



Northeastern University
College of Engineering

Engineering for Society

Boldly innovating to better our world

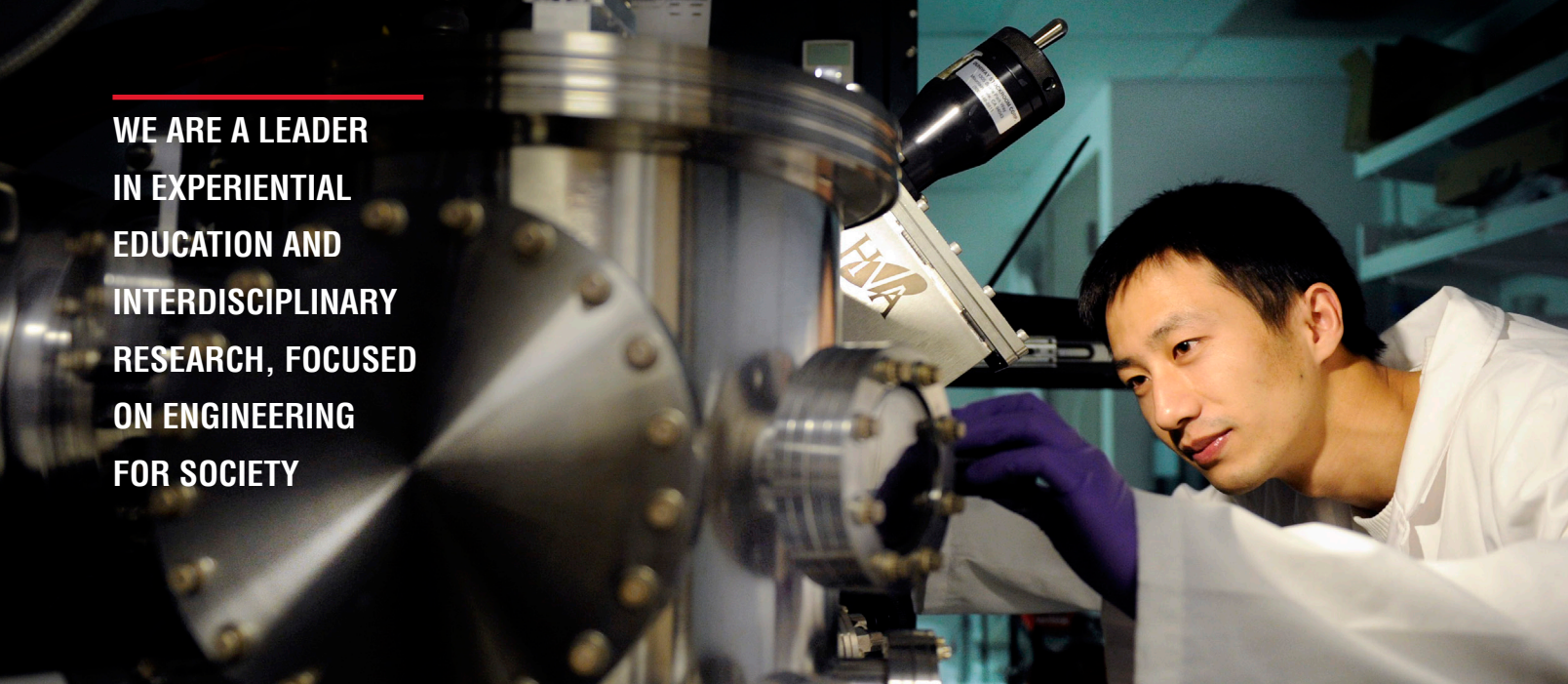
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2016 | 2017

SCHOLARSHIP REPORT

Electrical and Computer Engineering

**WE ARE A LEADER
IN EXPERIENTIAL
EDUCATION AND
INTERDISCIPLINARY
RESEARCH, FOCUSED
ON ENGINEERING
FOR SOCIETY**



We in the Department of Electrical and Computer Engineering are happy to provide you with our Annual Scholarship Report. This report highlights the research and accomplishments of our esteemed faculty in the past year, serving as a reminder of the real-world implications of the work being done here at Northeastern.

There are a couple of exciting initiatives we would like to bring to your attention. In particular, the National Science Foundation named Associate Professor Tommaso Melodia director of research of the Project Office for the Platforms for Advanced Wireless Research initiative, also known as PAWR. PAWR will fund the research and development of multiple community-scale platforms supporting next-generation wireless communications networks across the U.S. Over the next seven years, the PAWR Project Office will oversee close to \$100 million in investments from the National Science Foundation.

Professor Edmund Yeh will lead Northeastern as a member of a group that was given a four-year, \$10 million research project from the Defense Advanced Research Projects Agency. This group, Northeastern, MIT, and Raytheon BBN, will work hand-in-hand to research advance wireless communication technology.



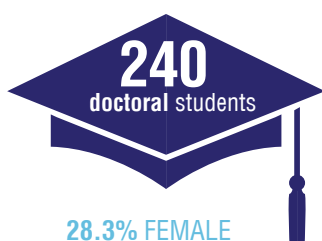
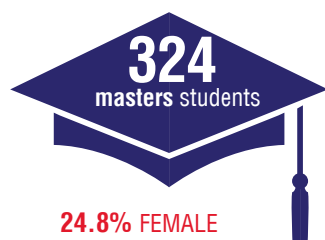
Lastly, COE Distinguished Professor David Kaeli received a \$4.6 million, four-year award from the National Science Foundation to continue and expand the CyberCorps® Scholarship for Service program. The renewal of this 2012 grant will allow the program to continue to prepare highly-qualified cybersecurity professionals for entry in the government workforce.

We hope you can come see for yourself the exciting work being done in our wonderful department and college.

Sincerely,

Miriam Leeser
Interim Chair of Electrical and Computer Engineering
m.leeser@northeastern.edu

QUICK FACTS — Electrical and Computer Engineering



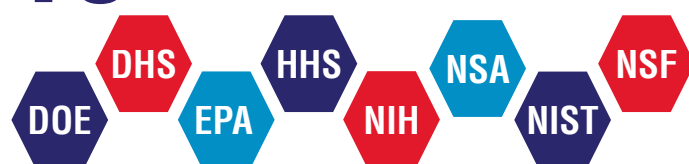
\$17M ANNUAL FACULTY RESEARCH EXPENDITURES



The department offers seven research concentrations and is either the lead or partner of seven federally-funded research centers.

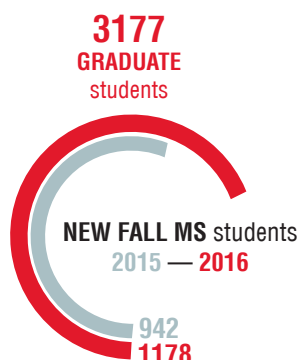
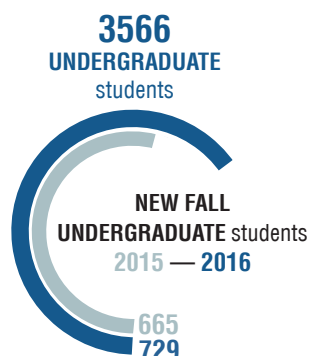
QUICK FACTS — College of Engineering

13 MULTI-INSTITUTIONAL RESEARCH CENTERS
funding by eight federal agencies

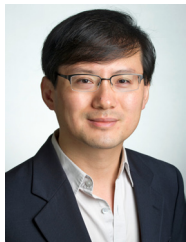


5 ENGINEERING
DEPARTMENTS

Bioengineering
Chemical Engineering
Civil and Environmental Engineering
Electrical and Computer Engineering
Mechanical and Industrial Engineering



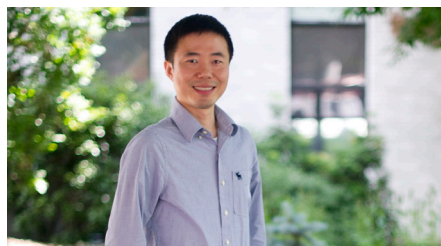
FACULTY HONORS AND AWARDS



Professor **Edmund Yeh** received a \$1 million, two-year National Science Foundation award for his project, entitled “Software Defined Network-Assisted Named Data Network

for Data Intensive Experiments.” The project team will redesign the Large Hadron Collider (LHC) high energy physics program network. Northeastern is the lead on this multi-university initiative, working with the California Institute of Technology and Colorado State University.

Professor **Edmund Yeh** will also lead Northeastern in a \$10 million research project funded by DARPA, shared with Raytheon BBN and the Massachusetts Institute of Technology, as part of the Dispersed Computing Program. The research to advance wireless communication technology will build “software instantiations of algorithms and protocol stacks that leverage pervasive, physically dispersed computing platforms to boost application and network performance by orders of magnitude.”

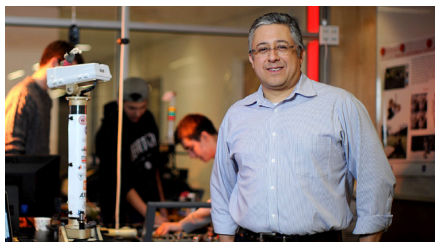


Professor **Yongmin Liu**, jointly appointed in mechanical and industrial engineering, was awarded a \$500K NSF CAREER Award for his project, entitled “Spin Plasmonics for Ultrafast All-Optical Manipulation of Magnetization in Hybrid Metal-Ferromagnet Structures.” Additionally, he was selected as part of the inaugural cohort of SPIE Defense and Commercial sensing Rising Researchers. Liu was also published in *Advanced Materials* for his paper, “Origami-Based Reconfigurable Metamaterials for Tunable Chirality.”



Associate Professor **Tommaso Melodia** has been named the director of research of the Project Office for a National Science Foundation initiative called Platforms for Advanced Wireless

Research, or PAWR, which will disburse over the next seven years nearly \$100 million in investments from the NSF and more than 25 companies and industry associations to winning teams. The NSF will fund the Project Office with a five-year, \$6.1 million award.



Northeastern University researchers, led by Associate Professor **Taskin Padir**, have been selected to partner with a consortium of universities, nonprofit institutions, local governments, and industry to launch a new independent robotics institute as part of the U.S. Department of Defense’s Manufacturing USA. The Advanced Robotics Manufacturing Institute, or ARM, project will bring together manufacturing companies and researchers to expand the companies’ robotics capabilities, including the development of next-generation robots, educational opportunities, and workforce training. Padir was also awarded a \$200K National Science Foundation grant to design “Localization and Accountability Technology for Emergency Responders.”



Associate Professor **Kaushik Chowdhury** was awarded the Presidential Early Career Award for Scientists and Engineers (PECASE). This is the highest honor given by the

United States government to science and engineering professionals who are in the early stages of their research careers.

Professor **Yun Raymond Fu** was awarded a \$390K grant from the Army Research Office for his project entitled “Images Assisted Video Recognition by Heterogeneous Knowledge Transfer.” Fu was also named a Fellow of the International Association for Pattern Recognition and member of the Association for Computing Machinery’s Future of Computing Academy.



Assistant Professor **Stratis Ioannidis** and Professor Edmund Yeh were awarded a \$500K National Science Foundation grant for “Caching Networks with Optimality Guarantees.” The project provides distributed, adaptive, stochastic optimization protocols with optimality guarantees over arbitrary network topologies.



Professors **Stratis Ioannidis** and **Miriam Leeser** have been awarded a \$500K National Science Foundation grant to create a “Massively Scalable Secure Computation Infrastructure Using FPGAs.”



Assistant Professor **Jose Martinez-Lorenzo**, jointly appointed with mechanical and industrial engineering, was awarded a \$500K National Science Foundation CAREER

Award for his project, entitled “4D mm-Wave Compressive Sensing and Imaging at One Thousand Volumetric Frames per Second.” One of the main applications of this system is finding security threats hidden under clothing, inside backpacks, or in public spaces, such as sports arenas.



Assistant Professor **Mahshid Amirabadi** was awarded a \$240K grant from ARPA-E to develop “A New Class of Soft-Switching Capacitive-Link Universal Converters for Photovoltaic

Application.” Focusing on commercial and utility-scale PV systems, the project will develop a new class of PV inverters that have the potential to radically increase the power density, lifetime, and efficiency while significantly reducing the costs associated with shipping, installation, repair, and replacement.



Professor **Dagmar Sternad**, jointly appointed with the College of Science, was awarded a \$500K collaborative NSF grant for her project, entitled “Towards Robots

with Human Dexterity.”



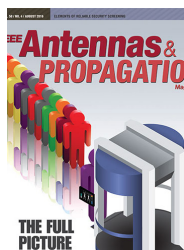
Assistant Professor **Pau Closas** has been given an Early Achievement Award by the Institute of Navigation (ION) “for mathematically profound contributions to the design of

advanced navigation receivers and for efforts in disseminating GNSS technology.”



Professor **Hossein Mosallaei's** paper, titled “Turnable Two Dimensional Optical Beam Steering with Reconfigurable Indium Tin Oxide Plasmonic Reflectarray Metasurface,” was

selected by the editors of the *Journal of Optics* to be included in the “Highlights of 2016” collection.



An article, titled “Improving Security Screening: A Comparison of Multistatic Radar Configurations for Human Body Imaging,” by College of Engineering

Distinguished Professor **Carey Rappaport**, electrical and computer engineering (ECE), and Assistant Professor **Jose Martinez Lorenzo**, jointly appointed in ECE, was one of four featured articles on the cover of *IEEE Antennas & Propagation*.



Vincent Harris, University Distinguished Professor and William Lincoln Smith Chair Professor, affiliated faculty in chemical engineering, received in collaboration

with Quorvo an \$8M grant (2017-2019) from the Defense Advanced Research Projects Agency for a project, “Magnetics on GaN for Next GEneration T/R Systems (MAGNETS),” which involves the Integration of active and passive elements in GaN-based Transmit and receive modules.



David Kaeli, College of Engineering Distinguished Professor and Agnes Chan of the College of Computer and Information Science, received a \$4.6M four-year renewal award

from the National Science Foundation to continue and expand participation in the CyberCorps® Scholarship for Service (SFS) program, which prepares highly-qualified cybersecurity professionals for entry into the government workforce.

PATENTS

Assistant Professor **Aatmesh Shrivastava** was awarded three patents for: “Low Input Voltage Boost Converter with Peak Inductor Current Control and Offset Compensated Zero Detection”; “Methods and Apparatus for a Single Inductor Multiple Output DC-DC Converter Circuit”; and “Low-Power Clock Source.”

Professor Emeritus **Carmine Vittoria**, was awarded a patent for “Apparatus and Method of Measuring Permeability of a Sample Across which a DC Voltage is Being Applied.”

