

Edward P. Furlani

Curriculum Vitae



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EDUCATION

Ph.D. Theoretical Physics, June 1982
University at Buffalo – State University of New York
Dissertation: A Scattering Theory for Quantum Fields on Exterior Domains
Advisor: Professor Jonathan Dimock

M.A. Physics (Summa Cum Laude), University at Buffalo - SUNY, June 1980,
B.S. Electrical Engineering (Cum Laude), University at Buffalo - SUNY, June 1977

RESEARCH INTERESTS

Computational research to advance emerging applications in the fields of micro and nanoscale science and technology. Multiscale modeling of innovative materials, processes and devices with design features and functionality engineered at the nanometer to the micron length scale. Active research areas: biomedical devices, microfluidics, Lab-on-a-Chip, optics, nanophotonics, applied magnetics and microsystems technology.

PROFESSIONAL EXPERIENCE

Academic: Professor, joint appointments (2011-present)

Dept. of Chemical and Biological Engineering
Dept. Electrical Engineering
University at Buffalo, SUNY (www.cbe.buffalo.edu)

Industrial: Senior Principal Scientist (1982-2010)

Eastman Kodak Research Laboratories, Rochester NY

RESEARCH PRODUCTIVITY

Patents: 152 issued U.S. patents, 40 issued foreign patents

Publications: Over 100 in peer-reviewed journals, Over 90 in conference proceedings

Conference Presentations: Over 90 conference presentations (37 invited)

Citations: Over 6300 Google Scholar lifetime citations

Books: Sole authored textbook on Applied Magnetism, 6 book chapters

Graduated Students (since 2011): 5 Ph.D., 15 Masters

RESEARCH FUNDING

Total Funding (since 2011): \$7,354,600 (as PI \$2,130,000)

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PROFESSIONAL EXPERIENCE

I. Academic Experience

Professor (2011- present) Joint appointments in Departments of Chemical and Biological Engineering and Electrical Engineering, University at Buffalo, SUNY.

Founder and Director of the Laboratory for Interdisciplinary Modeling and Simulation (404 Furnas Hall) dedicated to computational research to advance fundamental understanding and rational design of next-generation materials and devices with features and functionality engineered at the nanometer to micron length scale. Areas of application: (i) **biomedical technology and devices**, development of therapeutic electrical stimulation technology; (ii) **metamaterials and plasmonic media**, photonic, telecommunication and biosensing applications; (iii) **inkjet and microfluidics**, broad-based applications including novel printing systems/processes and Lab-on-a-Chip; and (iv) **biomedical applications of magnetic nanoparticles**, magnetic drug delivery, magnetic-assisted gene transfection (magnetofection) and bioseparation. Research experience and objectives:

- **Biomedical Devices** - fundamental studies of stimulated electromagnetic and electrochemical interactions in tissue, design of next-generation electrical stimulation devices with integrated sensor and communications technologies for treatment for chronic wounds, bone regeneration and peri-prosthetic (implant) infections.
- **Metamaterials** - computational photonics, scattering, absorption, spectral analysis, resonance, optical rotation, circular dichroism, structured light: design of nanostructured photonic media, polymer-based photonic materials and chiral media.
- **Plasmonics** - analysis of plasmon resonance, design of plasmonic colloids and thin film media.
 - Development of microfluidic plasmonic-based biosensing platforms.
 - Development of nano to micro-scale waveguides, resonators and nano-antenna for photonic and telecommunication applications.
 - Plasmonic photothermal phenomena, especially for theranostic applications.
- **Microfluidics** - Computational fluid dynamics, heat and mass transfer, nanofluids, multiphase and phase change analysis, general transport phenomena
 - Biosensors, Lab-on-a-Chip
 - Microfluidic processes
- **Magnetic particle-based bioapplications** - fundamental analysis of the magnetic field-directed transport, separation and assembly of magnetic nano/micro particles.
 - Bioseparation, cell-sorting, biosensing, drug/gene delivery, magnetically functional microfluidic devices for biomedical applications, point-of-service clinical diagnostics, magnetic particle-based self-assembly.

**Research Professor: Institute for Lasers, Photonics and Biophotonics
University at Buffalo - State University of New York: 2003-present**

PROFESSIONAL EXPERIENCE CONTINUED

II. Industrial Experience

Eastman Kodak Research Labs: 1982-2010

Senior Principal Scientist: Invented (152 U.S. patents) numerous commercial materials, components and devices that contributed to several of Kodak's product lines. Directed corporate computational research for the design and development of commercial materials, processes and devices. Expert in development and application of analytical and computational methods (finite element method, finite differences, finite volume method, method of lines, volume of fluid) to model coupled electromagnetic, magnetic, fluidic, optical, structural, thermal and transport phenomena. Determined proof-of-concept through modeling, specified prototype designs, guided experimental characterization of prototypes, initiated and managed academic contracts/grants in support of multiple research projects, developed budgets and procured computational infrastructure at the program and division level.

2000-2010 Kodak **Integrated Materials and Microstructures Lab:** Lead analyst in Kodak's state-of-the-art microsystems research laboratory with 12,000 sq. ft. Class 100/1000 clean room and full suite of microfabrication tools and characterization equipment. Laboratory staff of 30 research scientists dedicated to the design, characterization and commercialization of novel microsystems including Micro-ElectroMechanical Systems (MEMS), Micro-Optical Electromechanical Systems (MOEMS) and especially CMOS/MEMS inkjet printhead technology and related microfluidic devices.

- **CMOS/MEMS Inkjet Printheads and Microfluidic Devices:** Designed general microfluidic devices and specialized inkjet printing devices capable of ultra-high generation and precise placement of picoliter-sized droplets using computational fluid dynamics (multiphase, phase change analysis, nanofluids with pigments) for Kodak's commercial drop-on-demand and continuous inkjet printers. Instrumental in the development of Kodak's revolutionary continuous ink jet technology STREAM™, tradename PROSPER™. This transformative technology enables unprecedented printing throughput with up to 1,000,000 picoliter-sized drops produced each second by each nozzle and up to 1000 nozzle per printhead. The commercial ULTRASTREAM™ printer provides a resolution of 600 x 1,800 dpi at web speeds of up to 150 meters per minute. Determined fundamental STREAM™ operating mechanisms [1], led design optimization and developed IP for the critical system component, the micromachined CMOS/MEMS-based STREAM™ printhead. Kodak's inkjet printer division, including PROSPER™, evolved into a multi-hundred million dollar business supporting over 1000 employees.

[1] **E.P. Furlani**, Instability of Viscous Microjets with Spatially Varying Surface Tension, J. Phys. A: Math. Gen. 38 (1), 263-276, 2005.

Inventor of Patented Technology (U.S. Patents): 8,182,068, 8,016,395, 8,011,764, 8,007,082, 7,998,250, 7,946,692, 7,850,289, 7,845,773, 7,735,981, 6,169,358, 6,171,886, 6,262,519, 6,267,464, 6,290,339, 6,351,879, 6,367,132, 6,527,373, 6,578,245, 6,578,955, 6,588,890, 6,626,520, 6,702,209, 6,626,520, 6,726,310, 6,830,701, 6,863,382, 6,874,867.

- **Ceramic Microsystems and Applications:** Developed seminal highly-cited IP that teaches fabrication methods and applications of ceramic-based micosystems. Worked with materials scientists to develop methods for fabricating integrated unitary ceramic-based microsystems, especially for micro-chemical reactors, to overcome the limitations of conventional layered silicon-based technology with respect to true 3D fabrication and degradation of silicon in harsh chemical environments encountered in reactors.

