECE). SAIC  
Dragos Mircea, Ph.D. 2007 (ECE). Hitachi Global Storage.  
Michael Ricci, Ph.D. Physics 2007, Systems Engineering Group, Inc.  
Hua Xu, Ph.D. Physics, 2007, NIST Gaithersburg  
James Hart (jointly advised with Ott, Antonsen), Ph.D. Physics, 2009, MIT Lincoln Labs  
Enrique Cobas (joint with Fuhrer), Ph.D. Materials Science, 2010, Naval Research Laboratory  
Biniyam T. Taddese, Ph.D. Electrical and Computer Engineering, 2012, Intel  
Jen-Hao Yeh, Ph.D. Electrical and Computer Engineering, 2013, Laboratory for Physical Sciences  
Tamin Tai, Ph.D. Electrical and Computer Engineering, 2013, Oak Ridge National Laboratory  
Melissa Trepanier, Ph.D. Physics, 2015, US Government  
Daimeng Zhang, Ph.D. Electrical and Computer Engineering, 2016, VT iDirect, Virginia  
Bo Xiao, Ph.D. Electrical Engineering, 2017, Google  
Kuang Qin (co-advised Ph.D. at U. Houston, 2017)  
Xu Jiang (co-advised Ph.D. at NIH, 2017)  
Qin Liu (co-advised Ph.D. at NIH, 2018, post-doc Stanford Univ.)  
Min Zhou, Ph.D. Electrical Engineering, 2019, Quantcast, San Francisco

Marc Sheffler, M.S. Physics, 1998, Post-Doc at the University of Stuttgart  
Wensheng Hu, M.S. ECE, 1999, Engineer, Hughes Network Systems  
J. David Kokales, M.S. Physics, 1999, Member of the Technical Staff, Illinois Superconductor  
C. P. (Gus) Vlahacos, M.S. Physics, 1999 (co-advised with F. Wellstood), NSA, LPS  
Hans Georg Breunig, M. S. Physics, 2000, Post-Doc, University of Marburg, Germany  
Senta Karotke, Diplom. in Physics, 2001, Grad. Student, University of Basle, Switzerland  
Jesse Bridgewater, M.S. Physics, 2002. Graduate student at UCLA  
Renato Mariz de Moraes, M.S.E.E. 2002 (ECE). Graduate student at UC Santa Cruz  
Sameer Hemmady, M.S.E.E. 2004 (ECE). Univ. of New Mexico and Techflow Scientific,  
Albuquerque  
Nathan Orloff, M.S. Physics, 2007, Member of the Technical Staff, NIST Boulder  
Ziyuan Fu, M.S. ENEE, 2017, Shanghai Institute of Satellite Engineering

Patrick Hemmer, B.S. Physics, 2018, graduate student in Physics, Univ. of Maryland Baltimore County

Yuewen Tan, B.S. Physics, 2016. Graduate student in Physics, Washington University in St. Louis

John Abrahams, B.S. Physics, 2012

Elliott Bradshaw, B.S. Physics, 2007

Vassili Demergis, B.S. Physics, 2006, Graduate student, University of Texas, Austin

Marc Pollak, B.S. Physics, 2004, Graduate Student, University of Maryland

Nathan Orloff, B.S. Physics, 2004, Graduate Student, University of Maryland

Jonah Kanner, B.S. Physics, 2003, Graduate student, University of Maryland

Greg Ruchti, B.S. Physics, 2003, Graduate Student, Johns Hopkins University

Paul Petersan, B.S. Physics, 1998, Graduate Student, Physics Department, University of Texas

Sudeep Dutta, B.S. Physics, 1998, Graduate Student, Physics Department, UMD

Ali Gokirmak, B.S. Physics, 1998, Graduate Student, EE Department, Cornell University

Tony DeMarco, B. S. Physics, 1995, Graduate Student, EE Department, University of Maryland

Abi Davis, B. S. Physics, 1993, Engineer, Superconductor Technology Inc, Santa Barbara, CA