COE Distinguished Professor **Carey Rappaport**, and Assistant Professor **Jose Martinez-Lorenzo**, jointly appointed with mechanical and industrial engineering, were awarded a patent for “Signal Processing Methods & Systems for Explosive Detection & Identification Using Electromagnetic Radiation.”

Associate Professor **Matteo Rinaldi** was awarded two patents for “Nano- and Micro-Electromechanical Resonators.”

Assistant Professor **Mahshid Amirabadi** was awarded a patent for “Sparse and Ultra-Sparse Partial Resonant Converters.”

FACULTY BY RESEARCH AREAS

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Faculty

COMMUNICATIONS AND SIGNAL PROCESSING

Dana Brooks
Pau Closas
Jennifer Dy
Deniz Erdogan
Vinay Ingle
Hanoeh Lev-Ari
Sarah Ostadabbas
Purnima Ratilal-Makris
Masoud Salehi
Dagmar Sternad
Milica Stojanovic

8

Faculty

MICROSYSTEMS AND DEVICES

Hui Fang
Yong-Bin Kim
Nicol McGruer
Marvin Onabajo
Matteo Rinaldi
Aatmesh Shrivastava
Nian Sun
Srinivas Tadigadapa

7

Faculty

POWER ELECTRONICS, SYSTEMS AND CONTROL

Ali Abur
Mahshid Amirabadi
Bradley Lehman
Bahram Shafai
Eduardo Sontag
Mario Sznajder
Gilead Tadmor

21

Faculty

COMPUTER ENGINEERING, NETWORKS, AND ROBOTICS

Stefano Basagni
Octavia Camps
Kaushik Chowdhury
Yunsi Fei
Yun Raymond Fu
Stratis Ioannidis
David Kaeli
Engin Kirda
Mieczyslaw Kokar
Miriam Leeser
Xue Lin
Fabrizio Lombardi
Waleed Meleis
Tommaso Melodia
Ningfang Mi
Taskin Padi
Wil Robertson
Günar Schirner
Hanuman Singh
Devesh Tiwari
Edmund Yeh

8

Faculty

ELECTROMAGNETICS AND OPTICS

Charles DiMarzio
Vincent Harris
Yongmin Liu
Edwin Marengo
Jose Martinez Lorenzo
Hossein Mosallaei
Carey Rappaport
Michael B. Silevitch

ALI ABUR



Professor, Electrical and Computer Engineering

PhD, Ohio State University, 1985
ece.neu.edu/people/abur-ali

Power system monitoring, estimation and optimization, fault location, and identification in power grids

Fellow, Institute of Electrical and Electronics Engineers

SELECTED PUBLICATIONS

Y. Lin, A. Abur

Enhancing Network Parameter Error Detection and Correction via Multiple Measurement Scans, IEEE Transactions on Power Systems, 32(3), 2017, 2417-2425

Y. Lin, A. Abur

Highly Efficient Implementation for Parameter Error Identification Method Exploiting Sparsity, IEEE Transactions on Power Systems, 32(1), 2017, 734-742

A. Rouhani, A. Abur

Observability Analysis for Dynamic State Estimation of Synchronous Machines, IEEE Transactions on Power Systems, 32(4), 2017, 3168-3175

C. Xu, A. Abur

Robust Linear State Estimation Using Multi-Level Power System Models with Different Partitions, IEEE Manchester PowerTech, Manchester, UK, 2017, 1-5

G. Feng, A. Abur

Fault Location Using Wide-Area Measurements and Sparse Estimation, IEEE Transactions on Power Systems, 31(4), 2016, 2938-2945

M. Göl, A. Abur

A Fast Decoupled State Estimator for Systems Measured by PMUs, IEEE Transactions on Power Systems, 30(5), 2015, 2766-2771

M. Göl, A. Abur

A Hybrid State Estimator for Systems With Limited Number of PMUs, IEEE Transactions on Power Systems, 30(3), 2015, 1511-1517

SELECTED RESEARCH PROJECTS

Engineering Research Center for Ultra-Wide Area Resilient Electric Energy Transmission Network

Co-Principal Investigator, National Science Foundation

Zonal State Estimation for Large Interconnected Systems

Principal Investigator, PJM Interconnection

CRISP: Identification and Control of Uncertain, Highly Interdependent Processes Involving Humans with Applications to Resilient Emergency Health Response

Co-Investigator, National Science Foundation

MAHSHID AMIRABADI



Assistant Professor, Electrical and Computer Engineering

PhD, Texas A&M University, 2013
ece.neu.edu/people/amirabadi-mahshid

Design, modeling and control of power converters, power electronics for renewable energy systems, microgrids, variable speed drives, and wireless power transfer

Best Paper Award, Energy Conversion Congress and Exposition 2016; Best Paper Award, IEEE Energy Conversion Congress and Exposition 2016

SELECTED PUBLICATIONS

M. Amirabadi

Cuk-Based Universal Converters in Discontinuous Conduction Mode of Operation, IEEE Energy Conversion Congress and Exposition, Milwaukee, WI, 2016, 1-7

S.A.KH. Mozaffari Niapour, M. Amirabadi

Extremely Sparse Parallel AC-Link Universal Power Converters, IEEE Transactions on Industry Applications, 52(3), 2016, 2456-2466

M. Amirabadi

A New Class of High-Power-Density Universal Power Converters, IEEE Energy Conversion Congress and Exposition, Montreal, QC, 2015, 2596-2602

M. Amirabadi, H.A. Toliyat, J. Baek

Bidirectional Soft-Switching Series AC-Link Inverter, IEEE Transactions on Industry Applications, 51(3), 2015, 2312-2320

M. Amirabadi, J. Baek, H.A. Toliyat, W.C. Alexander

Soft-Switching AC-Link Three-Phase AC-AC Buck-Boost Converter, IEEE Transactions on Industrial Electronics, 62, 2015, 3-14

M. Amirabadi, J. Baek, H.A. Toliyat

Sparse AC-Link Buck-Boost Inverter, IEEE Transactions on Power Electronics, 29, 2014, 3942-2953

SELECTED RESEARCH PROJECTS

A New Class of Modular Power Converters for Next-Generation Shipboard Power Systems

Principal Investigator, Office of Naval Research

A New Class of Soft-Switching Capacitive-Link Universal Converters for Photovoltaic Application

Principal Investigator, Advanced Research Projects Agency-Energy

A Reliable PV Inverter for Reducing the Overall Cost of Residential PV Systems

Principal Investigator, The Massachusetts Clean Energy Center

STEFANO BASAGNI



Associate Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, University of Texas, Dallas, 2001
PhD, University of Milan, Italy, 1998
ece.neu.edu/people/basagni-stefano

Wireless networks, ad hoc networks, underwater and terrestrial sensor networking, and protocol design and testing

Distinguished Scientist of the Association for Computing Machinery

SELECTED PUBLICATIONS

- S. Basagni, V. Di Valerio, P. Gjanci, C. Petrioli
Finding MARLIN: Exploiting Multi-Modal Communications for Reliable and Low-Latency Underwater Networking, In Proceedings of IEEE Infocom, Atlanta, GA, 2017, 1-9
- M. Girolami, S. Basagni, F. Furfari, S. Chessa
SIDEMAN: Service Discovery in Mobile Social Networks, Ad Hoc & Sensor Wireless Networks, 34(1), 2016, 1-39
- Y. M. Aval, Y. Han, A. Tu, S. Basagni, M. Stojanovic, Y. Fei
Testbed-Based Performance Evaluation of Handshake-Free MAC Protocols for Underwater Acoustic Sensor Networks, In Proceedings of MTS/IEEE OCEANS, Monterey, CA, 2016, 1-7
- S. Basagni, C. Petrioli, D. Spenza
CTP-WUR: The Collection Tree Protocol in Wake-Up Radio WSNs for Critical Applications, In Proceedings of IEEE ICNC 2016, Kauai, HI, 2016, 1-6
- R.G. Cid-Fuentes, M.Y. Naderi, S. Basagni, K.R. Chowdhury, A. Cabellos-Aparicio, E. Alarcon
On Signaling Power: Communications over Wireless Energy, In Proceedings of IEEE Infocom 2016, San Francisco, CA, 2016
- D. Spenza, M. Magno, S. Basagni, L. Benini, M. Paoli, et al.
Beyond Duty Cycling: Wake-Up Radio with Selective Awakenings for Long-Lived Wireless Sensing Systems, Proceedings of IEEE Infocom 2015, Hong Kong, China, April 26-30, 2015
- L. Chen, J. Warner, P.L. Yung, D. Zhou, W. Heinzelman, I. Demirkol, U. Muncuk, K.R. Chowdhury, S. Basagni
Reach2-Mote: A Range Extending Passive Wake-up Wireless Sensor Node, ACM Transactions on Sensor Networks 11, 4(64), 2015, 1-64

SELECTED RESEARCH PROJECTS

- Cross Layer Approach to 5G: Models and Protocols
Principal Investigator, MathWorks, Inc.
- Development of the Northeastern University Marine Observatory Network
Principal Investigator, National Science Foundation
- Platforms for Advanced Wireless Research Project Office
Co-Principal Investigator for Platform Implementation, National Science Foundation

DANA BROOKS



Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, Northeastern University, 1991
ece.neu.edu/people/brooks-dana

Biomedical signal and image processing, medical imaging, statistical signal processing, inverse problems, electrocardiography, bio-optical imaging, magnetic resonance imaging, transcranial neuromodulation, estimation of protein conformations from x-ray scattering, regularization, and optimization

Søren Buus Outstanding Research Award, College of Engineering; Outstanding Mentor Award, College of Engineering

SELECTED PUBLICATIONS

- S. Guler, M. Dannhauer, B. Erem, R. Macleod, D. Tucker, S. Turovets, P. Luu, D. Erdogmus, D.H. Brooks
Optimization of Focality and Direction in Dense Electrode Array Transcranial Direct Current Stimulation (tDCS), Journal of Neural Engineering, 13(3), 2016, 36020-36033
- B. Erem, R. Martinez Orellana, D.E. Hyde, J.M. Peters, F.H. Duffy, P. Stovicek, S.K. Warfield, R.S. MacLeod, G. Tadmor, D.H. Brooks
Extensions to a Manifold Learning Framework for Time-Series Analysis on Dynamic Manifolds in Bioelectric Signals, Physical Review E, 93, 2016, 042218
- A.E. Onut, M. Akcakaya, J.P. Bardhan, D. Erdogmus, D.H. Brooks, L. Makowski
Constrained Maximum Likelihood Estimation of Relative Abundances of Protein Conformation in a Heterogeneous Mixture from Small Angle X-Ray Scattering Intensity Measurements, IEEE Transactions on Signal Processing, 63(20), 2015, 5383-5394
- S. Kurugol, K. Kose, B. Park, J.G. Dy, D.H. Brooks, M. Rajadhyaksha
Automated Delineation of Dermal-Epidermal Junction in Reflectance Confocal Microscopy Image Stacks of Human Skin, Journal of Investigative Dermatology, 135(3), 2014
- B. Erem, J. Coll-Font, R. Martinez-Orellana, P. Stovicek, D. Brooks
Using Transmural Regularization and Dynamic Modeling for non-Invasive Cardiac Potential Imaging of Endocardial Pacing with Imprecise Thoracic Geometry, IEEE Transactions on Medical Imaging, 3(3), 2014, 726-738

SELECTED RESEARCH PROJECTS

- Center for Integrative Biomedical Computing
Principal Investigator, National Institutes of Health
- Automated Image Guidance for Diagnosing Skin Cancer with Confocal Microscopy
Co-Investigator, National Institutes of Health
- Collaborative Research: US-German Research Proposal
Optimization of Human Cortical Stimulation
Principal Investigator, National Science Foundation

OCTAVIA CAMPS



Professor, Electrical and Computer Engineering;
affiliated faculty, Bioengineering

PhD, University of Washington, 1992
ece.neu.edu/people/camps-octavia

Robust computer vision; image processing;
and machine learning

SELECTED PUBLICATIONS

O. Camps, M. Gou, T. Hebble, S. Karanam, O. Lehmann, Y. Li, R. Radke, Z. Wu, F. Xiong

From the Lab to the Real World: Re-Identification in an Airport Camera Network, *IEEE Transactions on Circuits and Systems for Video Technology*, 27(3), 2017, 540-553

M. Gou, S. Karanam, W. Liu, O. Camps, R.J. Radke
A Large-Scale Multi-Camera Person Re-Identification Dataset, *Workshop on Target Re-Identification and Multi-Target Camera Tracking in Conjunction with Computer Vision and Pattern Recognition*, 2017

X. Zhang, Y. Wang, M. Sznaiier, O. Camps
Efficient Temporal Sequence Comparison and Classification Using Gram Matrix Embeddings on a Riemannian Manifold, *IEEE Conference on Computer Vision and Pattern Recognition*, 2016, 4498-4507

Y. Wang, O. Camps, M. Sznaiier, B. Roig Solvas
Jensen Bregman LogDet Divergence Optimal Filtering in the Manifold of Positive Definite Matrices, 9911, 2016, 221-235

M. Gou, X. Zhang, A. Rates-Borras, S. Asghari-Esfeden, O. Camps, M. Sznaiier
Person Re-Identification in Appearance Impaired Scenarios, *British Machine Vision Conference*, 2016

C. Dicle, B. Yilmaz, O. Camps, M. Sznaiier
Solving Temporal Puzzles, *IEEE Conference on Computer Vision and Pattern Recognition*, 2016, 5896-5905

Y. Cheng, Y. Wang, M. Sznaiier, O. Camps
Subspace Clustering with Priors via Sparse Quadratically Constrained Quadratic Programming, *IEEE Conference on Computer Vision and Pattern Recognition*, 2016, 5204-5212

SELECTED RESEARCH PROJECTS

Dynamic Invariants for Video Scenes Understanding
Principal Investigator, National Science Foundation

Robust Identification of a Class of Structured Systems with High Dimensional Outputs and Applications
Co-Principal Investigator, National Science Foundation

KAUSHIK CHOWDHURY



Associate Professor, Electrical and
Computer Engineering

PhD, Georgia Institute of Technology, 2009
ece.neu.edu/people/chowdhury-kaushik

Dynamic spectrum access, energy harvesting
sensor networks, 5G technology, intra-body
communication, and protocol design for wireless

ONR Director of Research Early Career Award 2016; Chair of the IEEE Technical Committee on Simulation; National Science Foundation CAREER Award 2015

SELECTED PUBLICATIONS

P. Nguyen, U. Muncuk, A. Ashok, K.R. Chowdhury, et al.
Battery-Free Identification Token for Touch Sensing Devices, *ACM Conference on Embedded Networked Sensor Systems (SenSys)*, Stanford, CA, 2016