Inventor of Patented Technology (U.S. Patents with Select FC=Forward Citations*): 5,683,649 (23FC), 5,708,893, 5,735,985 (20FC), 5,739,942, 5,779,969, 5,783,879 (16FC), 5,791,040, 5,793,519 (69FC), 5,804,130, 5,821,841, 5,822,839 (22FC), 5,840,140, 5,881,449, 5,888,445 (20FC), 5,910,856 (52FC), 5,961,930 (38FC), 5,961,932 (81FC), 5,965,092 (17FC), 5,976,472 (26FC), 5,993,750 (133FC), 6,036,927 (39FC). 6,154,239, 6,161,270.

***Forward citations: number of subsequent patents that reference a given patent as tracked by USPTO.**

- **Micro-Optical Electromechanical Systems (MOEMS):** Invented improvements in the optical efficiency of Kodak's proprietary micro-machined spatial light modulators and various electro-optic modulators used in Kodak's projection and display technologies and products. Performed micromechanical and optical analysis for device design.

Inventor of Patented Technology (U.S. Patents: FC=Forward Citations): 5,898,515 (66FC). 5,991,079 (26FC), 6,014,257 (28FC), 6,031,652 (34FC), 6,033,131 (51FC), 6,061,166 (81FC), 6,067,183 (50FC), 6,071,752, 6,088,148, 6,141,139, 6,381,062, 6,384,959 (45FC), 6,584,857, 6,487,913, 6,702,209, 6,721,082.

- **Microactuators and Transducers:** Developed IP for novel electro-thermal multimorph, electrostatic and piezoelectric transducers. These components were used in various Kodak products including inkjet drop ejectors and optical modulators for digital projection and display systems. Performed electro-thermal, electro-mechanical and piezoelectric simulations for proof-of-concept and product development.

Inventor of Patented Technology (U.S. Patents: FC=Forward Citations): 5,900,274 (27FC), 6,013,311, 6,464,341, 6,477,029, 6,588,884 (26FC), 6,598,960 (69FC), 6,685,303 (71FC), 6,721,020 (30FC), 6,817,702, 6,820,964, 6,824,249, 6,886,920, 7,029,101, 7,033,000, 7,405,480.

PROFESSIONAL EXPERIENCE CONTINUED

1982-2000 Kodak Applied Physics Research Lab: Lead analyst in a multidisciplinary research and development lab dedicated to the design, characterization and optimization of product prototypes and subsystems for applications that include electro-mechanical motion and control, rare-earth magnetic materials and devices, digital capture and display technology, ceramic materials and applications, magnetic data storage technology, electro-photographic copiers, laser scanners, magneto-optical storage.

- **Electromechanical Motion and Control Systems and Components:** Designed and patented electromechanical rotary and linear actuators, ultra-compact and high-speed brushless DC motors: galvanometers, laser scanners, optical disk drives and eddy-current damping mechanisms for use in a range of Kodak Products.

Inventor of Patented Technology (U.S. Patents): 5,606,206, 5,631,505, 5,802,415, 5,840,134.

- **Rare-earth NdFeB Permanent Magnet Materials and Devices:** Developed and patented novel methods for magnetizing high-strength NdFeB magnets with custom multipole patterns and designed rare-earth magnets for applications including magnetic latching mechanisms, non-contact magnetic torque couplers, magnetic web transport, brushless motors and electro-mechanical transducers used in numerous Kodak products.

Inventor of Patented Technology (U.S. Patents: FC=Forward Citations): 5,613,592, 5,659,280, 5,716,461, 5,829,889, 5,848,684, 5,852,393 (**73FC**), 5,861,692, 5,865,298, 5,893,206, 5,901,893, 5,978,001, 6,034,457, 6,094,119, 6,164,846, 6,206,264.

- **Micromagnetic Technology:** Developed and patented novel magnetic-based microsystem application and methods for magnetizing rare-earth micromagnets.

Inventor of Patented Technology: 5,893,206, 5,982,169, 6,017,770, 6,033,198, 6,171,886, 6,272,729, 6,313,937.

- **Electro-photographic Copiers:** Invented and designed novel multipole rare-earth magnet roller elements to provide unprecedented control of Kodak's proprietary magnetic particle-based toner transfer technology to provide enhanced image reproduction in Kodak's electro-photographic copier line (a multibillion dollar business); developed sensor technology and designed mechanical transport apparatus for enhanced paper sensing and handling, respectively.

Inventor of Patented Technology (U.S. Patents): 5,660,385, 5,701,552, 5,805,292, 5,978,001, 6,094,119.

- **Image Capture Technology:** Invented electromechanical light shutters and magnetic attachment mechanisms, and designed sensing systems for use in Kodak's digital, conventional and single-use cameras, multibillion dollar product lines.

Inventor of Patented Technology (U.S. Patents): 5,606,387, 5,608,484, 5,659,805, 5,694,621, 5,619,296, 5,659,805, 5,687,417, 5,708,874, 5,781,816, 5,828,920, 6,074,109, 6,123,468.

- **High-speed Laser Scanners, Writers, Thermal Printers:** Invented and developed magnetic latching mechanism to mount and stabilize laser writing elements Modeled interaction of laser light with photosensitive media to optimize high-throughput laser-based printers, electro-photographic systems and magneto-optic data storage components (collectively representing billion dollar product lines); performed mechanical design of ceramic-based apparatus for enhanced web transport,.

Inventor of Patented Technology (U.S. Patents): 5,755,520, 5,771,059, 5,771,063, 5,818,497, 5,829,881, 5,838,345, 5,949,463, 5,953,036, 5,973,715, 5,981,087, 6,034,713, 6,034,714, 6,277,006, 6,277,007.

- **Magneto-Optic Data Storage:** Invented and designed novel magnetic bias field actuation mechanisms for Kodak's magneto-optical data storage systems.

Inventor of Patented Technology: 5,535,181, 5,544,132, 5,570,329, 5,619,479, 5,710,747, 5,768,220, 5,909,411, 6,044,042, 6,134,193.

PROFESSIONAL EXPERIENCE CONTINUED

III. Technical/Entrepreneurial Leadership

Garwood Medical Devices LLC, 2016- present

Chief Development Officer, Member of Advisory Board

Garwood Medical Devices, LLC (GMD), a Buffalo NY-based medical device company, is developing next-generation programmable electrical stimulation devices with integrated sensor and communications technologies to enable unprecedented treatment for chronic wound healing, bone growth and peri-prosthetic (implant) infections. PI on a four year \$1.48M grant from the Buffalo Institute for Genomics and Data Analytics (BIG) to enable and accelerate GMD technology. Leading an interdisciplinary team of UB Engineering faculty and graduate students to advance fundamental understanding of electrically stimulated electromagnetic and electrochemical interactions in tissue and develop GMD prototype devices. Responsibilities as GMD's Chief Development Officer and as a member of the Advisory Board include technical oversight of engineering and commercialization activities, identifying opportunities for both intellectual property and new technology and assessment of competing technologies.

Vader Systems LLC, 2016- present

Member of Scientific Advisory Board

Vader Systems, a Buffalo NY-based 3D printing company, is developing a novel technology and commercial system for 3D printing of liquid metals. Vader's proprietary MagnetoJet™ drop-on-demand printing method is based on the principles of magnetohydrodynamics. Responsibilities as a member of Vader Systems' Scientific Advisory Board include the design of prototypes, determination of operating parameters for drop generation, coalescence and solidification, recommendation of materials, technical review of commercialization activities, opportunities for intellectual property and new technology and assessment of competing technologies.

Omantec LLC, 2015-present

Member of Advisory Board

Omantec, a Buffalo NY-based medical device company, is developing a novel electromechanical lift system for treating bed-ridden patients to facilitate various routine hygienic activities, e.g. cleaning etc. Responsibilities as a member of Omatec's Advisory Board include electromechanical design, determination of system operating parameters and requirements, recommendation of sensor technology for motion control safety, technical review of commercialization activities, opportunities for intellectual property and new technology and assessment of competing technologies.

HONORS

2016 - Senior Teacher of the Year, School of Engineering and Applied Sciences, University at Buffalo, SUNY.