National Science Foundation Research Experiences for Undergraduate Students

Roger Bock, summer , 1996

Sudeep Dutta, University of Maryland, summer, 1997

Nadia Fomin, Georgetown University, summer, 1998

Eric Wang, UC Berkeley, summer, 2001

Thomas Hartman, Princeton, Summer, 2002

#### **FORMER POSTDOCTORAL RESEARCHERS**

Lie Chen, Institute of Physics, Chinese Academy of Sciences, Beijing

Johan Feenstra, Member of the Technical Staff, Philips Research Laboratories, Eindhoven, The Netherlands

Dong-Ho Wu, Staff Scientist, Naval Research Laboratory, Washington, DC

Andrew Schwartz, Manager, EPSCAN Program, Neocera, Inc., Beltsville, MD

Vladimir V. Talanov, Member of the Technical Staff, Neocera, Inc., Beltsville, MD

Lucia V. Mercaldo, Staff Scientist, Solar Energy Research Institute, Naples, Italy

Alexander Tselev, Post-Doctoral Researcher, Georgetown University

Atif Imtiaz, NRC Post-Doc NIST/Boulder

Laura Adams, post-doc, Harvard University

David Tobias (post-doc, joint with Fuhrer), APS Congressional Fellow

Cihan Kurter, IBM Research

Matthew Frazier, Virginia

Behnood Ghamsari, Post-Doc, University of Ottawa

#### **CURRENT STUDENTS AND POST-DOCS**

Seokjin Bae

Jingnan Cai

Cougar Garcia (NGC/UMD)

Tim Kohler (LPS/UMD)

Shukai Ma

Bakhrom Oripov

Tamin Tai (Post-doc)

## STUDENT'S AWARDS

Min Zhou Best Student Paper Award, AMEREM 2018

Daimeng Zhang is chosen for the Engineering School Future Faculty Program, Jan., 2014

Jen-Hao Yeh is chosen for the Engineering School Future Faculty Program, Jan., 2011

Biniyam Taddese won first place in the Focusing Research on Entrepreneurial

Empowerment Poster Session on 5 December, 2008, sponsored by Black Graduate Student Association and Black Engineers Society. This became a news item on the ECE web site:

[http://www.ece.umd.edu/news/news\\_story.php?id=3581](http://www.ece.umd.edu/news/news_story.php?id=3581)

Sameer Hemmady won the 2006 Group on Statistical and Nonlinear Physics Best Student Speaker Award at the 2006 American Physical Society March Meeting.

Two of my undergraduate research students (Nathan Orloff and Marc Pollak) won the Monroe Martin Prize at graduation in May, 2004.

My undergraduate research student, Paul Petersan, won the J. Robert Dorfman Prize for Outstanding Undergraduate Research in CMPS for 1998.

My undergraduate research student, Ali Gokirmak, won the Robert Ma Scholarship for Foreign Students in 1997

Tony DeMarco won a Senior Summer Scholarship for work in my lab (1995)

## COURSES TAUGHT

Spring 1992

Physics 161, General Physics: Mechanics and Particle Dynamics, 150 students

Physics 838C, Superconductivity Seminar, ~20 students

Fall, 1992

Physics 262, General Physics: Vibrations, Waves, Heat, Electricity and Magnetism, 150 students

Physics 838C, Superconductivity Seminar, ~20 students

Spring 1993

Physics 161, General Physics: Mechanics and Particle Dynamics, 150 students

Physics 838C, Superconductivity Seminar, ~20 students

Fall, 1993

Physics 262, General Physics: Vibrations, Waves, Heat, Electricity and Magnetism, 150 students

Physics 838C, Superconductivity Seminar, ~20 students

Spring 1994

Physics 161, General Physics: Mechanics and Particle Dynamics, 86 student

Physics 838C, Superconductivity Seminar, ~20 students

Fall 1994

Physics 262, General Physics: Vibrations, Waves, Heat, Electricity and Magnetism, 125 students