R. Doost-Mohammady, M.Y. Naderi, K.R. Chowdhury
Performance Analysis of CSMA/CA based Medium Access in Full-Duplex Wireless Communications, *IEEE Transactions on Mobile Computing*, 15(6), 2016, 1457-1470

M. Swaminathan, F.S. Cabrera, J.S. Pujol, U. Muncuk, G. Schirner, K.R. Chowdhury
Multi-Path Model and Sensitivity Analysis for Galvanic Coupled Intra-Body Communication through Layered Tissue, *IEEE Transactions on Biomedical Circuits and Systems*, 10(2), 2016, 339-351

M. Swaminathan, U. Muncuk, K.R. Chowdhury
Topology Optimization for Galvanic Coupled Wireless Intra-Body Communication, *IEEE International Conference on Computer Communications (INFOCOM)*, San Francisco, 2016

R.G. Cid-Fuentes, M.Y. Naderi, S. Basagni, K.R. Chowdhury, A. Cabellos-Aparicio, E. Alarcón
On Signaling Power: Communications Over Wireless Energy, *IEEE International Conference on Computer Communications (INFOCOM)*, San Francisco, 2016

S. De, D. Mishra, K.R. Chowdhury
Charging Time Characterization for Wireless RF Energy Transfer, *IEEE Transactions on Circuits and Systems II*, 64(4), 2015, 362-366

SELECTED RESEARCH PROJECTS

Cross Layer Approach to 5G Communications
Co-Principal Investigator, MathWorks

End-to-end Protocol Designs that Address the Challenges of Distributed Dynamic Spectrum Access Networks

Principal Investigator, Office of Naval Research

CAREER: IDEA: Integrated Data and Energy Access for Wireless Sensor Networks

Principal Investigator, National Science Foundation

PAU CLOSAS



Assistant Professor, Electrical and Computer Engineering

PhD, Universitat Politècnica de Catalunya, 2009
ece.neu.edu/people/closas-pau

Statistical and array signal processing; estimation and detection theory; Bayesian inference; stochastic filtering; robust statistics; and game theory, with applications

to positioning systems; wireless communications, and mathematical biology

Duran Farell for Technological Research; EURASIP Best PhD Thesis Award; 2016 Institute of Navigation Early Achievements Award

SELECTED PUBLICATIONS

- J. Curran, M. Paonni, M. Navarro, S. Pfletschinger, P. Closas, M. Anghileri
Coding Aspects of Secure GNSS Receivers, Proceedings of the IEEE, 104(6), 2016, 1271-1287
- J. Vilà-Valls, P. Closas, Á. García-Fernández
Uncertainty Exchange Through Multiple Quadrature Kalman Filtering, IEEE Signal Processing Letters, 23(12), 2016, 1825-1829
- M.G. Amin, P. Closas, A. Broumandan, J.L. Volakis
Vulnerabilities, Threats, and Authentication in Satellite-Based Navigation Systems [Scanning the Issue], Proceedings of the IEEE, 104(6), 2016, 1169-1173
- J. Vilà-Valls, P. Closas, C. Fernández-Prades, J.A. López-Salcedo, G. Seco-Granados
Adaptive GNSS Carrier Tracking Under Ionospheric Scintillation: Estimation vs Mitigation, IEEE Communications Letters, 19(6), 2015, 961-964
- D. Dardari, P. Closas, P. Djuric
Indoor Tracking: Theory, Methods, and Technologies, IEEE Transactions on Vehicular Technology, 64(4), 2015, 1263-1278
- X. Liu, M. Liang, Y. Morton, P. Closas, T. Zhang, Z. Hong
Performance Evaluation of MSK and OFDM modulations for Future GNSS Signals, GPS Solutions, 18(2), 2014, 13
- A. Moragrega, P. Closas, C. Ibars
Supermodular Game for Power Control in TOA-Based Positioning, IEEE Trans. on Signal Processing, 61(12), 2013, 3246-3259
- P. Closas, C. Fernández-Prades, J. Vilà-Valls
Multiple Quadrature Kalman Filtering, IEEE Transactions on Signal Processing, 60(12), 2012, 6125-6137
- P. Closas, C. Fernández-Prades, J.A. Fernández-Rubio
A Bayesian Approach to Multipath Mitigation in GNSS Receivers, IEEE Journal of Selected Topics in Signal Processing, 3(4), 2009, 695-706

CHARLES DIMARZIO



Associate Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering, Mechanical and Industrial Engineering

PhD, Northeastern University, 1996
ece.neu.edu/people/dimarzio-charles

Optics, microscopy, coherent detection, interaction of light and sound waves, hyperspectral imaging, diffusive optical tomography and ultrasound, landmine detection, magneto-optic sensors, multi-model imaging, and activities include: computer modeling, designing, building and testing of hardware, and processing the resulting data

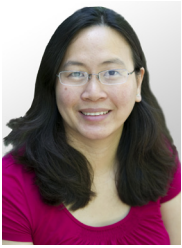
SELECTED PUBLICATIONS

- J.L. Hollmann, R. Horstmeyer, C. Yang, C.A. DiMarzio
Diffusion Model for Ultrasound-Modulated Light, Journal of Biomedical Optics, 19(3), 2014, 035005
- J.L. Hollmann, R. Horstmeyer, C. Yang, C.A. DiMarzio
Analysis and Modeling of an Ultrasound-Modulated Guide Star to Increase the Depth of Focusing in a Turbid Medium, Journal of Biomedical Optics, 18(2), 2013, 025004
- Z. Lai, J. Kerimo, Y. Mega, C.A. DiMarzio
Stepwise Multiphoton Activation Fluorescence Reveals a New Method of Melanin Detection, Journal of Biomedical Optics, 18(6), 2013, 061225
- Z.R. Hoffman, C. DiMarzio
Structured Illumination Microscopy Using Random Intensity Incoherent Reflectance, Journal of Biomedical Optics, 2013

SELECTED RESEARCH PROJECTS

- Coded-Illumination Fourier Ptychography for High-content Multimodal Imaging
Principal Investigator, National Science Foundation

JENNIFER DY



Professor, Electrical and Computer Engineering;
affiliated faculty, Bioengineering

PhD, Purdue University, 2001
ece.neu.edu/people/dy-jennifer

Machine learning, data mining, statistical
pattern recognition, computer vision, and
image processing

National Science Foundation CAREER Award

SELECTED PUBLICATIONS

- S.M. Brown, A. Webb, R.S. Mangoubi, J.G. Dy
A Sparse Combined Regression-classification Formulation for
Learning a Physiological Alternative to Clinical Post-Traumatic
Stress Disorder Scores, Twenty-ninth AAAI Conference on
Artificial Intelligence, 2015
- J. Ross, P. Castaldi, M. Cho, J.G. Dy
Dual Beta Process Priors for Latent Cluster Discovery in Chronic
Obstructive Pulmonary Disease, ACM SIGKDD Knowledge
Discovery and Data Mining, 2014
- D. Niu, J.G. Dy, M.I. Jordan
Iterative Discovery of Multiple Alternative Clustering Views,
IEEE Transactions on Pattern Analysis and Machine Intelligence,
36(7), 2014, 1340-1353
- Y. Yan, R. Rosales, G. Fung, J.G. Dy
Active Learning from Crowds, Proceedings of the 28th
International Conference on Machine Learning (ICML), 2011,
1161-1168
- Y. Guan, J.G. Dy, M.I. Jordan
A Unified Probabilistic Model for Global and Local Unsupervised
Feature Selection, Proceedings of the 28th International
Conference on Machine Learning (ICML), 2011, 1073-1080
- M. Masaeli, G. Fung, J.G. Dy
From Transformation-Based Dimensionality Reduction to
Feature Selection, Proceedings of the 27th International
Conference on Machine Learning (ICML), 2010, 751-758
- Y. Yan, R. Rosales, G. Fung, M. Schmidt, J.G. Dy, et al.
Modeling Annotator Expertise: Learning When Everybody
Knows a Bit of Something, Proceedings of the Thirteenth
International Conference on Artificial Intelligence and Statistics
(AISTATS), 9, 2010, 932-939

SELECTED RESEARCH PROJECTS

- Automated Image Guidance for Diagnosing Skin Cancer With
Confocal Microscopy
Principal Investigator, National Institutes of Health
- Genetic Epidemiology of COPD
Co-Principal Investigator, National Institutes of Health
- Spatio-Temporal Extremes and Associations Marine Adaptation
and Survivorship under Climate Change and Rising Ocean
Temperatures
Principal Investigator, National Science Foundation

DENIZ ERDOGMUS



Associate Professor, Electrical and Computer
Engineering; affiliated faculty, Bioengineering

PhD, University of Florida, 2002
ece.neu.edu/people/erdogmus-deniz

Brain computer interfaces, cognitive and
interactive systems, nonlinear and statistical
signal processing, information theory, and
machine learning

National Science Foundation CAREER Award; Søren Buus
Outstanding Research Award, College of Engineering; College of
Engineering Faculty Fellow

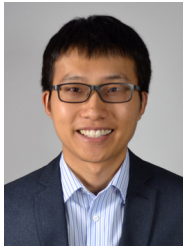
SELECTED PUBLICATIONS

- B.S. Oken, U. Orhan, B. Roark, D. Erdogmus, A. Fowler,
A. Mooney, B. Peters, M. Miller, M. Fried Oken
BrainComputer Interface with Language Model/EEG Fusion for
Lockedin Syndrome, Neurorehabilitation and Neural Repair,
28(4), 2014, 387-394
- A. Fowler, B. Roark, U. Orhan, D. Erdogmus, M. Fried-Oken
Improved Inference and Autotyping in EEGbased BCI Typing
Systems, ASSETS 2013, Bellevue, WA, Oct 2013
- H. Nezamfar, U. Orhan, S. Purwar, K. Hild, B. Oken, D. Erdogmus
Decoding of Multichannel EEG Activity from the Visual
Cortex in Response to Pseudorandom Binary Sequences of
Visual Stimuli, International Journal of Imaging Systems and
Technology, 21(2), 2011, 139-147
- Y. Huang, D. Erdogmus, M. Pavel, S. Mathan, K.E. Hild II
A Framework for Rapid Visual Image Search using Single-trial
Brain Evoked Responses, Neurocomputing, 74, 2011,
2041-2051
- D. Erdogmus
BCI: A Timely Opportunity for Projectbased Learning, National
Academy of Engineering Frontiers in Engineering Education
Workshop, Irvine, California, Dec 2010

SELECTED RESEARCH PROJECTS

- CAREER: Signal Models, Channel Capacity, and Information Rate
for Noninvasive Brain Interfaces
Principal Investigator, National Science Foundation
- Automated Classification of Retinopathy of Prematurity using
Machine Learning
Investigator, National Institutes of Health
- Strengthening Human Adaptive Reasoning and Problem Solving
(SHARP)
Co-Principal Investigator, Intelligence Advanced Research
Projects Activity
- The Rehabilitation Engineering Research Center on Augmentative
and Alternative Communication
Co-Principal Investigator, U.S. Department of Education

HUI FANG



Assistant Professor, Electrical and Computer Engineering

PhD, University of California, Berkeley, 2014
ece.neu.edu/people/fang-hui

Nano-electronics, bio-electronics, materials surfaces and interfaces

SELECTED PUBLICATIONS

- H. Fang, K.J. Yu, C. Gloschat, Z. Yang, E. Song, C.-H. Chiang, J. Zhao, S.M. Won, S. Xu, M. Trumpis, Y. Zhong, S.W. Han, Y. Xue, D. Xu, S.W. Choi, G. Cauwenberghs, M. Kay, Y. Huang, J. Viventi, I.R. Efimov, J.A. Rogers
Capacitively Coupled Arrays of Multiplexed Flexible Silicon Transistors for Long-Term Cardiac Electrophysiology, *Nature Biomedical Engineering*, 1, 2017, 0038
- K.J. Seo, Y. Qiang, I. Bilgin, S. Kar, C. Vinegoni, R. Weissleder, H. Fang
Transparent Electrophysiology Microelectrodes and Interconnects from Metal Nanomesh, *ACS Nano*, 11, 2017, 4365-4372
- H. Fang, J. Zhao, K. Yu, E. Song, A.B. Farimani, C.H. Chiang, X. Jin, Y. Xue, D. Xu, W. Du, K.J. Seo, Y. Zhong, Z. Yang, S. Won, G. Fang, S.W. Choi, S. Chaudhuri, Y. Huang, M. Ashraful Alam, J. Viventi, N.R. Aluru, J.A. Rogers
Ultra-thin, Transferred Layers of Thermally Grown Silicon Dioxide as Biofluid Barriers for Bio-Integrated Flexible Electronic Systems, *PNAS*, 113, 2016, 11682-11687
- K.J. Yu, D. Kuzum, S.-W. Hwang, B.H. Kim, H. Juul, N.H. Kim, S.M. Won, K. Chiang, M. Trumpis, A.G. Richardson, H. Cheng, H. Fang, et. al.
Bioresorbable Silicon Electronics for Transient Spatiotemporal Mapping of Electrical Activity from the Cerebral Cortex, *Nature Materials*, 15, 2016, 782-791
- H. Fang, C. Battaglia, C. Carraro, S. Nemsak, B. Ozdol, J. S. Kang, H.A. Bechtel, S.B. Desai, et. al.
Strong Interlayer Coupling In Van Der Waals Heterostructures Built From Single-Layer Chalcogenides, *Proceedings of the National Academy of Sciences*, 111, 2014, 6198-6202
- H. Fang, H.A. Bechtel, E. Plis, M. C. Martin, S. Krishna, E. Yablonovitch, A. Javey
Quantum of Optical Absorption in Two-Dimensional Semiconductors, *Proceedings of the National Academy of Sciences*, 110, 2013, 11688-11691
- H. Fang, M. Tosun, G. Seol, T.-C. Chang, K. Takei, J. Guo, A. Javey
Degenerate n-Doping of Few-Layer Transition Metal Dichalcogenides by Potassium, *Nano Letters*, 13, 2013, 1991-1995
- H. Fang, S. Chuang, T. C. Chang, K. Takei, T. Takahashi, A. Javey
High-performance Single Layered WSe₂ p-FETs with Chemically Doped Contacts, *Nano Letters*, 12, 2012, 3788-3792

YUNSI FEI



Professor, Electrical and Computer Engineering

PhD, Princeton University, 2004
ece.neu.edu/people/fei-yunsi

Computer architecture, embedded systems, hardware-oriented security, design automation, mobile computing, and underwater sensor networks