2008 - Prolific Inventor Award for achieving 143 U.S. Patents, Society for Imaging Science and Technology.

2001 - Chief Technology Officer Century Award for achieving 100 U.S. patents, Eastman Kodak Company

1998 - Distinguished Inventor Award for achieving 20 U.S. patents, Eastman Kodak Company.

1977-1980 - Graduate School Fellowship, University at Buffalo SUNY.

RESEACH IMPACT - CUMULATIVE CITATIONS

World-Wide Citations = 6314, H index = 40.

Citations tracked by Google Scholar including patents:



Edward Furlani

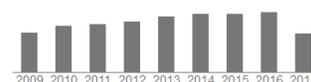
Professor, Chemical and Biological Engineering and Electrical Engineering, University at Buffalo

Computational Physics: Applied Magnetics, Computational Fluid Dynamics, Transport Phenomena, Nanophotonics, Plasmonics

Verified email at buffalo.edu - Homepage

Google Scholar

Citation indices	All	Since 2012
Citations	6314	3097
h-index	40	27
i10-index	116	70



BOOKS

E. P. Furlani, *Permanent Magnet and Electromechanical Devices: Materials, Analysis and Applications*, 518 pp., Academic Press, 2001.

A comprehensive graduate level text/reference on applied magnetism covering the theory of magnetism, modern magnetic materials, and mathematical methods for modeling magnetic structures and electromechanical devices.

Adopted as a textbook at the following academic institutions:

Oregon State University: Course - ECE 499/599 Advanced Topics - Engineering Magnetism, 2006/2008.

Technische Universiteit Eindhoven: Course-5P690 - Advanced Actuator Systems, 2005/2006/2007/2008/2009/2010.

ORGANIZATION MEMBERSHIP

Member: 2010 - American Physical Society, 2010ef -American Institute of Chemical Engineers, 2010 - Optical Society of America, 2014 - American Chemical Society. 2010 - Senior Member of Institute for Electrical and Electronic Engineers.

Ph.D. STUDENTS – DEGREES CONFERED

1. **2017 - Kai Liu (EE):** Optical and Photothermal Behavior of Colloidal and Self-Assembled Magnetic-Plasmonic Nanostructures, Major Professor: Edward P. Furlani, Committee members: Natalia Litchinitser, Pao-Lo Liu and Erik Einarsson, May 9, 2017.
2. **2016 - Ioannis Karamelas (CBE):** Computational Analysis of Pulsed-laser Plasmon-enhanced Photothermal Energy Conversion and Nanobubble Generation at the Nanoscale, Major Professor: Edward P. Furlani, Committee members: Mark Swihart, Gang Wu, July 28, 2016.
3. **2016 - Xiaozheng Xue (CBE):** Field-directed Transport and Self-assembly of Magnetic Nanoparticles with Applications, Major Professor: Edward P. Furlani, Committee members: Mark Swihart, Johannes Nitche May 2016.
4. **2013- Fatema Alali (EE):** Manipulation of Light Enhancement at the Nanoscale with Applications to Metamaterials, Plasmonics and Chirality, Major Professor: Edward P. Furlani, Committee members: Profs. Natalia M. Litchinister, Qiaoqiang Gan and Alexander Cartwright. Defense May 8, 2013.
5. **2010 - Michael S. Hanchak (ME):** Co-advisor for Michael S. Hanchak, Dept of Mechanical Engineering, University of Dayton: Dissertation: One Dimensional Model of Thermo-Capillary Driven Liquid Jet Break-up with Drop Merging, Michael was an Eastman Kodak scientist and I provided principal guidance for his Ph.D. thesis and research, which was focused on Kodak's microfluidic technology. Defense: May 2010.

MS STUDNETS – DEGREES CONFERED

1. **2017 - Gurav Garg (MS CE):** Thesis: Performance Analysis of Drop-on-Demand Metal 3D Printing Device: A Computational Study.
2. **2017 - Ajeya Anand (MS EE):** Thesis: Electrical Stimulation for Wound Healing.
3. **2016 - Aditi Verma (MS CE):** Thesis: Applications of Computational Transport Analysis: Oil Spill Dynamics.
4. **2016 - Michael Cowan (MEng CE):** Project: CFD, Microfluidics.
5. **2015 - Steve Gearhart (MS EE):** Thesis: Formation of High Efficiency InP-Based Nanocrystal Films Using Acrylate Polymers.
6. **2015 - Chayanjit Ghosh (MS EE):** Thesis: Photonic Analysis of Colloidal Plasmonic Nanoparticles
7. **2015 - Moon Kattula (MS CE):** Thesis: A Computational Model for Predicting Fully-Coupled Particle-Fluid Dynamics and Self-Assembly, A theoretical Study
8. **2015 - Ting Wang (MEng CE):** Project: Modeling Thin Film Composite Membranes.

9. **2014 - Chenxu Liu (MS CE):** Thesis: A Computational Model for Predicting Fully-Coupled Particle-Fluid Dynamics and Self-Assembly for Magnetic Particle Applications.
10. **2014 - Koushik Ponnuru (MS CE):** Thesis: Multiscale Computational Modeling of a Radiantly Driven Solar Thermal Collector.
11. **2013 - Young Hwa Kim (MS EE):** Thesis: Metasurfaces with Plasmon-enhanced Birefringence and Optical Rotation.
12. **2012 - Kenyan Schultes (MEng CE):** Project: CFD, Microfluidics.
13. **2012 - Ratna Reddy Chada (MS EE):** Thesis: Theoretical and Experimental Characterization of Plasmonic Materials and Grating-based SPR Sensing.
14. **2012 - Qian Xie (MS EE):** Thesis: Plasmonic Analysis of Nanostructures for Bioapplications.
15. **2012 - Karthik Thirukonda Viswanath (MS CE):** Thesis: Analysis of Colloidal Pigment Aggregation and Ink Media Interactions in Porous Media.

Ph.D. DISSERTATION COMMITTEE MEMBER

1. **2017 - Qi Li (CBE):** Dissertation: Studies of Solution Processable InGaP-based Quantum Dots and Perovskite Solar Cells, Major Professor: Mark Swihart, Committee members: Edward P. Furlani, Chong Cheng, Defense August 10, 2017.
2. **2017 - Gopichand Mallam (CBE):** Dissertation: Dissolution Processing of Nanostructured Polymers Tailored for the Effective Utilization of Cellulosics, Major Professor: Paschalis Alexandridis, Committee members: Edward P. Furlani, Marina Tsianou, Defense August 10, 2017.
3. **2017 - Gopichand Mallam (CBE):** Dissertation: Crystallization and Aggregation Behavior of Calcium Oxalate in Aqueous and Gel Media, Major Professor: Marina Tsianou, Committee members: Edward P. Furlani, Paschalis Alexandridis, Defense August 10, 2017.
4. **2017 - Krishnendu Ghosh (EE):** Dissertation: Ab Initio Electron Transport in Monoclinic β -Ga₂O₃, Major Professor: Uttam Singiseti, Committee members: Edward P. Furlani, Jonathan Bird, Bruce D. McCombe, Defense July 5, 2017.
5. **2017 - Martin Meskin:** Dissertation: Application of Phasor Measurement Unit for Distribution Networks Protection with High penetration of Photovoltaic Sources, Major Professor: Alexander Domijan, Committee members: Edward P. Furlani, Ilya Gringerg, Defense May 1, 2017.
6. **2016 - PhD Jingyuan Lyu (EE):** Dissertation, Rapid Magnetic Resonance Imaging Using Random Projection, Nonlinear Kernel, and Compressed Sensing, Panel, Major Professor: Leslie Ying, Committee members: Profs. Edward P. Furlani, Dimitrios Pados, Zhi Sun Defense November 11, 2016.
7. **2016 - PhD Salih Z. Silahli (EE):** Dissertation, Nonlinear light-matter interactions of structured light beams in engineered media, Panel, Major Professor: Natalia Litchinitser, Committee members: Profs. Edward P. Furlani, Qiaoqiang Gan, Zhi Sun Defense July 5, 2016.
8. **2016 - PhD Dewei Zhu (CBE):** Dissertation, Nobel Metal-based Plasmonic Nanomaterials and Their Application for Bio-imaging and Photothermal Therapy, Panel, Major Professor: Mark Swihart, Committee members: Profs. Edward P. Furlani, Carl Lund, Defense February 8, 2016.
9. **2015 - PhD Xie Zeng (EE):** Dissertation, Plasmonic Interferometers: from Physics to Biosensing Applications, Panel, Major Professor: Qiaoqiang Gan, Committee members: Profs. Edward P. Furlani, Kwang W. Oh and Alex Cartwright, Defense October 23, 2015.
10. **2015 - PhD Tianmu Zhang (EE):** Dissertation, Energy Harvesting and Spectroscopy of Nanocrystals, Panel, Major Professor: Alexander Cartwright, Committee members: Profs. Edward P. Furlani, Qiaoqiang Gan and Wayne Anderson, October 23, 2015.