Physics 838C, Superconductivity Seminar, ~20 students

Spring 1995

Physics 422, Quantum Physics II, 20 students

Physics 838C, Superconductivity Seminar, ~20 students

Fall 1995

Physics 421, Quantum Physics I, 20 students

Physics 838C, Superconductivity Seminar, ~20 students

Spring 1996

Physics 422, Quantum Physics II, 15 students

Physics 499A, Individual Problems with Lab, 1 student

Physics 798, Special Problems in Advanced Physics, 1 student  
 Physics 838C, Superconductivity Seminar, ~25 students  
 Physics 899, Doctoral Dissertation Research, 1 student  
 Fall 1996  
 Physics 421, Quantum Physics I, 15 students  
 Physics 798, Special Problems in Advanced Physics, 1 student  
 Physics 838C, Superconductivity Seminar, ~25 students  
 Physics 899, Doctoral Dissertation Research, 1 student  
 Spring 1997  
 Sabbatical  
 Physics 899, Ph.D. thesis research, 1 student  
 Fall 1997  
 Sabbatical  
 Physics 499A, Individual Problems with Lab, 1 student  
 Physics 899, Ph.D. thesis research, 1 student  
 Spring 1998  
 Physics 121, Fundamentals of Physics I, 84 students  
 Physics 499A, Individual Problems with Lab, 1 student  
 Physics 799, Masters Thesis Research, 1 student  
 Physics 838C, Superconductivity Seminar, ~25 students  
 Physics 899, Ph.D. thesis research, 1 student  
 Fall 1998  
 Buyout from Teaching  
 Physics 799, Masters Thesis Research, 3 students  
 Physics 838C, Superconductivity Seminar, ~25 students  
 Physics 899, Ph.D. thesis research, 1 student  
 Spring 1999  
 Physics 121, Fundamentals of Physics I, 76 students  
 Physics 799, Masters Thesis Research, 1 student  
 Physics 838C, Superconductivity Seminar, ~20 students  
 Physics 899, Ph.D. thesis research, 2 students  
 Fall 1999  
 Physics 122, Fundamentals of Physics II, 57 students  
 Physics 799, Masters Thesis Research, 2 students  
 Physics 838C, Superconductivity Seminar, ~20 students  
 Physics 899, Ph.D. thesis research, 2 students  
 Spring 2000  
 Physics 121, Fundamentals of Physics I, 77 students  
 Physics 799, Masters Thesis Research, 1 student  
 Physics 838C, Superconductivity Seminar, ~20 students  
 Physics 899, Ph.D. thesis research, 2 students  
 Fall 2000  
 Physics 122, Fundamentals of Physics II, 81 students  
 Physics 838C, Superconductivity Seminar, ~20 students  
 Physics 899, Ph.D. thesis research, 2 students  
 Spring 2001  
 Physics 798S, Introduction to Superconductivity, 11 students  
 Physics 838C, Superconductivity Seminar, ~20 students  
 Physics 899, Ph.D. thesis research, 2 students  
 Fall 2001  
 Physics 402, Quantum Physics II, 11 students  
 Physics 838C, Superconductivity Seminar, ~20 students