National Science Foundation CAREER Award; College of Engineering Faculty Fellow

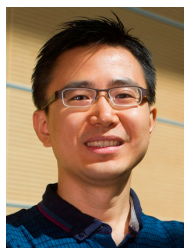
SELECTED PUBLICATIONS

- P. Luo, K. Athanasiou, Y. Fei, T. Wahl
Algebraic Fault Analysis of SHA-3, *IEEE Design, Automation and Test in Europe Conference & Exhibition, Lausanne, Switzerland, 2017*
- Z. Juang, Y. Fei, D.R. Kaeli
A Novel Side-Channel Timing Attack on GPUs, *ACM Great Lake Symposium on VLSI, 2017*
- B. Jiang, Y. Fei
A PHEV Power Management Cyber-Physical System for On-Road Applications, *IEEE Transactions on Vehicular Technology*, 66(7), 2017, 5797-5807
- C. Luo, Y. Fei, A.A. Ding
Side-Channel Power Analysis of XTS-AES, *IEEE Design, Automation & Test in Europe, Lausanne, Switzerland, 2017*
- B. Jiang, Y. Fei
Vehicle Speed Prediction by Two-Level Data Driven Models in Vehicular Networks, *IEEE Transactions on Intelligent Transport Systems*, 18(7), 2017, 1793-1801
- Y. Han, Y. Fei, A.A. Ding
A Stochastic MAC Protocol with Randomized Power Control for Underwater Sensor Networks, *IEEE International Conference on Sensing, Communication and Networking, London, UK, 2016*

SELECTED RESEARCH PROJECTS

- TWC: Medium: Automating Countermeasures and Security Evaluation Against Software Side-Channel Attacks
Principal Investigator, National Science Foundation
- Embedded Hardware-based Security and Side Channel Analysis
Principal Investigator, Analog Devices
- MRI: Development of a Testbed for Side-channel Analysis and Security Evaluation-TeSCASE
Principal Investigator, National Science Foundation
- STARSS: Side-Channel Analysis and Resiliency Targeting Accelerators
Co-Principal Investigator, National Science Foundation and Semiconductor Research Corporation

YUN RAYMOND FU



Associate Professor, Electrical and Computer Engineering; jointly appointed, Computer and Information Science

PhD, University of Illinois, 2008
ece.neu.edu/people/fu-yun

Machine learning and computational intelligence, social media analytics, human-computer interaction, and cyber-physical systems

Office of Naval Research Young Investigator Award; Army Research Office Young Investigator Award; International Neural Network Society's Young Investigator Award; Søren Buus Outstanding Research Award; Grainger Foundation Frontiers of Engineering Award

SELECTED PUBLICATIONS

S. Li, Y. Fu

Learning Balanced and Unbalanced Graphs via Low-Rank Coding, *IEEE Transactions on Knowledge and Data Engineering (T-KDE)*, 27(5), 2015, 1274-1287

Y. Fu

Human-Centered Social Media Analytics, Springer, 2014

Y. Kong, Y. Jia, Y. Fu

Interactive Phrases: Semantic Descriptions for Human Interaction Recognition, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 36(9), 2014, 1775-1788

Y. Fu

Low-Rank and Sparse Modeling for Visual Analysis, Springer, 2014

K. Li, Y. Fu

Prediction of Human Activity by Discovering Temporal Sequence Patterns, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 36(8), 2014, 1644-1657

SELECTED RESEARCH PROJECTS

Pinpoint Geolocation Using Multi-Source Multi-Dimensional Big Data from Social Media

Principal Investigator, Naval Postgraduate School

Deep Structures Boosted Self-Organized Behavior Pattern Learning for Anomaly Detection

Principal Investigator, Office of Naval Research

Wireless Sensing of Speech Kinematics & Acoustics for Remediation

Co-Principal Investigator, National Science Foundation

Intention Sensing Through Video-Based Imminent Activity Prediction

Principal Investigator, Army Research Office

Methods for Multimedia Search and Retrieval by Fusing Data Across Various Sources or Domains

Principal Investigator, MIT Lincoln Laboratory

Multimodal Speech Translation for Assistive Communication

Co-Principal Investigator, National Institutes of Health

Sensing and Modeling Behavior in Response to Environmental Changes

Principal Investigator, Air Force Office of Scientific Research

VINCENT G. HARRIS



University Distinguished Professor, William Lincoln Smith Professor, Electrical and Computer Engineering; affiliated faculty, Chemical Engineering

PhD, Northeastern University, 1990
ece.neu.edu/people/harris-vincent

Design and processing of advanced materials with emphasis on high frequency device applications for radar, communication, and sensing

Fellow, American Association for the Advancement of Science, Distinguished Scientist Award, The Materials, Minerals, and Metals Society; Fellow, Institute of Electrical and Electronics Engineers; Fellow, American Physical Society; Fellow, Institute of Physics; Fellow, Institute of Engineering and Technology; Institute of Metal Research's Lee Hsun Lecture Award; Fulbright Senior Fellow; Søren Buus Outstanding; Research Award, College of Engineering

SELECTED PUBLICATIONS

A.S. Sokolov, M. Geiler, V.G. Harris

Broadband Ferromagnetic Resonance Linewidth Measurement by a Microstripline Transmission Resonator, *Applied Physics Letters*, 108(17), 2016

P. Taheri, R. Barua, J. Hsu, M. Zamanpour, Y. Chen, V.G. Harris
Structure, Magnetism, and Magnetostrictive Properties of Mechanically Alloyed Fe 81 Ga 19, *Journal of Alloys and Compounds*, 661, 2016, 306-311

X. Wu, S. Yan, W. Liu, Z. Feng, Y. Chen, V.G. Harris

Influence of Particle Size on the Magnetic Spectrum of NiCuZn Ferrites for Electromagnetic Shielding Applications, *Journal of Magnetism and Magnetic Materials*, 401, 2016, 1093-1096

M. Bi, X. Wang, H. Lu, L. Deng, K.J. Sunday, M.L. Taheri, V.G. Harris
Magnetic and Microwave Properties of Amorphous FeCoNbBCu Thin Films, *Journal of Applied Physics*, 119(2), 2016

F. Chen, X. Wang, Y. Nie, Q. Li, J. Ouyang, Z. Feng, Y. Chen, V.G. Harris
Ferromagnetic Resonance Induced Large Microwave Magnetodielectric Effect in Cerium Doped Y3Fe5O12 Ferrites, *Scientific Reports*, 6, 2016, 28206

Z. Su, Q. Li, X. Wang, B. Hu, Z. Feng, Y. Chen, V.G. Harris
Room Temperature Magnetoelectric Effect of YFeO3-Y3Fe5O12 Ferrite Composites, *Journal of Alloys and Compounds*, 656, 2016, 465-469

SELECTED RESEARCH PROJECTS

Accelerated Development of Magnetodielectrics Having Equivalent Permeability and Permittivity for RF Applications

Principal Investigator, Rogers Corp

Magnetodielectric Heterostructures and Composites

Principal Investigator, Rogers Corp

Nonlinear Properties of Ferrite Materials

Principal Investigator, Raytheon

VINAY INGLE



Associate Professor, Electrical and
Computer Engineering

PhD, Rensselaer Polytechnic Institute, 1981
ece.neu.edu/people/ingle-vinaykumar

Multidimensional signal processing and
hyperspectral imaging

SELECTED PUBLICATIONS

- V. Ingle, J. Proakis
Digital Signal Processing Using MATLAB, Cengage Learning,
Fourth Edition, 2017
- N. Bosowski, V. Ingle, D. Manolakis
Generalized Linear Models for Count Time Series, International
Conference on Acoustics, Speech and Signal Processing,
New Orleans, 2017
- R. Herrero, V. Ingle
Backward and Forward Linear Prediction Applied to
Ultraspectral Image Processing—Effects on Rate Distortion,
Signal Image and Video Processing, 10(4), 2016, 639-646
- M. Pieper, D. Manolakis, E. Truslow, T. Cooley, M. Brueggeman,
A. Weisner, J. Jacobson, V. Ingle
In-Scene LWIR Downwelling Radiance Estimation, SPIE 9976,
Imaging Spectrometry XXI, 99760E, 2016
- E. Truslow, S. Golowich, D. Manolakis, V. Ingle
Performance Metrics and Evaluation of Chemical Identification
Systems, Optical Engineering, SPIE , 55(2), 2016
- R. Herrero, V. Ingle
Preprocessing and Compression of Hyperspectral Images
Captured On-Board UAVs, Conference on Unmanned/
Unattended Sensors and Sensor Networks, SPIE Security and
Defence, Edinburgh, 2016

SELECTED RESEARCH PROJECTS

- Anomaly Detection in Sequential Image Frames using
Low-Rank Modeling
Principal Investigator, Massachusetts Institute of Technology
Lincoln Lab
- Joint Exploitation of LIDAR and Hyperspectral Imagery
Principal Investigator, Massachusetts Institute of Technology
Lincoln Lab
- Machine Learning Algorithms for Anomaly Detection in
Sequential Image Frames
Principal Investigator, Massachusetts Institute of Technology
Lincoln Lab
- Performance Modeling and Prediction for LWIR Hyperspectral
Target Detection Systems
Principal Investigator, Massachusetts Institute of Technology
Lincoln Lab
- Signal Processing of Long Wave Hyperspectral Imagery
Principal Investigator, Massachusetts Institute of Technology
Lincoln Lab

STRATIS IOANNIDIS



Assistant Professor, Electrical and
Computer Engineering

PhD, University of Toronto, 2009
ece.neu.edu/people/ioannidis-stratis

Distributed systems, networking, machine
learning, big data, and privacy

SELECTED PUBLICATIONS

- D. Koutra, A. Dighe, S. Bhagat, U. Weinsberg, S. Ioannidis,
C. Faloutsos, J. Bolot
PNP: Fast Path Ensemble Method for Movie Design Knowledge
Discovery and Data Mining, KDD, 2017
- S. Ioannidis, E. Yeh
Adaptive Caching Networks with Optimality Guarantees,
International Conference on Measurements and Modeling
of Computer Systems (SIGMETRICS), Antibes San
Juan Les Pins, 2016
- K. Nayak, X.S. Wang, S. Ioannidis, U. Weinsberg, N. Taft, E. Shi
GraphSC: Parallel Secure Computation Made Easy, Symposium
on Security and Privacy (S&P), San Jose, CA, 2015
- A. Karbasi, S. Ioannidis, L. Massoulié
From Small-World Networks to Comparison-Based Search, IEEE
Transactions on Information Theory (IT), 2015

SELECTED RESEARCH PROJECTS

- Assistive Integrative Support Tool for Retinopathy of Prematurity
Principal Investigator, National Science Foundation
- Caching Networks with Optimality Guarantees
Principal Investigator, National Science Foundation
- Massively Scalable Secure Computation Infrastructure Using
FPGAs
Principal Investigator, National Science Foundation
- Privacy-Preserving Data Mining over FPGAs in the Datacenter
Principal Investigator, Google Faculty Research Award

DAVID KAEI



COE Distinguished Professor, Electrical and Computer Engineering; affiliated faculty: Bioengineering, Computer and Information Science

PhD, Rutgers University, 1992
ece.neu.edu/people/kaeli-david

Computer architecture; GPUs; heterogeneous computing; performance analysis; security and information assurance; hardware reliability and recovery; Big Data analytics; workload characterization

Fellow, Institute of Electrical and Electronics Engineers; Distinguished Scientist, Associate of Computing Machinery; Distinguish Professor, Heterogeneous Systems Architecture Foundation; National Science Foundation CAREER Award

SELECTED PUBLICATIONS

A. Jadidi, M. Arjomand, M. Tavana, D. Kaeli, M. Kandemir, C. Das
Exploring the Potential for Collaborative Data Compression and Hard-Error Tolerance in Resistive Memories, 47th IEEE/IFIP International Conference on Dependable Systems and Networks, 2017

X. Gong, Z. Chen, A.K. Ziabari, R. Ubal, D. Kaeli
TwinKernels: An Execution Model to Improve GPU Hardware Scheduling at Compile Time, Proceedings of the 2017 International Symposium on Code Generation and Optimization, 2017, 39-49

Z.-H. Jiang, Y. Fei, D. Kaeli
A Complete Key Recovery Timing Attack on a GPU, Proceedings of the IEEE International Symposium on High Performance Computer Architecture, 2016, 394-405

SELECTED RESEARCH PROJECTS

Engineering Strong, Highly Conductive Nanotube Fibers via Fusion
Co-Principal Investigator, National Science Foundation

Exploring Analysis of Environment and Health Through Multiple Alternative Clustering

Co-Principal Investigator, National Science Foundation

Leveraging Intra-Chip/Inter-Chip Silicon Photonic Networks for Designing Next-Generation Accelerators

Principal Investigator, National Science Foundation

Multi-Agent Modeling Framework for Mitigating Distributed Disruptions in Critical Supply Chains

Co-Principle Investigator, National Science Foundation

Puerto Rico Testsite for Exploring Environmental Contamination Threats

Co-Principal Investigator, National Institutes of Environmental Health Sciences

Side-Channel Analysis and Resiliency Targeting Accelerators
Principle Investigator, National Science Foundation and Semiconductor Research Corporation

YONG-BIN KIM



Professor, Electrical and Computer Engineering

PhD, Colorado State University, 1996
ece.neu.edu/people/kim-yong-bin

Integrated circuit design and for nanoelectronics and nano technology, high speed system integration for signal processing and communication applications, bio-chip and bio-sensor interface circuit design, electronic neuron circuit design, low power adaptive robot controller circuit design; high performance and low power VLSI design, system-on-chip (soc), and Physical VLSI CAD

SELECTED PUBLICATIONS

G. Jeon, Y.-B. Kim
A 4Gb/s Half-Rate DFE with Switched-Cap and IIR Summation for Data Correction, IEEE International Symposium on Circuits and Systems, Baltimore, MD, 2017, 2392-2395

G. Jeon, Y.-B. Kim
Switched Capacitor and Infinite Impulse Response Summation for a Quad-Rate DFE 4Gb/s Data Rate, ACM GLSVLSI Conference, Banff, Alberta, Canada, 2017, 439-442

H. Zhu, W. Yang, G. Engel, Y.-B. Kim
A Two-Parameter Calibration Technique Tracking Temperature Variations for Current Source Mismatch in DACs, IEEE Transactions on Circuits and Systems II, 64(4), 2017, 387-391

W. Wei, K. Namba, F. Lombardi, Y.-B. Kim
A Novel Scheme for Tolerating Single Event/Multiple Bit Upsets (SEU/MBU) in Non-Volatile Memories, IEEE Transactions on Computers, 65(3), 2016, 781-790

Y. Choi, Y.-B. Kim
A Novel On-Chip Impedance Calibration Method for LPDDR4 Interface Between DRAM and AP/SoC, Association for Computing Machinery GLSVLSI Conference, 2016, 215-219