11. **2015 - PhD Hun Lee (EE):** Dissertation, Droplet-based Microfluidic Platform for Immunoassay Applications using Magnetic Particles, Panel, Major Professor: Kwang W. Oh, Committee members: Profs. Edward P. Furlani, Qiaoqiang Gan and Uttam Singiseti, Defense March 10, 2015.
12. **2015 - PhD Jing Xu (EE):** Dissertation, Micro-Fabricated Flow Calorimeter for RF Power Measurement, Panel, Major Professor: Albert Titus, Committee members: Profs. Edward P. Furlani Uttam Singiseti and Kwang W. Oh, Defense February 12, 2015.
13. **2014 - PhD Mujahidul Islam (EE):** Dissertation, The Effect of Unsheduled Power Flow in a Subtransmission Network Due to Large Variations in Power Output from Distributed Generators, Panel, Major Professor: Mark Swihart, Committee members: Profs. Alexander Domijan, Edward P. Furlani, Pao-lo Liu, Ilya Gringerg and Arif Islam. Defense April 24 2014.
14. **2014 - PhD Bilel Neji (EE):** Dissertation, Study and Design of a Micro-Fabricated DC Substitution Calorimeter for RF Power Measurement, Panel, Major Professor: Albert Titus, Committee members: Profs. Edward P. Furlani Uttam Singiseti and Kwang W. Oh, Defense December 22, 2014.
15. **2014 - PhD Linfeng Xu (EE):** Dissertation, Study of Point-of-Care Microfluidic Pumping and Blood Sample Preparation, Panel, Major Professor: Kwang W. Oh, Committee members: Profs. Edward P. Furlani, Qiaoqiang Gan and Wayne Anderson, Defense December 22, 2014.
16. **2014 - PhD Wenjin Luo (EE):** Dissertation, Research on Novel Algorithms for Smart Grid Reliability Assessment and Economic Dispatch: Theory and Simulation, Panel, Major Professor: Alexander Domijan, Committee members: Profs. Edward P. Furlani and Pao-Lo Liu, Defense November 25, 2014.
17. **2014 - PhD Hosein Kerdar (Civil, Structural, and Env. Eng.):** Dissertation, Electromagnetic Vibration Isolation and Stabilization System: Theory and Simulation, Panel, Major Professor: Gary Dargush, Co-advisors: Dr. Amjad Aref and Dr. André Filiatrault, Committee members: Profs. Edward P. Furlani and Dr. Tarunraj Singh, Defense August 6, 2014.
18. **2013 - PhD Xin Liu (CBE):** Dissertation, Inorganic Nanomaterials and their Applications for Bioimaging, Optoelectronics and Nanoelectronics, Panel, Major Professor: Mark Swihart, Committee members: Profs. Edward P. Furlani and ChongCheng. Defense December 4, 2013.
19. **2013 - PhD Candidate Vaibhaw Kumar (CBE):** Dissertation, Understanding the Effects of Nanoscale Roughness on the Wetting Behavior of Fluids Using Molecular Simulation, Panel, Major Professor: Jeff Erington, Committee members: Profs. Edward P. Furlani and Dave Kofke. Defense August 7, 2013.
20. **2013 - PhD Candidate Munish Kumar Sharma (CBE):** Dissertation, Flame-based Synthesis of Multicomponent Metal Nanoparticles and Nanostructured Coatings, Panel, Major Professor: Mark Swihart, Committee members: Profs. Edward P. Furlani and Carl Lund. Defense July 26, 2013.

21. **2013 - PhD Candidate Apra Pandey (EE):** Dissertation, Manipulating Light with Metamaterial: Basic Physics to Applications, Panel, Major Professor: Natalia M. Litchinister, Committee members: Profs. Edward P. Furlani, Qiaoqiang Gan and Alexander Cartwright. Defense May 10, 2013.
22. **2013 - PhD Candidate Rajagopal Panchapakesan (EE):** Dissertation, Droplet Feedback Mechanisms on a Digital Microfluidic Platform and Development of Hyperbilirubinemia Panel, Major Professor: Kwang W. Oh, Committee members: Profs. Edward P. Furlani, Qiaoqiang Gan. Defense January 9, 2013.
23. **2012 - PhD Candidate Ke Liu (EE):** Dissertation, Graded Photonic Bandgap Structures and Applications, Major Professor: Alexander Cartwright, Committee members: Profs. Edward P. Furlani, Qiaoqiang Gan and Frank Bright. Defense July 16, 2012.
24. **2012 - PhD Candidate Ethan Gibson (EE):** Dissertation, Transition Metamaterials: A Study of Resonant Absorption, Major Professor: Natalia Litchinister, Committee members: Profs. Edward P. Furlani, Qiaoqiang Gan and Alexander Cartwright. Defense July 10, 2012.
25. **2011 - PhD Candidate Sha Liu (CBE):** Dissertation, Synthesis of Nanoparticles via Vapor Phase and Solution Phase Methods. Advisor Mark T. Swihart, Committee members: Profs. Edward P. Furlani and Carl Lund. Defense August 23, 2011.
26. **2011 - PhD Candidate Kangsun Lee (EE):** Dissertation, Pressure-Driven Microfluidic Networks using Electric Circuit Analogy for On-chip Cell Assay Application. Advisor Kwang Wook Oh, Committee members: Profs. Edward P. Furlani. Defense August 17, 2011.
27. **2011 - PhD Candidate Byungwook Ahn (EE):** Dissertation, Dynamic Control of Water-in-Oil Droplets in Continuous Flow by Active and Passive Methods. Advisor Kwang Wook Oh, Committee members: Profs. Edward P. Furlani, Esther Takeuchi. Defense August 15, 2011.

Ph.D. DISSERTATION EXTERNAL REVIEWER

25. **2013 - Invited External Reviewer:** Candidate Shuwen Zeng, Nanyang Technological University: Dissertation: "Nanomaterials Preparation and Their Sensing Applications", July 4, 2013,
26. **2010 - Invited Member of the Board of Examiners:** Committee member for doctoral candidate Sri Sachin Shaw, Indian Institute of Technology, Kharagpur: Dissertation: "Blood Flow in a Stenosed Artery and Magnetic Drug Targeting in Microvessels - Effect of Blood Rheology". Fall of 2010.