Physics 899, Ph.D. thesis research, 2 students

Spring 2002

Physics 411, Intermediate Electricity and Magnetism, ~ 35 students

Physics 838C, Superconductivity Seminar, ~20 students

Physics 899, Ph.D. thesis research, 2 students

Fall 2002

Physics 375, Optics Laboratory, 11 students

Physics 389, Undergraduate Research, 1 student

Physics 499A, Individual Problem with Laboratory, 1 student

Physics 798, Special Problem in Advanced Physics, 1 student

Physics 838C, Superconductivity Seminar, ~20 students

Physics 899, Ph.D. thesis research, 2 students

Spring 2003

Physics 411, Intermediate Electricity and Magnetism, ~ 40 students

Physics 389, Undergraduate Thesis Research, 2 students

Physics 499A, Individual Problem with Laboratory, 1 student

Physics 838C, Superconductivity Seminar, ~25 students

Physics 899, Ph.D. thesis research, 2 students

Fall 2003

Physics 375, Optics Laboratory, 12 students

Physics 499A, Individual Problem with Laboratory, 2 students

Physics 838C, Superconductivity Seminar, 30 students

Physics 899, Ph.D. thesis research, 2 students

Spring 2004

Physics 499A, Special Problems in Physics, 2 students

Physics 798S, Superconductivity, 12 students + 5 audits

Physics 838C, Superconductivity Seminar, 25 students

Physics 899, Doctoral Dissertation Research, 3 students

Fall 2004

SABBATICAL

Physics 838C, Superconductivity Seminar, 26 students

Physics 899, Doctoral Dissertation Research, 1 student

ENEE 899, Doctoral Dissertation Research, 1 student

Spring 2005

SABBATICAL

Physics 899, Doctoral Dissertation Research, 2 students

ENEE 899, Doctoral Dissertation Research, 1 student

Summer 2005

Physics 899, Doctoral Dissertation Research, 1 student

Fall 2005

Physics 375, Experimental Physics III, 13 students

Physics 499A, Special Problems in Advanced Physics, 1 student

Physics 838C, Superconductivity Seminar, 3 students

Physics 798, Special Problems in Advanced Physics, 1 student

Physics 899, Doctoral Dissertation Research, 1 student

ENEE 898, Pre-Candidacy Research, 1 student

Spring 2006

Physics 407, Physics Undergraduate Research, 1 student

ENEE 699, Independent Study, 1 student

Physics 798S, Superconductivity, 14 students + 5 audits

Physics 838C, Superconductivity Seminar, 25 students

Physics 898, Pre-Candidacy Research, 1 student

Physics 899, Doctoral Dissertation Research, 1 student  
 ENEE 899, Doctoral Dissertation Research, 1 student  
 Summer 2006  
 ENEE 699, Independent Study, 1 student  
 Fall 2006  
 Physics 375, Experimental Physics III, 18 students  
 Physics 838C, Superconductivity Seminar, 53 students  
 Physics 899, Doctoral Dissertation Research, 1 student  
 ENEE 899, Doctoral Dissertation Research, 2 students  
 Spring 2007  
 Physics 402, Quantum Mechanics II, 54 students  
 Fall 2007  
 Physics 838C, Superconductivity Seminar, 30 students  
 Physics 899, Doctoral Dissertation Research, 1 student  
 Spring 2008  
 Physics 402, Quantum Mechanics II, 44 students  
 Fall 2008  
 Spring 2009  
 Physics 402, Quantum Mechanics II, 51 students  
 Fall 2009  
 Physics 375, Experimental Physics III, 16 students  
 Spring 2010  
 Physics 404, Statistical Physics, 42 students  
 Fall 2010  
 Physics 375, Experimental Physics III, 19 students  
 Spring 2011  
 Physics 404, Statistical Physics, 51 students  
 Fall 2011  
 Sabbatical  
 Spring 2012  
 Sabbatical  
 Fall 2012  
 Phys 798I, Superconductivity  
 Spring 2013  
 Phys 410, Classical Mechanics  
 Fall 2013  
 Phys 410, Classical Mechanics  
 GEMS 296, Team Project Seminar I  
 Spring 2014  
 Phys 275, Classical Mechanics Laboratory  
 GEMS 297, Team Project Seminar II  
 Fall 2014  
 Phys 410, Classical Mechanics  
 Spring 2015  
 Physics 276 Experimental Physics II: Electricity and Magnetism  
 Fall 2015  
 Phys 410, Classical Mechanics  
 Spring 2016  
 Physics 798S Superconductivity  
 Fall 2016  
 Phys 402, Quantum Mechanics II  
 Spring 2017  
 Phys 371, Modern Physics  
 Fall 2017  
 Phys 402, Quantum Mechanics II

Spring 2018  
Phys 371, Modern Physics  
Fall 2018  
Sabbatical  
Spring 2019  
Phys 401, Quantum Mechanics I  
Fall 2019  
Phys 371, Modern Physics

**Other Teaching:**

Given review lectures on Quantum Mechanics for students preparing for the Physics GRE.

**Comment on Student Ratings of Teaching:**

I taught Physics 121 and 122 during the Spring and Fall semesters of 2000. My teaching evaluations for these classes have been among the best in the department in the past 5 years. For example, my numbers for questions 1 and 2 on the student course evaluation for my Fall 2000 Phys 122 are significantly higher than any other professor who taught 121 or 122 in 1999. My numbers were 3.43 and 3.63, while those of the others ranged from 2.68 to 3.22 for question 1, and 2.74 to 3.46 for question 2.