H. Zhu, R. Kapusta, Y.-B. Kim
Noise Reduction Technique Through Bandwidth Switching for Switched-Capacitor Amplifier, IEEE Transactions on Circuits and Systems 1(TCAS1), 62(7), 2015, 1707-1715

I. Jung, Y.-B. Kim
A 12-bit 32MS/s SAR ADC Using Built-In Self Calibration Technique to Minimize Capacitor Mismatch, 2014 IEEE International Symposium on Defect and Fault Tolerance in VLSI and Nanotechnology Systems(DFT), August 3-6, Amsterdam, Netherlands, 2014, 275-279

SELECTED RESEARCH PROJECTS

Semi-Self Calibration of High Speed Transceiver for DRAM Interface
Principal Investigator, Hynix Semiconductor

Compact and Power Efficient Integrated Voltage Tunable RF Multiferroic Inductors with Wide Tunable Inductance
Principal Investigator, Winchester Technology

ENGIN KIRDA



Professor, Electrical and Computer Engineering;
jointly appointed, Computer and Information Science

PhD, Technical University of Vienna, 2002
ece.neu.edu/people/kirda-engin

Malware analysis and detection; web security;
social network security; reverse engineering;
intrusion detection

SELECTED PUBLICATIONS

- M. Weissbacher, W. Robertson, E. Kirda, C. Kruegel, G. Vigna
ZigZag: Automatically Hardening Web Applications Against
Client-Side Validation Vulnerabilities, In *USENIX Security
Symposium*, Washington DC, 2015
- C. Mulliner, W. Robertson, E. Kirda
Hidden GEMs: Automated Discovery of Access Control
Vulnerabilities in Graphical User Interfaces, In *IEEE Symposium
on Security and Privacy (S&P)*, San Jose, CA, 2014
- S. Le Blonde, A. Uritesc, C. Gilbert, Z. Leong Chua, P. Saxena, E. Kirda
Look at Targeted Attacks Through the Lense of an NGO, In
USENIX Security Symposium, San Diego, CA, 2014
- K. Onarlioglu, C. Mulliner, W. Robertson, E. Kirda
PrivExec: Private Execution as an Operating System Service, In
IEEE Symposium on Security and Privacy (S&P), San Francisco,
CA, 2013
- L. Bilge, E. Kirda, C. Kruegel, M. Balduzzi
EXPOSURE: Finding Malicious Domains Using Passive DNS
Analysis, In *Network and Distributed Systems Security
Symposium (NDSS)* San Diego, CA, 2011

SELECTED RESEARCH PROJECTS

- Continuum: Finding Space and Time Vulnerabilities in
Java Programs
Co-Principal Investigator, Defense Advanced Research
Projects Agency
- DarkDroid: Exposing the Dark Side of Android Marketplaces
Principal Investigator, Defense Advanced Research
Projects Agency
- Firmalice: Modeling and Identifying Malice in Firmware
Principal Investigator, Defense Advanced Research
Projects Agency
- TWC: Medium: Collaborative: Automated Reverse Engineering of
Commodity Software
Co-Principal Investigator, National Science Foundation
- ZIGZAG: Secure Execution of Client-Side Web Application
Components
Principal Investigator, Office of Naval Research

MIECZYSŁAW KOKAR



Professor, Electrical and Computer Engineering

PhD, Wrocław University of Technology, 1973
ece.neu.edu/people/kokar-mieczyslaw

Cognitive radio; software engineering-self-
controlling software; information fusion

SELECTED PUBLICATIONS

- Y. Chen, J. Moskal, M.M. Kokar, K. Chowdhury
A Comparison of OWL and XML Based Approaches to
Representing Cognitive Radio Functions, *Wireless Innovation
Forum Conference on Wireless Communications Technologies
and Software Defined Radio*, 2016, 174-181
- V. Roman, J.J. Moskal, M.M. Kokar, R.P. Guesman,
R.B. Normoyle, D.H. Scheidt
Reusability of Knowledge for Deriving Latent Situational
Information in EW Scenarios, *Military Communications
Conference, IEEE*, 2016
- L. Lechowicz, M.M. Kokar
Cognitive Radio: Interoperability Through Waveform
Reconfiguration, Artech House, Norwood, MA, 2015
- Y. Chen, M.M. Kokar, J. Moskal, D. Suresh
Mapping Spectrum Consumption Models to Cognitive Radio
Ontology for Automatic Inference, *Wireless Innovation Forum
Conference on Wireless Communications Technologies and
Software Defined Radio*, *Wireless Innovation Forum*, 2015,
*Best paper award
- D. Suresh, M.M. Kokar, J. Moskal, Y. Chen
Updating CRO to CRO2, In *Wireless Innovation Forum
Conference on Wireless Communications Technologies and
Software Defined Radio*, *Wireless Innovation Forum*, 2015
- B.E. Ulicny, J.J. Moskal, M.M. Kokar, K. Abe, J. Smith
Inference and Ontologies, In A. Kott, C. Wang, and R. F.
Erbacher, editors, *Cyber Defense and Situational Awareness*,
Springer, 2014, 167-199
- L. Grande, M. Sherman, H. Zhu, M.M. Kokar, J. Stine
IEEE DySPAN 1900.5 Efforts To Support Spectrum Access
Standardization, 2013 *IEEE Military Communications
Conference (MILC OM 2013)*, San Diego, 2013
- B. Ulicny, J. Moskal, M.M. Kokar
Situational Awareness from Social Media, *Proceedings of the
Eighth Conference on Semantic Technologies for Intelligence,
Defense, and Security*, Fairfax, VA, 2013, 87-92
- S. Li, M.M. Kokar
Flexible Adaptation in Cognitive Radios, Springer, Springer New
York Heidelberg Dordrecht London, 2012

SELECTED RESEARCH PROJECTS

- Converged Collaborative Elements for RF Task Operations
Principal Investigator, DARPA

MIRIAM LEESER



Professor and Interim Chair, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, Cambridge University, 1988
ece.neu.edu/people/leeser-miriam

Accelerators for compute intensive applications: reconfigurable hardware and graphics processing units (GPUs); applications including biocomputing, machine learning, software-defined radio; uses and implementations of computer arithmetic

SELECTED PUBLICATIONS

- M. Sabbagh, M. Uecker, A.J. Powell, M. Leeser, M.H. Moghari
Cardiac MRI Compressed Sensing Image Reconstruction with a Graphics Processing Unit, International Symposium on Medical Information and Communication Technology (ISMICT), 2016
- R. Subramanian, B. Drozdenko, E. Doyle, R. Ahmed, M. Leeser, K.R. Chowdhury
High-level System Design of IEEE 802.11b Standard-Compliant Link Layer for MATLAB-Based SDR, IEEE Access, 4, 2016, 1494-1509
- B. Drozdenko, M. Zimmermann, T. Dao, K. Chowdhury, M. Leeser
Modeling Considerations for the Hardware-Software Co-Design of Flexible Modern Wireless Transceivers, 22nd International Conference on Field Programmable Logic and Applications (FPL), 2016
- X. Fang, M. Leeser
Open-Source Variable-Precision Floating-Point Library for Major Commercial FPGAs, ACM Transactions on Reconfigurable Technology Systems, 9(3), 2016
- N. Moore, M. Leeser, L. Smith King
Kernel Specialization Provides Adaptable GPU Code for Particle Image Velocimetry, IEEE Transactions on Parallel and Distributed Systems, 26(4), 2015, 1049-1058
- M. Leeser, S. Mukherjee, J. Brock
Fast Reconstruction of 3D Volumes from 2D CT Projection Data with GPUs, Biomed Central Research Notes, 7(528), 2014
- X. Wang, M. Leeser
VFloat: A Variable Precision Fixed and Floating-Point Library for Reconfigurable Hardware, ACM Transactions on Reconfigurable Technology and Systems, 3(3), 2010, 1-34
- X. Wang, M. Leeser
K-means Clustering for Multispectral Images Using Floating point Divide, IEEE Symposium on Field-programmable Custom Computing Machines (FCCM), 2007, 151-162

SELECTED RESEARCH PROJECTS

- Ensuring Reliability and Portability of Scientific Software for Heterogeneous Architectures
Co-Principal Investigator, National Science Foundation
- Hardware/Software Implementations of WiFi and LTE Communications
Principal Investigator, Mathworks

BRAD LEHMAN



Professor, Electrical and Computer Engineering

PhD, Georgia Institute of Technology, 1992
ece.neu.edu/people/lehman-bradley

Power electronics; dc-dc converters; pulse width modulation; motion control; electric motor drives; analog circuits; control theory; differential equations; time delays; nonlinear systems and control; industrial control

IEEE Modeling and Control Technical Achievement Award of the IEEE Power Electronics Society; IEEE Standards Medallion

SELECTED PUBLICATIONS

- W. Huang, B. Lehman
Analysis and Verification of Inductor Coupling Effect in Interleaved Multiphase dc-dc Converters, IEEE Transactions on Power Electronics, 31(7), 2016, 5004-5017
- W. Huang, B. Lehman
A Compact Coupled Inductor for Interleaved Multiphase DC-DC Converters, IEEE Transactions on Power Electronics, 31(10), 2016, 6770-6775
- D.O. Neacsu, Y. Zheng, B. Lehman
An SD Card Flash-Memory-Based Implementation of a Multi-optimal Three-Phase PWM Generator, IEEE Transactions on Power Electronics, 31(1), 2016, 39-51
- S. Chen, P. Li, R. Ball, J.-F. de Palma, B. Lehman
Analysis of a Switched Impedance Transformer-Type Nonsuperconducting Fault Current Limiter, IEEE Transactions on Power Electronics, 30(4), 2015, 1925-1936
- J. Zhang, B.M. Hodge, S. Lu, H.F. Hamann, B. Lehman, J. Simmons, E. Campos, V. Banunarayanan, J. Black, J. Tedesco
Baseline and Target Values for Regional and Point PV Power Forecasts: Toward Improved Solar Forecasting, Solar Energy, 122, 2015, 804-819
- G. Spagnuolo, G. Petrone, B. Lehman, C.A. Ramos Paja, Y. Zhao, M.L. Orozco Gutierrez
Control of Photovoltaic Arrays: Dynamical Reconfiguration for Fighting Mismatched Conditions and Meeting Load Requests, IEEE Industrial Electronics Magazine, 9(1), 2015, 62-76
- Y. Zhao, R. Ball, J. Mosesian, J.F. de Palma, B. Lehman
Graph-Based Semi-Supervised Learning for Fault Detection and Classification in Solar Photovoltaic Arrays, IEEE Transactions on Power Electronics, 30(5), 2015, 2848-2858

SELECTED RESEARCH PROJECTS

- A Multi-Model Machine Learning-Solar Forecasting Technology
Principal Investigator, United States Department of Energy
- Advanced 100W Solar Blanket for Squad Power
Principal Investigator, Department of Defense

HANOCH LEV-ARI



Professor, Electrical and Computer Engineering

PhD, Stanford University, 1984
ece.neu.edu/people/lev-ari-hanoach

Adaptive filtering; statistical signal processing; spectrum analysis and estimation; networked dynamic state estimation

Fellow, Institute of Electrical and Electronics Engineers

SELECTED PUBLICATIONS

- P. Hajiyani, H. Lev-Ari, A.M. Stankovic
Mitigating Bad Data and Measurement Delay in Nonlinear Dynamic State Estimation, Proceedings of the IEEE International Symposium on Circuits and Systems (ISCAS), Montreal, 2016
- P. Ren, H. Lev-Ari, A. Abur
Robust Continuous-Discrete Kalman Filter for Estimating Machine States with Model Uncertainties, 19th Power Systems Computation Conference (PSCC), Genoa, Italy, 2016
- P. Argyropoulos, H. Lev-Ari, A. Abur
Subband Transmission Line Modeling for Robust Power System Transient Simulation, IEEE PES General Meeting, Denver, 2015
- P.E. Argyropoulos, H. Lev-Ari
Wavelet Customization for Improved Fault Location Quality in Power Networks, IEEE Transactions on Power Delivery, 30(5), 2015, 2215-2223
- B. Yan, H. Lev-Ari, A.M. Stankovic
Robust Continuous-Discrete Kalman Filter for Time-Stamped Delay Mitigation in Networked Estimation and Control Systems, 46th North American Power Symposium, Pullman, 2014
- L. Peng, H. Lev-Ari
Estimating the Autocorrelation Function of an Arbitrarily Time-Variant System Response, IEEE International Conference on Acoustics, Speech and Signal Processing, Vancouver, BC, May 2013, 6249-6253

SELECTED RESEARCH PROJECTS

- Center for Ultra-Wide-Area Resilient Electric Energy Transmission Networks (CURENT)
Co-Principal Investigator, National Science Foundation
- Advanced Cyber-Physical Models for Estimation and Control in Naval Power and Energy Systems
Principal Investigator, Office of Naval Research

XUE LIN



Assistant Professor, Electrical and Computer Engineering

PhD, University of Southern California, 2016
ece.neu.edu/people/lin-xue

Near-threshold computer for low-power embedded systems; high-performance and mobile cloud computing systems; machine learning and computing in (embedded) cyber-physical systems

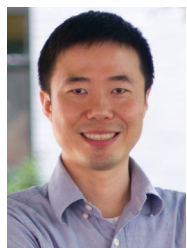
SELECTED PUBLICATIONS

- Q. Xie, X. Lin, Y. Wang, S. Chen
Performance Comparisons Between 7nm Finfet and Conventional Bulk CMOS Standard Cell Libraries, IEEE Transaction Circuits and Systems II, 62(8), 2015, 761-765
- Y. Wang, X. Lin, M. Pedram
A Near-Optimal Model-Based Control Algorithm for Households Equipped with Residential Photovoltaic Power Generation and Energy Storage Systems, IEEE Transaction Sustainable Energy, 2015, 1-10
- X. Lin, Y. Wang, Q. Xie, M. Pedram
Task Scheduling with Dynamic Voltage and Frequency Scaling for Energy Minimization in the Mobile Cloud Computing Environment, IEEE Transaction Services Computing, 8(2), 2014, 175-186
- Y. Wang, X. Lin, M. Pedram
A Stackelberg Game-Based Optimization Framework of the Smart Grid with Distributed PV Power Generations and Data Centers, IEEE Transaction Energy Conversion, 29(4), 2014, 978-987
- Y. Wang, X. Lin, Y. Kim, Q. Xie, M. Pedram, N. Chang
Single-Source, Single Destination Charge Migration in Hybrid Electrical Energy Storage Systems, IEEE Transaction VLSI Systems, 22(12), 2014, 2752-2765
- X. Lin, Y. Wang, M. Pedram, J. Kim, N. Chang
Designing Fault-Tolerant Photovoltaic Systems, IEEE Design & Test (MDAT), 31(3), 2014, 76-84