MASTER'S THESIS COMMITTEE MEMBER

1. **2017 – Yaguang Zhai (MS EE)** A Simple and Portable Micromixing Device based on Capillary and Vacuum Driven Microfluidic System, Major Professor: Kwang Oh, Committee members: Profs. Edward P. Furlani, Qiaoqiang Gan.
2. **2017 - Sameerah Desnavi (MS EE)** Reconfigurable Topological Insulators: Major Professor: Natalia M. Litchinister, Committee members: Profs. Edward P. Furlani, Jennifer Zirnheld
3. **2016 – Nicholas Grasso (MS EE):** Thesis, Design, Simulation and Error Analysis of an Attenuation Standard and Attenuation Measurement System, Major Professor: Uttam Singiseti, Committee Members: Edward P. Furlani, Kwang Oh, Defense December 15, 2016.
4. **2016 - Emily Oakley (MS EE):** Thesis, Decentralized Digitized Electrode Design for Non-Contact Biopotential Applications: Major Professor: Kwang Oh, Committee Members: Edward P. Furlani, Defense May 5, 2016.
5. **2016 -Jordan Radice (MS EE):** Thesis, Decentralized Digitized Electrode Design for Non-Contact Biopotential Applications: Major Professor: Albert Titus, Committee Members: Edward P. Furlani, Jennifer Zirnheld, Defense May 3, 2016.
6. **2016 - Phil Schneider (MS EE):** Thesis, A Feasibility Study of an Ultrasonic Arm Test Phantom: Major Professor Kwang Oh, Committee Members: Edward P. Furlani, Jennifer Zirnheld, Defense April 28, 2016.
7. **2016 - Praveen Raghunathan Iyer (MS EE):** Thesis, Grounding System Design for HV Transmission: Major Professor Alexander Domijan, Committee Members: Edward P. Furlani, Ilya Gringerg, Defense April 13, 2016.
8. **2015 - Goutham Sankaranarayanan (MS EE):** Thesis, Label-free Surface Plasmon Sensing towards Cancer Diagnostics, Major Professor: Qiaoqiang Gan, Edward P. Furlani, Erik Einarsson, Defense June 29, 2015.
9. **2015 - Praveen Raghunathan Iyer:** Thesis, Towards Smart Power Distribution Systems, Major Professor: Alexander Domijan, Edward P. Furlani, Ilya Gringerg, Defense May 13, 2015.
10. **2013 - Seoyoung Son (MS CBE):** Thesis, Non-Viral and High-efficiency DNA delivery for Transient Nanog Overexpression in Mesenchymal Stem Cells by Magnetofection, Advisor Stelios T. Andreadis, Committee Member: Edward P. Furlani, Sheldon Park. Defense December 18, 2014.
11. **2013 - Vighnesh Magesh Kumar (MS EE):** Thesis, Test Bed Evaluation of Magnetic Induction based Communication for Underground Sensor Networks, Sr, Advisor Zhi Sun, Committee Members: Edward P. Furlani, Nicholas Mastronade. Defense August 15, 2013.

12. **2013 - Vikram Reddy Singaravadivelu (MS CBE):** Thesis, Modeling of Nickel Deposition in a Rotating Disk CVD Reactor, Major Professor: Mark Swihart, Committee Members: Edward P. Furlani. Defense May 6, 2013.
13. **2012 - Sivakumar Kandappan Singaravadivelu (MS CBE):** Thesis, Crystal Growth and Morphology Control of Calcium Oxalate in Hydrogels, Advisor Marina Tsianou, Committee members: Profs. Edward P. Furlani. Defense August 23, 2012.
14. **2011 - Sivakumar Kandappan Singaravadivelu (MS EE):** Thesis, The iPad as a tool for simulation and sensing. Advisor Albert Titus, Committee members: Profs. Edward P. Furlani and Nicholas Mastronarde. Defense Dec. 5, 2011.
15. **2011 - Linfeng Xu (MS EE):** Thesis, Structure Enhanced Microfluidic Devices for Self-powered Pumps, Stickers and Valves. Advisor Kwang Wook Oh, Committee members: Profs. Wayne A. Anderson, Edward P. Furlani. Defense May 26, 2011.
16. **2011 - Gary Floriano Martin (MS CBE):** Thesis, Computational Modeling of Compressible Gas flow through a High Temperature Reducing Jet Reactor. Advisor Mark T. Swihart, Committee members: Edward P. Furlani. Defense June 27, 2011.
17. **2011 - Jing Xu (MS EE):** Thesis, Droplet-based Microfluidic Devices for Multiple-droplet Trapping, Storing, and Clustering. Advisor Kwang Wook Oh, Committee members: Profs. Wayne A. Anderson, E. P. Furlani. Defense July 28, 2011.

INVITED PRESENTATIONS

1. **E. P. Furlani**, Multiphysics CFD: Challenges and Applications, Keynote Address, FLOW-3D Americas Users Conference, Sante Fe NM, September 19-21, 2017.
2. **E. P. Furlani**, High-Throughput Multiphysics and Multiscale Simulations, NASA Tech Brief Webinar, May 25, 2017.
3. W. Bacon, G. Gellman, M. J. Phillips, M. Ehrensberger and **E. P. Furlani**, University Startups Demo Day, National Council of Entrepreneurial Tech. Transfer, Washington DC, Sept. 20 2016.
4. **E. P. Furlani**, “Multiphysics and Multiscale Simulations: Advancing Basic Science and Industrial Applications”, Keynote Address, COMSOL Conference on Multiphysics Simulation, Boston MA, October 5-7, 2016.
5. J. Berthier, K.A. Brakke, **E.P. Furlani**, I.H. Karampelas, G. Delapierre, Open-Surface Microfluidics, NSTI Nanotech Conf., Wash. DC, June 2014.
6. X. Xue and **E. P. Furlani**, Magnetic Nanoparticle Dynamics and Assembly Phenomena in External Magnetic Fields, NSTI Nanotech. Conf. Wash. DC. May 2013.
7. N. M. Litchinitser, A. Pandey, R. Biswas, T. Moein, J. Zeng, **E. P. Furlani**, A. N. Cartwright, Novel Micro, Nano, and Meta Structures for Sensing, SPIE Photonics West, Jan. 2012.
8. **E.P. Furlani**, Challenges of Modeling InkJet Systems, NSTI Nanotech. Conf. Boston, June 2011.
9. **E. P. Furlani**, Metamaterials: A Bottom-up Approach, Metamaterials and Plasmonics: Novel Materials, Designs, and Applications, UB Workshop, May 2010.
10. **E. P. Furlani**, Ultrafast Continuous Inkjet Printing, Nano Magazine, Issue 20, p 31, Oct. 2010.
11. M. S. Hanchak and **E.P. Furlani**, Modeling Drop Generation at the Microscale, NSTI Nanotech. Conf. June 2010.
12. **PBS History Detectives** – Invited on-screen appearance and presentation for an upcoming program entitled “Westinghouse Space Boot”. This invitation was based on my research and book in the field of applied magnetism. The program is scheduled for broadcast June 21 2010.
13. N. M. Litchinitser, I. Mozjerin, Tolanya Gibson, **E. P. Furlani**, I. R. Gabitov, Electromagnetic Enhancement in Lossy Optical Transition Metamaterials 19th International Laser Physics Workshop (LPHYS'10), Foz do Iguacu, Brazil, 2010.
14. **E. P. Furlani**, Microfluidics: Analysis and Applications, CACM Seminar RIT. Jan.2010.
15. N. M. Litchinitser, I. Mozjerin, **E. P. Furlani**, I. Gabitov, and V. Shalaev, Transition Metamaterials, PQE-2010, Snowbird, UT, USA, January 3-7, 2010.