I also received **PERFECT teaching evaluations** for my graduate course Phys 798S Superconductivity during the Spring 2006 semester. There were 11 students enrolled, 6 submitted evaluations, and ALL students gave an evaluation of "A" (4.0) in ALL categories.

## **SERVICE**

### **University Service for the past 10 years**

Chair, Physics Graduate Qualifier Committee (2009-2011)  
Executive Committee of Physics Council (2009-2011)  
Interim Director, Center for Nanophysics and Advanced Materials (2007-2009)  
Condensed Matter and Nano Faculty Search Committee (2006-2008, 2012-13)  
Faculty Promotion Committees (2011, 2013)  
CNAM Graduate Fellowship Committee (2008-2009)  
Physics Council (2008-2011)  
CSR Review Committee (2006)  
Graduate Admissions Committee (2006, 2015- 2017)  
Physics Salary Advisory Committee (2006-2007, 2018)  
Faculty Candidate Teaching Interview Committee (2004-2007)  
Committee on Appointments, Promotion and Tenure (2000-2004, 2010-2011, 2012-2014)  
Priorities Committee (2001-2002, 2006)  
Laboratory Committee (2002-2004, 2006-2011)  
Incoming Graduate Student Advisor (2006)  
Chairman of the Physics Undergraduate Honors Committee (1999-present)  
Gemstone Discussant (2006)  
Gemstone Advisor (2013-2016)  
MRSEC Executive Committee (2002-2004)  
Promotion Committee for Drew Baden (2003)  
Committee to select NSF/REU students (1997-2002, 2004)  
Extended Graduate Qualifier Committee (~1992-2004)  
Physics Salary Advisory Committee (1999-2000)  
Advised Incoming Physics Graduate Students (1995-1999, 2002)



Faculty Search Committee, (1996-1997)  
Organized the Condensed Matter / Superconductivity Seminar Series (1993-1997)  
Physics Internal Review Committee (1992-1993), Chair of the sub-committee on Research  
Physics Council (1992-1995)  
Physics Internal Review Committee (2004), Chair of the sub-committee on Infrastructure (2004)  
Executive Committee of Physics Council (1992-1993)  
Physics Curriculum Review Committee for the Engineering Sequence (1992)  
Dean's Peer Initiative Review Committee (1994)

Served on numerous M.S. and Ph.D. thesis exam committees

### **Outside Service for the past 10 years**

Technical Editor of the IEEE Transactions on Applied Superconductivity (2017-present)  
APS Committee on Meetings (2012-2014)  
Sorted abstracts for the March Meeting of the American Physical Society (1994, 2001-2008, 2011-2012)  
Selected Leader for Category 5 (Superconductivity) abstract sorting for the 2004 March Meeting of the American Physical Society  
Served on the Electronics Program Committee of the 2002 Applied Superconductivity Conference.  
Served as co-chair of the Electronics Program Committee for the 2000 Applied Superconductivity Conference  
Organized a 1-day Short Course on "Superconducting Electronics" at the 2000 Applied Superconductivity Conference. It was sold out (50 students).  
Member of the Electronics Program Committee for the 2002 Applied Superconductivity Conference  
Co-organized a session on "Materials Challenges for Applications of HTSC" at the Spring 1996 Materials Research Society Meeting  
Technical Program Committee Member for MSMW 98, MSMW 00, MSMW 02 and MSMW 04 conferences in Kharkov, Ukraine (MSMW = Physics and Engineering of Millimeter and Submillimeter Waves)  
Council for Engineering Education Post-Doc Review Committee (1992)  
External reviewer for Ph.D., University of British Columbia (2002)  
External reviewer for Ph.D., James Cook University, Australia (2000)  
Administered Caltech Undergraduate Transfer Exam (1995)  
Supervised high school student Doug Woodbury in "Physics Mentorship" project (1995)  
Chaired many sessions at many conferences  
Referee papers (PRL, PRB, RSI, APL, JAP, etc.)  
Referee funding proposals (NSF, EPSRC, Italian CNR)

Extensive Outreach participation through the MRSEC:  
Physics is Phun pre-shows  
Maryland Day demonstrations  
REU lectures, supervised 4 REU students  
Science writing with Northwestern High School students  
MRSEC "warm line" with Kettering Middle School

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