SELECTED RESEARCH PROJECTS

- A Framework of Simultaneous Acceleration and Storage Reduction on Deep Neural Networks Using Structured Matrices
Principal Investigator, National Science Foundation

YONGMIN LIU



Assistant Professor, joint faculty appointment in Mechanical and Industrial Engineering and Electrical and Computer Engineering

PhD, University of California, Berkeley, 2009
mie.neu.edu/people/liu-yongmin

Nano optics; nanoscale materials and engineering; nano devices; plasmonics; metamaterials; applied physics

NSF CAREER Award, Office of Naval Research Young Investigator Award; SPIE Rising Researcher; 3M Non-Tenured Faculty Award

SELECTED PUBLICATIONS

- Z.J. Wang, L.Q. Jing, K. Yao, Y.H. Yang, B. Zheng, C.M. Soukoulis, H.S. Chen, Y.M. Liu
Origami-Based Reconfigurable Metamaterials for Tunable Chirality, *Advanced Materials*, 2017
- K. Yao, Y.M. Liu
Controlling Electric and Magnetic Resonances for Ultracompact Nanoantennas with Tunable Directionality, *ACS Photonics*, 3, 2016, 953-963
- Z.J. Wang, K. Yao, M. Chen, H. Chen, Y.M. Liu
Manipulating Smith-Purcell Emission with Babinet Metasurfaces, *Physical Review Letters*, 117(15), 2016, 157401
- W.L. Gao, F.Z. Fang, Y.M. Liu, S. Zhang
Chiral Surface Waves Supported by Biaxial Hyperbolic Metamaterials, *Light: Science and Applications*, 2015, e238
- C.L. Zhao, Y.M. Liu, Y.H. Zhao, N. Fang, T.J. Huang
Reconfigurable Plasmo-fluidic Lens, *Nature Communications*, 4(2350), 2013, 1-8
- Y.M. Liu, S. Palomba, Y. Park, T. Zentgraf, X.B. Yin, X. Zhang
Compact Magnetic Antennas for Directional Excitation of Surface Plasmons, *Nano Letters*, 12(9), 2012, 4853-4858
- Y.M. Liu, X. Zhang
Metamaterials: A New Frontier of Science and Technology, *Chemical Society Reviews*, 40, 2011, 2494-2507
- T. Zentgraf, Y.M. Liu, M.H. Mikkelsen, J. Valentine, X. Zhang
Plasmonic Luneburg and Eaton Lenses, *Nature Nanotechnology*, 6, 2011, 151-155
- J. Yao, Z. Liu, Y.M. Liu, Y. Wang, C. Sun, G. Bartal, et al.
Optical Negative Refraction in Bulk Metamaterials of Nanowires, *Science*, 321(5891), 2008, 930

SELECTED RESEARCH PROJECTS

- CAREER: Spin Plasmonics for Ultrafast All-Optical Manipulation of Magnetization in Hybrid Metal-Ferromagnet Structures
Principal Investigator, National Science Foundation
- Reconfigurable Metamaterials for Beam Steering, Imaging and Sensing at Infrared Frequencies
Principal Investigator, Office of Naval Research

FABRIZIO LOMBARDI



ITC Endowed Professor, Electrical and Computer Engineering

PhD, University of London, 1982
ece.neu.edu/people/lombardi-fabrizio

Fault-tolerant computing; VLSI CAD; testing, configurable computing, distributed systems

Fellow, Institute of Electrical and Electronics Engineers; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

- H. Jiang, C. Shen, J. Han, F. Lombardi, P. Jonker
Adaptive Filter Designs Using Stochastic Circuits, *IEEE International Symposium on Very-Large-Scale Integration*, Pittsburgh, 2016, 122-127
- K. Namba, F. Lombardi
A Coding Scheme for Write Time Improvement of Phase Change Memory (PCM) Systems, *IEEE Transactions on Multi-Scale Computing Systems*, 2(4), 2016, 291-296
- H.A.F. Almurib, F. Lombardi, T. Nandha Kumar
Current-Based Testing, Modeling and Monitoring for Operational Deterioration of a Memristor-Based LUT, *Journal of Electronic Testing Theory and Applications*, 32(5), 2016, 587-599
- W. Liu, L. Chen, W. Wang, F. Lombardi, M. O'Neill
Design and Analysis of Inexact Floating-Point Adders, *IEEE Transactions on Computers*, 65(1), 2016, 308-314
- S. Zare, S. Somu, C. Vittoria, F. Lombardi
Field Sensors and Tunable Devices Using Magnetoelectric Hexaferrite on Silicon Substrates, *IEEE Transactions on Electron Devices*, 63(8), 2016, 3229-3235
- K. Namba, F. Lombardi
High-Speed Parallel Decodable Single-Error Correcting (SEC) Codes, *IEEE Transactions on Device and Material Reliability*, 16(1), 2016, 30-37
- L. Chen, J. Han, W. Liu, F. Lombardi
On the Design of Approximate Restoring Dividers for Error-Tolerant Applications, *IEEE Transactions on Computers*, 65(8), 2016, 2522-2533
- X. Cui, D. Wenwen, F. Lombardi, W. Liu
A Parallel Decimal Multiplier Using Hybrid Binary Coded Decimal (BCD) Codes, *Proceedings of the IEEE International Symposium on Arithmetics*, San Jose, 2016, 150-155
- P. Zhu, J. Han, Y. Guo, F. Lombardi
Reliability and Criticality Analysis of Communication Networks by Stochastic Computation, *IEEE Network Magazine*, 30(6), 2016, 70-76
- K. Namba, F. Lombardi
Single Multiscale-Symbol Error Correction Codes for Multiscale Storage Systems, *IEEE Transactions on Computers*, 65(6), 2016, 2005-2009

EDWIN MARENGO



Associate Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, Northeastern University, 1997
ece.neu.edu/people/marengo-fuentes-edwin

Theoretical and applied electromagnetics, theoretical and applied optics, scattering theory, wave inverse problems, noniterative inverse scattering, physics-based signal processing and imaging, change detection theory and applications, compressive sensing, electromagnetic information theory, analysis and design of optical and quantum holographic detectors

National Science Foundation CAREER Award

SELECTED PUBLICATIONS

- J. Tu, E.A. Marengo
Generalized Likelihood Ratio Test Change Detection with Optical Theorem Constraint, *Journal of the Optical Society of America A*, 33, 2016, 2225-2236
- E.A. Marengo, J. Tu
Generalized Optical Theorem in the Time Domain, *Progress in Electromagnetics Research B*, 65, 2016, 1-18
- E.A. Marengo, J. Tu
Optical Theorem Detectors for Active Scatterers, *Waves in Random and Complex Media*, 25, 2015, 682-707
- E.A. Marengo
Nonuniqueness of Optical Theorem Detectors, *Journal of the Optical Society of America A*, 32, 2015, 1936-1942
- E.A. Marengo
Inverse Diffraction Theory and Computation of Minimum Source Regions of Far Fields, *Mathematical Problems in Engineering*, 513953, 2014, 1-18
- E.A. Marengo, J. Tu
Optical Theorem for Transmission Lines, *Progress in Electromagnetics Research B*, 61, 2014, 253-268
- E.A. Marengo
A New Theory of the Generalized Optical Theorem in Anisotropic Media, *IEEE Transactions on Antennas and Propagation*, 61, 2013, 2164-2179

JOSE MARTINEZ LORENZO



Assistant Professor, Mechanical and Industrial Engineering; jointly appointed, Electrical and Computer Engineering

PhD, University of Vigo, 2005
ece.neu.edu/people/martinez-lorenzo-jose-angel

Devices, circuits and sensing; antenna analysis, modeling, design, and optimization; subsurface scattering analysis; computational methods of electromagnetics; novel radar system specification and design; explosives detection

SELECTED PUBLICATIONS

- I.A. Osaretin, M.W. Shields, J.A. Martinez-Lorenzo, W.J. Blackwell
A Compact 118-GHz Radiometer Antenna for the Micro-sized Microwave Atmospheric Satellite, *IEEE Antennas & Wireless Propagation Letters*, 13, 2014, 1533-1536
- Y. Rodriguez-Vaqueiro, C. Rappaport, J.A. Martinez-Lorenzo, et al.
Fourier-Based Imaging for Multistatic Radar Systems, *IEEE Transactions on Microwave Theory and Techniques*, 62(8), 2014, 1798-1810
- Y. Alvarez, J.A. Martinez-Lorenzo, C. Rappaport, et al.
On the Combination of SAR and Model Based Techniques for High-Resolution Real-Time Two-Dimensional Reconstruction, *IEEE Transactions on Antennas and Propagation*, 62(10), 2014, 5180-5189
- Y. Rodriguez-Vaqueiro, J.A. Martinez-Lorenzo
On the use of Passive Reflecting Surfaces and Compressive Sensing Techniques for Detecting Security Threats at Standoff Distances, *International Journal on Antennas and Propagation*, 248351, 2014, 1-8

SELECTED RESEARCH PROJECTS

- Advanced Algorithm Development for Multiband GPR Radar Detection of Buried Mines
Co-Principal Investigator, US Army Night Vision and Electronic Sensors Directorate
- Advanced Imaging and Detection of Security Threats using Compressive Sensing
Principal Investigator, Department of Homeland Security
- Advanced Mechanical-Electromagnetic Applications for next Generation Environmental Monitoring
Principal Investigator, National Oceanic and Atmospheric Administration
- Multi-Modality Electromagnetic Detection and Localization of Implanted Explosives Using Ultra low Field MRI and Nuclear Quadrupole Resonance
Co-Principal Investigator, Defense Advanced Research Projects Agency

NICOL MCGRUER



Professor, Electrical and Computer Engineering; affiliated faculty: Mechanical and Industrial Engineering, Bioengineering

PhD, Michigan State University, 1983
ece.neu.edu/people/mcgruer-nicol

MEMS, NEMS, RF MEMS; nanotechnology; micro/nanofabrication; microsystems; microrelay; nanoswitch; microspectrometer; microfluidics; organic FETs, organic solar cells

Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

S.D. Berger, N.E. McGruer, G.G. Adams
Simulation of Dielectrophoretic Assembly of Carbon Nanotubes Using 3D Finite Element Analysis, *Nanotechnology*, 26(15), 2015, e155602

A. Basu, R.P. Hennessy, G.G. Adams, N.E. McGruer
Hot Switching Damage Mechanisms in MEMS Contacts—Evidence and Understanding, *Journal of Micromechanics and Microengineering*, 24, 2014, e105004

Y.-C. Wu, N. McGruer, G.G. Adams
Adhesive Slip Process Between a Carbon Nanotube and a Substrate, *Journal of Physics D: Applied Physics*, 46, 2013, e175305

R.P. Hennessy, A. Basu, G.G. Adams, N. McGruer
Hot-Switched Lifetime and Damage Characteristics of MEMS Switch Contacts, *Journal of Micromechanics and Microengineering*, 23(5), 2013, e055003

H. Pan, Y.-C. Wu, G.G. Adams, G.P. Miller, N. McGruer
Interfacial Shear Stress Between Single-Walled Carbon Nanotubes and Gold Surfaces With and Without an Alkanethiol Monolayer, *Journal of Colloid and Interface Science*, 407, 2013, 133-139

C. Pramanik, Y. Li, A. Singh, W. Lin, J.L. Hodgson, J.B. Briggs, S. Ellis, P. Müller, N.E. McGruer, G.P. Miller
Water Soluble Pentacene, *Journal of Materials Chemistry C*, 1, 2013, 2193-2201

P. Ryan, Y.-C. Wu, S. Somu, G. Adams, N. McGruer
Single Walled Carbon Nanotube Electromechanical Switching Behavior with Shoulder Slip, *Journal of Micromechanics and Microengineering*, 21, 2011, e045028

SELECTED RESEARCH PROJECTS

PLASMID (Plasmonic Microelectromechanical Infrared Digitizer), Zero-Power Sensor

Co-Principal Investigator, Defense Advanced Research Projects Agency

Zero Power Sensors (ZePS), RF Wake-up

Co-Principal Investigator, Defense Advanced Research Projects Agency

WALEED MELEIS



Associate Professor and Associate Chair, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, University of Michigan, 1996
ece.neu.edu/people/meleis-waleed

Combinatorial optimization; algorithm design and analysis; scheduling; large-scale machine learning; parallel computing

COE Fostering Engineering Innovation in Education Award; Black Engineering Student Society Professor Appreciation Award; Invited to represent Northeastern at the National Academy of Engineering's Frontiers of Engineering Education Symposium; College of Engineering Outstanding Teacher Award; Martin W. Essigmann Outstanding Teaching Award, College of Engineering; Eta Kappa Nu Professor of the Year Award; Center for Innovative Course Design Teaching Award, EdTech

SELECTED PUBLICATIONS

W. Li, F. Zhou, W. Meleis, K. Chowdhury
Dynamic Generalization Kanerva Coding in Reinforcement Learning for TCP Congestion Control Design, *Proceedings of the 16th International Conference on Autonomous Agents and Multiagent Systems*, Sao Paulo, Brazil, 2017

J. Radford, A. Pilny, A. Reichelmann, B. Keegan, B. Welles, J. Hoyer, K. Ognyanova, W. Meleis, D. Lazer
Volunteer Science: An Online Laboratory for Experiments in Social Psychology, *Social Psychology Quarterly*, 79(4), 2016

L. Hayward, S. Ventura, M. Mahanna, W. Meleis
Inter-Professional Collaboration between Physical Therapy, Speech Language Pathology and Engineering Faculty and Students to Address Global Pediatric Rehabilitation Needs: A Case Report, *Journal of Physical Therapy Education*, 30(4), 2016

C. Wu, W. Li, W. Meleis,
Rough Sets-Based Prototype Optimization in Kanerva-Based Function Approximation, *IEEE/WIC/ACM International Conference on Intelligent Agent Technology*, 2015

J. Radford, B. Keegan, J. Hoyer, C. Karbeyaz, K. Ognyanova, B. Foucault Welles, W. Meleis, D. Lazer
Conducting Massively Open Online Social Experiments with Volunteer Science, *International AAAI Conference on Web and Social Media*, 2015

L. Sallaway, S. Magee, J. Shi, F. Quivira, K. Tgavalekos, D. Brooks, S. Muftu, W. Meleis, R. Moore, D. Kopans, K-T, Wan
Detecting Solid Masses in Phantom Breast Using Mechanical Indentation, *Experimental Mechanics*, 54(6), 2014, 935-942