16. J. Chwalek, **E. P. Furlani**, J. Gao, K. Vaeth and G. Hawkins, Recent Advancements in Continuous Inkjet Technology, AVS 56th International Symposium and Exhibition, Nov. 2009.
17. **E. P. Furlani**, Plasmonics: Modeling and Applications, New York Conf. on Applied Math. Oct. 2009.
18. K. Vaeth, **E. P. Furlani** et al., Stream Continuous Inkjet: A New Technology for Commercial Printing, RIT's 27 annual Microelectronic Engineering Conference. May 2009.
19. H. Panchawagh, **E. P. Furlani** et al., Recent Developments on Kodak's Continuous Inkjet Technology, Ontario on a Chip Conference, May 2009.
20. **E.P. Furlani**, **Continuous Inkjet Printing**, NSTI Nanotech Conf., May 2009.
21. G. Hawkins, A. Lopez, J. Chwalek, **E. P. Furlani**, Offset Class Printing Using Stream Continuous Inkjet Technology, Japan Society of Colour Material (JSCM), Univ. California, Berkeley, Nov. 2008.
22. **E.P. Furlani**, A. Baev and P.N. Prasad, Optical Nanotrapping Using Illuminated Metallic Nanostructures: Analysis and Applications, NSTI Nanotech Conf., June 2008.
23. **E. P. Furlani**, Microscale Manipulation of Fluid Properties with Applications to Ink Jet Printing, 6th New York Complex Matter Workshop, June 2008.
24. G. Hawkins, **E. P. Furlani** et al., The Application of Instabilities of Microfluidic Jets to Digital Offset-Class Printing, Hilton Head Solid-State Sensors, Actuators and Microsystems Workshop, June 2008.
25. H. Panchawagh, **E. P. Furlani** et al., Continuous Inkjet Printhead with Integral Deflection and Guttering, Microsystems Engineering Seminar Series, Rochester Institute of Technology, April 2008.
26. G. Hawkins, **E. P. Furlani** et al. Growth Technologies for Inkjet Printing, 15th Annual European Inkjet Printing Conference, Nov., 2007.
27. **E. P. Furlani**, Microfluidics: Commercial Success and Emerging Opportunity, University at Buffalo, Dept. of Chemical and Biological Engineering, March 2007.
28. **E. P. Furlani**, Magnetic Nanoparticles and Applications in Biomedicine, Wake Forest University, Dept. of Radiation Oncology, Jan. 2007.
29. **E. P. Furlani**, Bioapplications of Multifunctional Magnetic Nanoparticles, Wake Forest University, Physics Dept and Center for Nanotechnology and Molecular Materials, Jan. 2007.
30. **E. P. Furlani**, Thermal Modulation of Microjets for Continuous Inkjet Printing, The Institute for Liquid Atomization and Spray Systems, ILASS- Americas Newsletter, January 2007.
31. Y. Sahoo, **E. P. Furlani**, I. Roy and E. J. Bergey, Nanocarrier Technology in Bioimaging and Drug Delivery, International Conference on Molecules to Materials, March 2006.

32. G. Hawkins and **E. P. Furlani**, Digital Water, New York State Sections of APS and AAPT Spring 2003 Symposium, 88th APS NYSS Semi-Annual Symposium, SUNY Geneseo, April 2003.
33. **E. P. Furlani**, MEMS Analysis and Design, Department of Electrical Engineering, SUNY at Buffalo, April 2002.
34. **E. P. Furlani**, Analysis and Simulation of Micro-Optical ElectroMechanical Systems, Department of Mechanical Engineering, University of Rochester, March 2002.
35. **E. P. Furlani**, Microsystems Analysis and Design, Department of Electrical Engineering, Rochester Institute of Technology, April 2002.
36. **E. P. Furlani**, Mathematical Modeling and Simulation in Industry, Department of Mathematics, SUNY at Buffalo, April 1998.
37. **E. P. Furlani**, Maxwell's Equations and the Analysis of Electromagnetic Devices, The Institute for Mathematics and its Applications, Univ. Minnesota, June 1994. IMA Vol. in Math. & Applications: Mathematics in Industrial Probs., Part 7, Vol. 67, Chapter 19, Eds. A. Friedman and W. Miller, Springer-Verlag, N Y, 1995.

UNIVERSITY SERVICE

2017-2018 Alternate Member SEAS Promotions Committee Member

2016-2017 Member SEAS Tenure Committee Member

2015-2016 Member BioXFEL Faculty Search Committee Member

2015-2016 Chair CBE Faculty Search Committee Member

2014-2015 Faculty Search Committee Member, Chair of the Dept. of Materials Design and Innovation (MDI).

2013-2015 Undergraduate Curriculum Committee, Dept. of Electrical Engineering.

2012-2014 Faculty Search Committee Member, Dept. of Chemical and Biological Engineering: Multiscale Modeling Candidate.

2012-2013 Faculty Search Committee Member, Dept. of Chemical and Biological Engineering: Material Science Candidate.

2012-2013 Faculty Search Committee Member, Dept. of Electrical Engineering: Photonics Candidate.

PROFESSIONAL SERVICE

I. International Conference Symposium Organizer and Chair

1. **2012 - Present:** NSTI Nanotechnology Conference: **Symposium Chair and Organizer:** Micro and Biofluidics and Lab-on-a-Chip
2. **2011 - 2012:** NSTI Nanotechnology Conference: **Symposium Co-chair and Co-Organizer:** Micro and Nanofluidics

II. International Conference Steering Committee Member

1. **2005-present:** NSTI Nanotechnology Conference: MEMS and Microsystems Steering Committee Member.
2. **2009-2010:** American Vacuum Society - International Symposium and Exhibition.

III. International Conference Session Chair

1. **2014:** NSTI Nanotechnology Conference: Symposium: Micro and Nano Fluidic Session Chair: Micro and Nano Fluidic Devices, Fluid Transport, Bio Fluidic Devices.
2. **2013:** NSTI Nanotechnology Conference: Symposium: Micro and Nano Fluidics - Session Chair: Micro and Nano Fluidic Devices, Bio Fluidic Devices.
3. **2012:** NSTI Nanotechnology Conference: Symposium: Micro and Nanofluidics - Session Chair: Fluidic Device Simulation, Bio Fluidic Devices I & II.

4. **2011:** NSTI Nanotechnology Conference: Symposium: Micro and Nano Fluidics
Session Chair: Micro and Nanofluidic Simulation, Biofluidic Devices.
5. **2010:** NSTI Nanotechnology Conference: Symposium: Micro and Nano Fluidics -
Session Chair: Micro and Nanofluidic Devices, Micro and Nanofluidics - General
Phenomena.
6. **2009:** NSTI Nanotechnology Conference: Symposium: Micro and Nano Fluidics
Session Chair: Transport Phenomena.
7. **2008:** NSTI Nanotechnology Conference: Symposium: Micro and Nano Fluidics
Session Chair: Micro & Nano Fluidics: Devices & Applications.
8. **2007:** NSTI Nanotechnology Conference: Symposium: Micro and Nano Fluidics
Session Chair: Micro and Nano Fluidic Devices.
9. **2006:** NSTI Nanotechnology Conference: Symposium: Micro and Nano Fluidics -
Session Chair: Fluidics: Two-Phase Micro Fluidics.

IV. National Conference Committee Member and Session Chair

1. COMSOL Conference 2009 - Session Chair: Bioengineering
2. COMSOL Conference 2008 - Session Chair: Optics and Photonics.

V. International Scientific Review Panel

1. **Invited Reviewer - 2011:** Science & Engineering Research Council (SERC) of Singapore, reviewer for proposal “**Evaporation-induced self-assembly of nanoparticles in drying nanofluids,**” research conducted by Prof. Fei Duan at Nanyang Technological University.
2. **Invited Reviewer - 2011:** Presidents Technology Award (PTA)- Singapore, reviewed research project to recommend for PTA “**Development of novel channel models for the holistic design of next generation magnetic recording systems towards,**” research conducted by Prof. Chan Kheong Sann et al. at Nanyang Technological University.
3. **Invited Reviewer - 2011:** Presidents Technology Award - Singapore, reviewed research project to recommend for PTA “**Artificial Mesoscopic Structures for Next Generation Electronic and Photonic Technology,**” research conducted by Prof. Zhang Dao Hua et al. at Nanyang Technological University.
4. **Invited Reviewer - 2009:** Research Directorate - University of Cyprus, reviewer for proposal “**Design of New Nanoparticle Structures for Potential Diagnostic Applications,**” August 2009.
5. **Invited Reviewer - 2008:** Science & Engineering Research Council (SERC) of Singapore, reviewer for proposal “**White Light Near-field Imaging of Plasmonic Structures for Nano photonics Applications,**” submitted by Nanyang Technological University, February 2008.

VI. NSF Review Panel and Site Reviewer

1. NSF - EAGER Program, Spring 2017
2. NSF - Science and Technology Center Program, Spring 2015
3. NSF - Major Research Instrumentation Program, Spring 2014
4. NSF - Biophotonics, Fall 2013
5. NSF - Major Research Instrumentation Program, Spring 2013
6. NSF - Biophotonics Program, Fall 2012
7. NSF - Biophotonics Program, Fall 2011
8. NSF - CAREER Program, Fall 2011.
9. NSF - Biophotonics Program, Fall 2010.
10. NSF - Major Research Instrumentation Program, Spring 2010.
11. NSF - Major Research Instrumentation Program, Fall 2009.
12. NSF - Emerging Frontiers in Research and Innovation - Biosensing, Spring 2009.
13. NSF - Major Research Instrumentation Program, Spring 2009.
14. NSF Biophotonics, Advanced Imaging, and Sensing for Human Health (BISH), Spring 2009.
15. NSF Biophotonics, Advanced Imaging, and Sensing for Human Health (BISH) Program, Fall 2008.
16. NSF Biophotonics, Advanced Imaging, and Sensing for Human Health (BISH), Spring 2008.
17. NSF Nanoscale Exploratory Research (NER): Biosystems at the Nanoscale, 2007.
18. NSF Biophotonics Program, 2007.
19. NSF Faculty Early Career Development (CAREER) Program, 2007.
20. NSF Biophotonics, Advanced Imaging, and Sensing for Human Health (BISH), 2007.
21. NSF Nanoscale Exploratory Research (NER) Program - Member of Active Nanostructures and Nanosystems, 2006.
22. NSF Nanoscale Interdisciplinary Research Teams (NIRT), 2006.
23. NSF Mathematical and Physical Sciences, 2006.
24. NSF Site Visit Member - Engineering Research Center (ERC) for Smart Lighting, Rensselaer Polytechnic Institute, 2005.

VII. Referee – Peer Reviewed Journals

1. ACS Applied Materials & Interfaces
2. ACS Nano
3. Advanced Materials
4. Annals of Biomedical Engineering
5. Applied Mathematical Modelling
6. Applied Physics Letters
1. Canadian Journal of Chemical Engineering
2. Energy and Environmental Science
3. Experiments in Fluids
4. IEEE Transactions on Electromagnetic Compatibility
5. IEEE Transactions on Magnetics
6. IEEE Transactions on Nanotechnology
7. IMA Journal of Applied Mathematics
8. International Journal of Hyperthermia
9. International Journal of Heat and Mass Transfer
10. Journal of Alloys and Compounds
11. Journal of Applied Physics
12. Journal of Biosensors and Bioelectronics
13. Journal of Computational and Applied Mathematics
14. Journal of Computational Biology
15. Journal of Selected Topics in Quantum Electronics
16. Journal of Physics D: Applied Physics
17. Journal of Microfluidics and Nanofluidics
18. Journal of Theoretical Biology
19. Journal of Separation Science and Technology
20. Journal of Physics A
21. Journal of the Optical Society of America B
22. Journal of Magnetism and Magnetic Materials
23. Journal of Electromagnetic Waves and Applications
24. Lab on a Chip
25. Langmuir
26. Microvascular Research
27. Nanomedicine
28. Nano Letters
29. Nanoscale
30. Optics Communications
31. Physica Scripta
32. Physical Review E

33. Physics of Fluids
34. RSC Advances
35. Scientific Reports (Nature Journals)
36. Sensors

UNIVERSITY TEACHING

1. **Spring 2017** EE 432/532, CE 421/521 Optofluidics (40 students, 3 credits)
2. **Fall 2016** EE 202 Circ. Anal. I (210 students, 4 credits)
3. **Fall 2016:** CE 341 (90 students, 3 credits), Applied Math for Chem. Eng.
4. **Spring 2016** EE 432/532, CE 421/521 (30 students, 3 credits), Optofluidics
5. **Fall 2015** EE 202 (160 students, 4 credits), Circ. Anal. I
6. **Fall 2015:** CE 341 (90 students, 3 credits), Applied Math for Chem. Eng.
7. **Spring 2015:** CE 505/ EE 541 (40 students, 3 credits) Special Topic: Optofluidics
8. **Fall 2014:** CE 341 (75 students, 3 credits), Applied Math for Chem. Eng.
9. **Fall 2014:** EE 202 (170 students, 4 credits), Circ. Anal. I
10. **Spring 2014:** CE 505/ EE 541 (26 students, 3 credits) Special Topic: Optofluidics
11. **Fall 2013:** CE 341/500 (75 students, 3 credits), Applied Math for Chem. Eng.
12. **Fall 2013:** EE 202 (207 students, 4 credits), Circ. Anal. I
13. **Spring 2013:** CE 505/ EE 541 (20 students, 3 credits) Special Topic: Optofluidics
14. **Fall 2012:** CE 351 (67 students, 3 credits), Applied Math for Chemical Eng.
15. **Fall 2012:** EE 202 (100 students, 4 credits), Circ. Anal. I
16. **Spring 2012:** EE 202 (140 students, 4 credits), Circ. Anal. I
17. **Fall 2011:** CE 400 (19 students, 3 credits) Appl. Math. for Chemical Eng.
18. **Spring 2011:** EE 202 (152 students, 4 credits, Student Eval. 4.16/5), Circ. Anal. I.
19. **Fall 2010:** CE 400 (9 students, 3 credits) Appl. Math. for Chemical Engineers.
20. **Fall 2001:** MTH 306 (28 students, 4 credits), Intro. to Differential Equations.
21. **Spring 2001:** MTH 306 (30 students, 4 credits), Intro. to Differential Equations.
22. **Fall 2000:** MTH 306 (27 students, 4 credits), Intro. to Differential Equations.
23. **Spring 2000:** MTH 306 (31 students, 4 credits), Intro. to Differential Equations.
24. **Fall 1999:** MTH 242 (25 students, 4credits), Intro. to Differential Equations.
25. **Spring 1999:** MTH 242 (22 students, 4 credits), Intro. to Differential Equations.
26. **Fall 1998:** MTH 242 (26 students, 4 credits), Intro. to Differential Equations.
27. **Spring 1998:** MTH 242 (21 students, 4 credits), Intro. to Differential Equations.
28. **Fall 1997:** MTH 242 (29 students, 4 credits), Intro. to Differential Equations.

29. **Spring 1997:** MTH 141 (22 students, 4 credits), College Calculus I.
30. **Fall 1996:** MTH 141 (32 students, 4 credits), College Calculus I.
31. **Spring 1996:** MTH 417 (28 students, 4 credits), Multivariable Calculus.
32. **Fall 1995:** MTH 242 (21 students, 4 credits), Intro. to Differential Equations.
33. **Spring 1995:** MTH 418 (18 students, 4 credits) Survey of Partial Differential Eqs.
34. **Fall 1994:** MTH 242 (25 students, 4 credits), Intro. to Differential Equations.
35. **Spring 1994:** MTH 417 (18 students, 4 credits), Multivariable Calculus.
36. **Fall 1993:** MTH 242 (22 students, 4 credits), Intro. to Differential Equations.
37. **Spring 1993:** MTH 242 (26 students, 4 credits), Intro. to Differential Equations.
38. **Fall 1992:** MTH 141 (31 students, 4 credits), College Calculus I.
39. **Spring 1992:** MTH 141 (30 students, 4 credits), College Calculus I.
40. **Fall 1991:** MTH 141 (27 students, 4 credits), College Calculus I.
41. **Spring 1991:** MTH 141 (31 students, 4 credits), College Calculus I.
42. **Fall 1990:** MTH 141 (33 students, 4 credits), College Calculus I.
43. **Spring 1990:** MTH 141 (29 students, 4 credits), College Calculus I.