J. Tai, J. Zhang, J. Li, W. Meleis, N. Mi
ArA: Adaptive Resource Allocation for Clouds under Burst Workloads, *Proceedings of the IEEE International Performance Computing and Communications Conference*, Orlando, Florida, 2011, 1-8

TOMMASO MELODIA



Associate Professor, Electrical and Computer Engineering

PhD, Georgia Institute of Technology, 2007
ece.neu.edu/people/melodia-tommaso

Modeling, optimization, and experimental evaluation of wireless networked systems; networked implantable medical systems; multimedia sensor networks; secure tactical cognitive radio networks; underwater networks; mobile cloud computing

National Science Foundation CAREER Award

SELECTED PUBLICATIONS

Z. Guan, T. Melodia

CU-LTE: Spectrally-Efficient and Fair Coexistence Between LTE and Wi-Fi in Unlicensed Bands, Proceedings of AIEEE Conference on Computer Communications (INFOCOM), San Francisco, CA, 2016

G.E. Santagati, T. Melodia

U-Wear: Software-Defined Ultrasonic Networking for Wearable Devices, Proceedings of ACM Conference on Mobile Systems, Services and Applications (MOBISYS), Florence, Italy, May 2015, 1-16

Z. Guan, G.E. Santagati, T. Melodia

Ultrasonic Intra-Body Networking: Interference Modeling, Stochastic Channel Access and Rate Control, Proceedings of the IEEE Conference on Computer Communications, Hong Kong, 2015, 1-9

S. Pudlewski, N. Cen, Z. Guan, T. Melodia

Video Transmission Over Lossy Wireless Networks: A Cross-Layer Perspective, IEEE Journal of Selected Topics in Signal Processing, 9(1), 2015, 6-21

E. Demirors, G. Sklivanitis, G.E. Santagati, T. Melodia, et al.
Design of a Software-Defined Underwater Acoustic Modem with Real-Time Physical Layer Adaptation Capabilities, Proceedings of the International Conference on Underwater Networks and Systems, 2014, 1-8

SELECTED RESEARCH PROJECTS

PAWR: Platforms for Advanced Wireless Research
Director of Research, National Science Foundation

NeTS: Small: Beyond Separate-then-centralize: A Cellular Operating System to Optimize Software-defined 5G Wireless Networks
Principal Investigator, National Science Foundation

CAREER: Towards Ultrasonic Networking for Implantable Biomedical Devices
Principal Investigator, National Science Foundation

Small:Towards Real-time Video Streaming in the Internet of Underwater Things
Principal Investigator, National Science Foundation

Toward Maximal Spectral-Efficiency Networking
Principal Investigator, Air Force Research Laboratory

NINGFANG MI



Associate Professor, Electrical and Computer Engineering

PhD, College of William and Mary, 2009
ece.neu.edu/people/mi-ningfang

Capacity planning; MapReduce/Hadoop scheduling; cloud computing; resource management; performance evaluation; workload characterization; simulation; virtualization

National Science Foundation CAREER Award; IBM Faculty Award; Air Force Office of Scientific Research Young Investigator Award

SELECTED PUBLICATIONS

H. Gao, Z. Yang, J. Bhimani, T. Wang, J. Wang, N. Mi, B. Sheng
AutoPath: Harnessing Parallel Execution Paths for Efficient Resource Allocation in Multi-Stage Big Data Frameworks, The 26th International Conference on Computer Communications and Networks, Vancouver, Canada, 2017

J. Bhimani, N. Mi, M. Leeser, Z. Yang

FiM: Performance Prediction for Parallel Computation in Iterative Data Processing Applications, IEEE International Conference on Cloud Computing, Honolulu, Hawaii, 2017

Y. Yao, J. Wang, B. Sheng, C.C. Tan, N. Mi

Self-Adjusting Slot Configurations for Homogeneous and Heterogeneous Hadoop Clusters, IEEE Transactions on Cloud Computing, 5(2), 2017, 344-357

Z. Yang, M. Awasthi, M. Ghosh, N. Mi

A Fresh Perspective on Total Cost of Ownership Models for Flash Storage in Datacenters, 8th IEEE International Conference on Cloud Computing Technology and Science, Luxembourg, 2016

J. Tai, D. Liu, Z. Yang, X. Zhu, J. Lo, N. Mi

Improving Flash Resource Utilization at Minimal Management Cost in Virtualized Flash-Based Storage Systems, IEEE Transactions on Cloud Computing (TCC), 1, 2015, 1-14

Y. Yao, J. Tai, B. Sheng, N. Mi

LsPS: A Job Size-Based Scheduler for Efficient Assignments in Hadoop, IEEE Transactions on Cloud Computing (TCC), 99, 2014, 1-14

SELECTED RESEARCH PROJECTS

AFOSR YIP: Creating an Integrated Management Layer to Administer Heterogeneous Resources in Dynamic Workflow Clusters

Principal Investigator, Air Force Office of Scientific Research

CAREER: Capacity Planning Methodologies for Large Clusters with Heterogeneous Architectures and Diverse Applications

Principal Investigator, National Science Foundation

HOSSEIN MOSALLAEI



Professor, Electrical and Computer Engineering;
affiliated faculty, Bioengineering

PhD, University of California,
Los Angeles, 2001
ece.neu.edu/people/mosallaei-hossein

Electromagnetics and optics, quantum
systems, nanoscale materials and
metamaterials, nanoantennas, THz-IR Devices, multiscale
computation and mathematical-numerical models

SELECTED PUBLICATIONS

- S. Jafar-Zanjani, M.M. Salary, H. Mosallaei
Metafabrics for Thermoregulation and Energy-Harvesting
Applications, *ACS Photonics*, 4(4), 2017, 915-927
- A. Forouzmand, H. Mosallaei
Real-Time Controllable and Multi-Functional Metasurfaces
Utilizing Indium Tin Oxide Materials: A Phased Array
Prospective, *IEEE Transactions on Nanotechnology*, 16(2),
2017, 296-306
- A. Forouzmand, H. Mosallaei
Shared Aperture Antenna for Simultaneous Two-Dimensional
Beam Steering at Near-Infrared and Visible, *Journal of
Nanophotonics*, 11(1), 2017, 010501
- M.M. Salary, A. Forouzmand, H. Mosallaei
Model Order Reduction of Large-Scale Metasurfaces Using
a Hierarchical Dipole Approximation, *ACS Photonics*, 4(1),
2016, 63-75
- J. Cheng, H. Mosallaei
Truly Achromatic Optical Metasurfaces: A Filter Circuit Theory
Based-Design, *JOSA B*, 32(10), 2015, 2115-2121
- J. Cheng, D. Ansari, H. Mosallaei
Wave Manipulation with Designer Dielectric Metasurfaces,
Optics Lett, 39(21), 2014, 6285-6288

SELECTED RESEARCH PROJECTS

- Designer Solids Nanoantennas and Material
Principal Investigator, Army Research Office
- MURI, Multiscale Mathematical Modeling and Design Realization
of Novel 2D Functional Materials
Co-Principal Investigator, Army Research Office
- Nanoantennas for Engineering Waves on the Surface
Principal Investigator, Air Force Office of Scientific Research

MARVIN ONABAJO



Assistant Professor, Electrical and Computer Engineering

PhD, Texas A&M University, 2011
ece.neu.edu/people/onabajo-marvin

Design of analog, radio frequency, and
mixed-signal integrated circuits; built-in test
and calibration techniques for systems-on-a-
chip; on-chip temperature sensors for thermal
monitoring and built-in testing

National Science Foundation CAREER Award; Martin Essigman
Outstanding Teaching Award, College of Engineering

SELECTED PUBLICATIONS

- C.-H. Chang, S.A. Zahari, K. Wang, L. Xu, I. Farah, M. Onabajo
An Analog Front-End Chip with Self-Calibrated Input
Impedance for Monitoring of Biosignals via Dry Electrode-
Skin Interfaces, *IEEE Transactions on Circuits and Systems I:
Regular Papers*, 2017
- L. Xu, C.-H. Chang, M. Onabajo
A 0.77mW 2.4GHz RF Front-end with -4.5dBm In-Band IIP3
Through Inherent Filtering, *IEEE Microwave and Wireless
Components Letters*, 26(5), 2016, 352-354
- H. Chauhan, V. Kvartenko, R. Cox, T. Weber, M. Onabajo
An Optimization Platform for Digital Predistortion of Power
Amplifiers, *IEEE Design & Test*, 33(2), 2016, 49-58
- C.-J. Park, M. Onabajo, H.M. Geddada, A.I. Karsilayan,
J. Silva-Martinez
Efficient Broadband Current-Mode Adder-Quantizer Design for
Continuous-Time Sigma-Delta Modulators, *IEEE Transactions on
Very Large Scale Integration Systems*, 23(9), 2015, 1920-1930
- H. Chauhan, Y. Choi, M. Onabajo, I. Jung, Y.-B. Kim
Accurate and Efficient On-Chip Spectral Analysis for Built-In
Testing and Calibration Approaches, *IEEE Transactions on Very
Large Scale Integration (VLSI) Systems*, 22(3), 2014, 497-506

SELECTED RESEARCH PROJECTS

- CAREER: Low-Power Transceiver Design Methods for Wireless
Medical Monitoring
Principal Investigator, National Science Foundation
- Integrated Self-Calibrated Analog Front-end for Biopotential and
Bioimpedance Measurements
Principal Investigator, National Science Foundation

SARAH OSTADABBAS



Assistant Professor, Electrical and Computer Engineering

PhD, University of Texas at Dallas, 2014
ece.neu.edu/people/ostadabbas-sarah

Machine learning/pattern recognition;
computer vision, affective computing,
human-machine interaction

SELECTED PUBLICATIONS

- B. Rezaei, X. Huang, J. Yee, S. Ostadabbas
Long-Term Non-Contact Tracking of Caged Rodents, IEEE International Conference on Acoustics, Speech and Signal Processing, 2017
- A. Farnoosh, M. Nourani, S. Ostadabbas
Spatially-Continuous Plantar Pressure Reconstruction Using Compressive Sensing, Machine Learning in Health Care, 2017
- B. Rezaei, J. Lowe, J. Yee, S. Porges, S. Ostadabbas
Non-Contact Automatic Respiration Monitoring in Restrained Rodents, IEEE International Conference of the Engineering in Medicine and Biology Society, 2016
- S. Ostadabbas, S.N. Housley, N. Sebkhi, K. Richards, D. Wu, Z. Zhang, M.G. Rodriguez, L. Warthen, C. Yarbrough, S. Balagaje, A.J. Butler, M. Ghovanloo
Tongue-Controlled Robotic Rehabilitation: A Feasibility Study in People with Stroke, Journal of Rehabilitation Research and Development (JRRD), 53(6), 2016, 989-1006
- S. Ostadabbas, N. Sebkhi, M. Zhang, S. Rahim, L.J. Anderson, F. Lee, M. Ghovanloo
A Vision-Based Respiration Monitoring System for Passive Airway Resistance Estimation, IEEE Transactions on Biomedical Engineering (TBME), 2016
- S. Ostadabbas, M. Ghovanloo, A.J. Butler
Developing A Tongue Controlled Exoskeleton for a Wrist Tracking Exercise: A Preliminary Study, Journal of Medical Devices (JMD), 9, 2015
- S. Ostadabbas, M. Nourani, R. Yousefi, M. Pompeo
A Knowledge-Based Modeling for Plantar Pressure Image Reconstruction, IEEE Transactions on Biomedical Engineering (TBME), 61(10), 2014, 2538-2549

SELECTED RESEARCH PROJECTS

- Compressive Sensing for In-Shoe Pressure Monitoring
Principal Investigator, Mathworks Microgrant
- Decoding Situational Empathy: A Graph Theoretic Approach Towards Introducing a Quantitative Empathy Measure
Principal Investigator, Northeastern Tier 1 Grant

TASKIN PADIR



Associate Professor, Electrical and Computer Engineering; affiliated faculty Mechanical and Industrial Engineering

PhD, Purdue University, 2004
ece.neu.edu/people/padir-taskin

Humanoid robots, dexterous manipulation,
model-based robot design, human-
supervised robot autonomy, medical cyber-
physical systems

- Kalenian Award for Entrepreneurial Spirit, HEART: Humans Empowered with Assistive Robot Technologies; Romeo L. Moruzzi Young Faculty Award for Innovation in Undergraduate Education

SELECTED PUBLICATIONS

- D. Sinyukov, T. Padir
CWave: High-Performance Single-Source Any-Angle Path Planning on a Grid, IEEE International Conference on Robotics and Automation, Singapore, 2017
- V. Dimitrov, J. Vazquez, T. Padir
LocATER: Localization and Accountability Technologies for Emergency Responders, IEEE International Symposium on Technologies for Homeland Security, Boston, MA, 2017
- M. DeDonato, F. Polido, K. Knoedler, B.P.W. Babu, N. Banerjee, C.P. Bove, X. Cui, R. Du, P. Franklin, J.P. Graff, P. He, A. Jaeger, L. Li, D. Berenson, M.A. Gennert, S. Feng, C. Liu, X. Xinjilefu, J. Kim, C.G. Atkeson, X. Long, T. Padir
Team WPI-CMU: Achieving Reliable Humanoid Behavior in the DARPA Robotics Challenge, J. Field Robotics, 34, 2017, 381-399
- T. Padir, H. Yanco, R. Platt
Towards Cooperative Control of Humanoid Robots for Handling High-Consequence Materials in Gloveboxes, Waste Management Symposia, Robotics & Remote Systems-Nuclear Environments: Hardware- Next Gen Systems Track, Phoenix, AZ, 2017
- X. Long, M. Wonsick, V. Dimitrov, T. Padir
Task-Oriented Planning Algorithm for Humanoid Robots Based on a Foot Repositionable Inverse Kinematics Engine, IEEE-RAS International Conference on Humanoid Robots (Humanoids), Cancun, Mexico, 2016

SELECTED RESEARCH PROJECTS

- Accessible Testing on Humanoid-Robot-R5 and Evaluation of NASA Administered (ATHENA) Space Robotics Challenge
Principal Investigator, National Aeronautics and Space Administration
- Autonomy and Navigation for Advanced UAVs
Principal Investigator, Massachusetts Seaport Economic Development Council
- Collaborative Research: Cooperative Control of Humanoid Robots for Remote Operations in Nuclear Environments
Principal Investigator, Department of Energy
- LocATER: Localization and Accountability Technology for Emergency Responders
Principal Investigator, National Science Foundation

CAREY RAPPAPORT



COE Distinguished Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, Massachusetts Institute of Technology, 1987
ece.neu.edu/people/rappaport-carey