FUNDED RESEARCH PROPOSALS

Total Funding (since 2011): \$7,354,600 (as PI \$2,130,000)

9/1/2017-8/31/2020 Co-PI, NSF: PFI: BIC: WearNet: Smart Health Monitoring & Diagnosis System based on Wearable Nano-biosensing Networks: 20%, effort: 0.25 Sumner mo., Total Budget \$1,000,000.

9/1/2017-8/30/2019 PI, NYS Jeff Lawrence Manufacturing Innovation Fund: CleanSlate UV and Grantwood Technologies: Development of Next-Generation Solid-State DUV Disinfection technology and Commercial Device Prototype, percent credit 30%, Total Budget \$75,000.

8/1/2017-7/30/2018 PI, NYS Ctr. of Excellence in Materials Informatics: Development of Next-Generation Solid-State DUV Disinfection technology: A Collaboration with CleanSlate UV and Grantwood Technologies, eAward No. NA, percent credit 100%, Total Budget \$30,000.

12/1/2016-6/30/2017 Co-PI, NYS Ctr. of Excellence in Materials Informatics: Advancing the Science of Electrical Stimulation Therapy: A Collaboration with Garwood Medical Devices, Award No. 1133112-2-75163, percent credit 50%, Total Budget \$40,000.

6/1/2016-6/1/2017 PI, Harris Corp.: Development of Novel Magnetic Damping System for Spaceborne Optical Systems, percent credit 100%, Total Budget \$60,000.

8/1/2016-7/30/2019 Co-PI, NSF: Engineering Nanocarbon Air Cathodes for High-Temperature Solid-State Li-O₂ Batteries percent credit: Award No. 1604392, 20%, effort: 0.25 Sumner mo., Total Budget \$342,665.

8/1/2016-7/30/2020 PI, Empire State Development, Buffalo Institute for Genomics and, Data Analytics (BIG): Therapeutic Electrical Stimulation Technology and Device Development, Award No. 69300-1135733-1, percent credit 40%, effort: 1 Acad. mo. & 1 Sumr. mo., Total Budget \$1,480,000.

8/1/2016-7/30/2020 PI, Garwood Medical Devices: Therapeutic Electrical Stimulation Technology and Device Development, Award No. 76774-1136702-2, percent credit: 40%, effort: NA, Total Budget \$361,872.

5/1/2016-9/1/2016 PI, Rensselaer Polytechnic Institute: Computational Modeling for Industrial Applications, percent credit 100%, Total Budget \$25K

7/1/2015-7/1/2016 Co-PI, UB CAT Grant: UB-Vader Systems Collaboration for Development of new X-ray Imaging System Components and Medical Imaging Testing Products using Metal 3D Printing, percent credit 30%, Total Budget \$48K

5/15/2014-1/29/2015 PI, UB Center for Industrial Effectiveness (TCIE): Vader Systems Modeling and Optimization of a Droplet-based Three-dimensional Printing System, percent credit 80%, Total Budget \$9,886.

01/1/14-01/1/2016 Co-PI, NYS CFA: Advanced Computing Infrastructure to Support Industrial Innovation and Economic Development, percent credit 20%, Total Budget \$1,000,000. Equipment grant Commitment NA.

11/15/2014-12/30/2015 PI, Xerox Corp: In-Ground Inductive-Loop Analysis for Vehicle Transportation Applications, percent credit 100%, Total Budget \$20,000.

03/31/13-3/31/2014 NY: Co-PI, NYS Ctr. of Excellence in Materials Informatics: percent credit 5%, Total Budget \$500,000.

9/23/2013-2/29/2014 UB Center for Industrial Effectiveness (TCIE) for S. Howes Corp.: subcontract PI Development of Predicted Performance Simulation Models - Phase 1, percent credit 80%, Total Budget \$35,300.

08/1/13-8/1/2016 NY: Co-PI, New York State High Performance Computing Consortium (HPC2): percent credit 20%, Total Budget \$516,112.

08/01/13-7/30/2016 Co-PI, NSF: MRI: Development of an Instrument for Quantitative Characterization of Behavior of Magnetic Particles and Magnetically-Labeled Biomaterials in Emerging Applications, Commitment 0.5 months of academic year, percent credit 20%, Total Budget \$764,000.

06/01/13-2/28/2014 PI, NSF SBIR Subcontract: Macroscale Knudsen Pumped Solar Thermal Collectors, Effort 0.48 months, Furlani share \$40,000. Total Budget: \$150,000.

2013-2014 PI, IMA Life Corp: Process and Materials Modeling for Development of Novel Lyophilization Systems, percent credit 100%, Total Budget \$40,000.

2013-2014 PI, Univ. Texas Medical Branch: Understanding Biomechanical Behavior of the Human Eye, percent credit 100%, Total Budget \$12,500.

4/01/2012- 3/31/2015 Co-PI, NSF: Dissolution Processing of Nanostructured Polymers Tailored for Effective Utilization of Cellulosics, Project duration: 04/01/2012 – 03/31/2015, effort.25 summer months, percent credit 5%, Total Budget: \$398,017.

2011-2012 PI, Cabot Corp: Colloid Research and Wetting Phenomena, percent credit 100%, Total Budget \$45,000.

04/01/2012-8/1/2013 Co-PI, DOE: High Efficiency Colloidal Quantum Dot Phosphors, Furlani share: 10% academic year, percent credit 5%, Total Budget \$519,962.

2011–2012 PI, EMD Chemicals: Modeling Materials Synthesis, percent credit 100%, Total Budget \$27,000.

2009-2014 Co=PI, Air Force Office of Scientific Research (AFOSR): Develop Bottom-Up Chemical Approaches to 3-D Negative Index Meta-Materials Two-Photon Lithography-Chiral Chemical Synthesis Approach, AFOSR Grant # FA95500810258 Total funding amount \$1,500,000. Furlani share (summer salary - 2 months).

PUBLICATIONS

Note: Underlined authors are Student advisees of Edward P. Furlani

I. Publications in Refereed Journals

1. X. Z. Xue, K. Liu, **E. P. Furlani**, “Theoretical Study of the Self-Assembly and Optical Properties of 1D Chains of Magnetic-Plasmonic Nanoparticles”, *J. Phys. Chem. C* 121, 9489-9496 (2017).
2. J. Gomez-pastora, I. H. Karampelas, X. Z. Xue, E. Bringas, **E. P. Furlani**, I. Ortiz, “Magnetic Bead Separation from Flowing Blood in a Two-Phase Continuous-Flow Magnetophoretic Microdevice: Theoretical Analysis through Computational Fluid Dynamics Simulation”, *J. Phys. Chem. C* 121, 7466-7477 (2017).
3. L. X. Zhu, M. Yavari, W. G. Jia, **E. P. Furlani**, H. Q. Lin, “Geometric Restriction of Gas Permeance in Ultrathin Film Composite Membranes Evaluated Using an Integrated Experimental and Modeling Approach”, *Ind. Eng. Chem. Res.* 56, 351-358 (2017).
4. J. Gomez-pastora, X. Xue, I. H. Karampelas, E. Bringas, **E. P. Furlani**, I. Ortiz, “Analysis of separators for magnetic beads recovery: From large systems to multifunctional microdevices”, *Sep. Purif. Technol.* 172, 16-31 (2017).
5. M. P. S. dos santos, J. A. F. Ferreira, J. A. O. Simoes, R. Pascoal, J. Torrao, X. Z. Xue, **E. P. Furlani**, “Magnetic levitation-based electromagnetic energy harvesting: a semi-analytical non-linear model for energy transduction”, *Sci Rep* 6, 18579 (2016).
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II. Publications Under Review

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