Bioelectromagnetics, microwave tissue imaging, electromagnetic breast cancer detection and treatment, cardiac ablation therapy, microwave assisted balloon angioplasty, catheter-based sensing. Antennas, electromagnetic computation, subsurface sensing and imaging, explosives detection, security system conceptualization and design

Fellow and Distinguished Lecturer, Institute of Electrical and Electronics Engineers; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

- G. Ghazi, C. Rappaport, J.A. Martinez-Lorenzo
Improved SAR Imaging Contour Extraction Using Smooth Sparsity-Driven Regularization, *IEEE Antennas and Wireless Propagation Letters*, 15(2), 2016, 266-269
- B. Gonzalez-Valdes, Y. Alvarez, S. Mantzavinos, C.M. Rappaport, F. Las-Heras, J.A. Martinez-Lorenzo
Improving Security Screening: A Comparison of Multistatic Radar Configurations for Human Body Imaging, *IEEE Antennas and Propagation Magazine*, 58(4), 2016, 35-47
- B. Gonzalez-Valdes, Y. Alvarez, Y. Rodriguez-Vaqueiro, A. Arboleya-Arboleya, A. Garcia-Pino, C. Rappaport, F. Las-Hera, J.A. Martinez-Lorenzo
Millimeter Wave Imaging Architecture for the On-the-Move Whole Body Imaging, *IEEE Transactions on Antennas and Propagation*, 64(6), 2016, 2328-2338
- C. Rappaport, B. Gonzalez-Valdes,
Multistatic Nearfield Imaging Radar for Portal Security Systems Using a High Gain Toroidal Reflector Antenna, *European Conference on Antennas and Propagation (EuCAP)*, Lisbon, Portugal, 2015, *best paper award
- Y. Alvarez, Y. Rodriguez-Vaqueiro, B. Gonzalez-Valdes, C. Rappaport, F. Las-Heras, J.A. Martinez-Lorenzo
Three-Dimensional Compressed Sensing-Based Millimeter-Wave Imaging, *IEEE Transactions on Antennas and Propagation*, 63(12), 2015, 5868-5873

SELECTED RESEARCH PROJECTS

- Awareness and Localization of Explosive-Related Threats (ALERT)
Co-Principal Investigator, Department of Homeland Security
- Improved Millimeter Wave Radar AIT Characterization of Concealed Low-Contrast Body-Borne Threats
Principal Investigator, Department of Homeland Security

PURNIMA RATILAL-MAKRIS



Associate Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, Massachusetts Institute of Technology, 2002
ece.neu.edu/people/ratilal-makris-purnima

Remote sensing; underwater acoustics; acoustical oceanography; bioacoustics; ultrasound imaging; nonlinear scattering; wave propagation in random media; signal, image and array processing; statistical inference theory

Presidential Early Career Award for Scientists and Engineers; Office of Naval Research Young Investigator Award

SELECTED PUBLICATIONS

- Z. Gong, A.D. Jain, D. Tran, P. Ratilal, et al.
Ecosystem Scale Acoustic Sensing Reveals Humpback Whale Behavior Synchronous with Herring Spawning Processes and Re-Evaluation Finds No Effect of Sonar on Humpback Song Occurrence in the Gulf of Maine in Fall 2006, *PLoS ONE*, 9(10), 2014, e104733
- D. Tran, W. Huang, A. Bohn, D. Wang, N. Makris, P. Ratilal, et al.
Using a Coherent Hydrophone Array for Observing Sperm Whale Range, Classification, and Shallow-Water Dive Profiles, *The Journal of the Acoustical Society of America*, 135(6), 2014, 3352-3363
- Z. Gong, D. Tran, P. Ratilal
Comparing Passive Source Localization and Tracking Approaches With a Towed Horizontal Receiver Array in an Ocean Waveguide, *The Journal of the Acoustical Society of America*, 134, 2013, 3705-3720
- Z. Gong, T. Chen, P. Ratilal, N. Makris
Temporal Coherence of the Acoustic Field Forward Propagated Through a Continental Shelf with Random Internal Waves, *The Journal of the Acoustical Society of America*, 134, 2013, 3476-3485
- D. Tran, M. Andrews, P. Ratilal
Probability Distribution for Energy of Saturated Broadband Ocean Acoustic Transmission: Results from Gulf of Maine 2006 Experiment, *Journal of the Acoustical Society of America*, 132, 2012, 3659-2672
- M. Andrews, Z. Gong, P. Ratilal
Effects of Multiple Scattering, Attenuation and Dispersion in Waveguide Sensing of Fish, *Journal of the Acoustical Society of America*, 130, 2011, 1253-1271

MATTEO RINALDI



Associate Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, University of Pennsylvania, 2010
ece.neu.edu/people/rinaldi-matteo

Understanding and exploiting the fundamental properties of micro/nanomechanical structures and advanced nanomaterials to engineer new classes

of micro and nanoelectromechanical systems (M/NEMS) with unique and enabling features applied to the areas of chemical, physical and biological sensing and low power reconfigurable radio communication systems

IEEE Sensors Council Early Career Award; National Science Foundation CAREER Award; Defense Advanced Research Projects Agency Young Faculty Award

SELECTED PUBLICATIONS

- C. Cassella, Y. Hui, Z. Qian, G. Hummel, M. Rinaldi
Aluminum Nitride Cross-Sectional Lamé Mode Resonators, IEEE/ASME Journal of Microelectromechanical Systems, 25(2), 2016, 275-285
- C. Cassella, G. Chen, Z. Qian, G. Hummel, M. Rinaldi
Cross-sectional Lamé Mode Ladder Filters for UHF Wideband Applications, IEEE Electron Device Letters, 37, 2016, 681-683
- Y. Hui, J. S. Gomez-Diaz, Z. Qian, A. Alu', M. Rinaldi
Plasmonic Piezoelectric Nanomechanical Resonator for Spectrally Selective Infrared Sensing, Nature Communications, 7, 2016, 11249
- Z. Qian, F. Liu, Y. Hui, S. Kar, M. Rinaldi
Graphene as a Massless Electrode for Ultra-High-Frequency Piezoelectric Nano Electro Mechanical Systems, Nano Letters, 15(7), 2015, 4599-4604

SELECTED RESEARCH PROJECTS

- Microelectromechanical Resonant Circulator (MIRC)
Principal Investigator, DARPA MTO SPAR program
- Plasmonic Microelectromechanical Infrared Digitizer (PLASMID)
Principal Investigator, DARPA MTO N-Zero program
- Zero Power Sensors (ZePS)
Principal Investigator, DARPA MTO N-Zero program
- CAREER: Nano Electro Mechanical Resonant Sensing Platform for Chip Scale, High Resolution and Ultra-Fast Terahertz Spectroscopy and Imaging
Principal Investigator, National Science Foundation
- Intrinsically Switchable and Programmable MEMS Filter Array
Principal Investigator, Defense Advanced Research Projects Agency

WILLIAM ROBERTSON



Assistant Professor, Computer & Information Science; jointly appointed, Electrical and Computer Engineering

PhD, University of California, Santa Barbara, 2009
ece.neu.edu/people/robertson-wil

Trustworthy computing architectures; web security; statistical machine learning for anomaly detection; malware analysis using adversarial program analysis; reverse engineering; intrusion detection

SELECTED PUBLICATIONS

- A. Ozcan, C. Mulliner, W. Robertson, E. Kirda, et al.
BabelCrypt: The Universal Encryption Layer for Mobile Messaging Applications, Proceedings of the International Conference on Financial Cryptography and Data Security (FC), Isla Verde, PR, 2015, 1-15
- M. Weissbacher, W. Robertson, E. Kirda, C. Kruegel, G. Vigna
ZigZag: Automatically Hardening Web Applications Against Client-Side Validation Vulnerabilities, Proceedings of the USENIX Security Symposium, Washington DC, 2015, 737-752
- C. Mulliner, W. Robertson, E. Kirda
Hidden GEMs: Automated Discovery of Access Control Vulnerabilities in Graphical User Interfaces, Proceedings of the IEEE Symposium on Security and Privacy (Oakland), San Jose, CA, 2014, 1-14
- M. Weissbacher, T. Lauinger, W. Robertson
Why is CSP Failing? Trends and Challenges in CSP Adoption, Proceedings of the International Symposium on Research in Attacks, Intrusions, and Defenses (RAID), Gothenburg, 2014, 1-22
- K. Onarlioglu, C. Mulliner, W. Robertson, E. Kirda
PrivExec: Private Execution as an Operating System Service, Proceedings of the IEEE Symposium on Security and Privacy (Oakland), San Francisco, CA, 2013, 1-16

SELECTED RESEARCH PROJECTS

- Automated Inference of High-Level Program Structure
Principal Investigator, Office of Naval Research
- Continuum: Finding Space and Time Vulnerabilities in Java Programs
Principal Investigator, Defense Advanced Research Projects Agency
- DarkDroid: Exposing the Dark Side of Android Marketplaces
Co-Principal Investigator, Defense Advanced Research Projects Agency
- Firmalice: Modeling and Identifying Malice in Firmware
Co-Principal Investigator, Defense Advanced Research Projects Agency
- Multi-Disciplinary Preparation of Next Generation Information Assurance Practitioners
Co-Principal Investigator, National Science Foundation

MASOUD SALEHI



Associate Professor, Electrical and
Computer Engineering

PhD, Stanford University, 1979
ece.neu.edu/people/salehi-masoud

Error correcting codes; information theory;
digital communications

SELECTED PUBLICATIONS

- M. Sadeghzadeh, M. Maleki, M. Salehi, H.R. Bahrami
Large Scale Analysis of Physical Layer Security in Multi-User
Wireless Networks, Proceedings of the IEEE International
Conference on Communications (ICC), Paris, France, 2017
- K. Firouzbakht, G. Noubir, M. Salehi
Linearly Constrained Bimatrix Games in Wireless
Communications, IEEE Transactions on Communications, 64,
2016, 429-440
- K.-L. Huang, V.C. Gaudet, M. Salehi
A Hybrid ARQ Scheme Using LDPC Codes with Stochastic
Decoding, Proceedings of the 49th Annual Conference on
Information Sciences and Systems, 2015, 1-4
- N. Yang, M. Salehi
A Family of Orthogonal Full Rate Differential Space Time
Block Code Systems, Proceedings of the IEEE Military
Communications Conference (MILCOM), Baltimore, MD,
October 6-8, 2014, 569-574
- J.G. Proakis, M. Salehi
Fundamentals of Communication Systems, Second Edition
Pearson, 2014
- K. Firouzbakht, G. Noubir, M. Salehi
On the Performance of Adaptive Packetized Wireless
Communication Links Under Jamming, IEEE Transactions on
Wireless Communications, 13(7), 2014, 3481-3495
- K.-L. Huang, V. Gaudet, M. Salehi
Output Decisions for Stochastic LDPC Decoders, Proceedings
of the 48th Annual Conference on Information Sciences and
Systems, Princeton, New Jersey, 2014, 1-5
- K. Firouzbakht, G. Noubir, M. Salehi
Packetized Wireless Communication Under Jamming, a
Constrained Bimatrix Game, Proceedings of the IEEE Global
Communications Conference (GLOBECOM), 2014, 740-745
- K. Firouzbakht, G. Noubir, M. Salehi
Quadratic Program Solution of Communication Links Under
Jamming, Proceedings of the 48th Asilomar Conference on
Signals, Systems and Computers, 2014, 1011-1015
- O. Vahabzadeh, M. Salehi
A Novel Two-User Cooperation Scheme for Cooperative
Communications Based on Protograph-Based Low-Density
Parity-Check (LDPC) Codes, Proceedings of the 47th Annual
Conference on Information Sciences and Systems, 2013, 1-4

GUNAR SCHIRNER



Associate Professor, Electrical and
Computer Engineering

PhD, University of California, Irvine, 2008
ece.neu.edu/people/schirner-gunar

Embedded computer systems; novel
architectures for embedded vision; cyber-
physical systems; system-level design and
methodologies; hardware/software co-design

SELECTED PUBLICATIONS

- H. Tabkhi, G. Schirner
A Joint SW/HW Approach for Reducing Register File
Vulnerability, ACM Transactions on Architecture and Code
Optimization (ACM TACO), 2015
- N. Teimouri, H. Tabkhi, G. Schirner
Revisiting Accelerator-Rich CMPs: Challenges and Solutions,
Proceedings of the 52nd Annual Design Automation Conference
(DAC), San Francisco, CA, 84, 2015
- H. Tabkhi G. Schirner
Application-Guided Power Gating Reducing Register File Static
Power, IEEE Transactions on Very Large Scale Integration
(TVLSI), 22(12), 2014, 2513-2526
- J. Zhang, G. Schirner
Automatic Specification Granularity Tuning for Design Space
Exploration, Design Automation and Test in Europe (DATE),
Dresden, Germany, 2014, 1-6
- H. Tabkhi, R. Bushey, G. Schirner
Function-Level Processor (FLP): A High Performance, Minimal
Bandwidth, Low Power Architecture for Market-Oriented
MPSoCs, IEEE Embedded Systems Letters, 2014
- H. Tabkhi, R. Bushey, G. Schirner
Function-Level Processor (FLP): Raising Efficiency by Operating
at Function Granularity for Market-Oriented MPSoCs, IEEE
International Conference on Application-specific Systems,
Architectures and Processors (ASAP), Zurich, Switzerland, 2014
- G. Schirner, M. Götz, A. Rettberg, M. Zanella, F.J. Rammig
Embedded Systems: Design, Analysis and Verification, 403,
Springer, 2013
- G. Schirner, D. Erdogmus, K. Chowdhury, T. Padir
The Future of Human-in-the-Loop Cyber-Physical Systems, IEEE
Computer, 46(1), 2013, 36-45

SELECTED RESEARCH PROJECTS

- Collaborative Research: Holistic Design Methodology for Automated
Implementation of Human-in-the-loop Cyber-physical Systems
Principal Investigator, National Science Foundation
- Power Efficient Emerging Heterogeneous Platforms
Principal Investigator, National Science Foundation

BAHRAM SHAFAI



Professor, Electrical and Computer Engineering;
affiliated faculty, Bioengineering

PhD, George Washington University, 1985
ece.neu.edu/people/shafai-bahram

Control Systems; digital signal processing;
robust and optimal control

Associate Editor, Editorial Board and Program Chair of ISIAC-WAC;
Senior Member, Institute of Electrical and Electronics Engineers

SELECTED PUBLICATIONS

- B. Shafai, S. Nazari, A. Oghbaee
Positive Unknown Input Observer Design for Positive Linear Systems, Proceedings 19th International Conference on System Theory, Control and Computing (ICSTCC), Cheile Gradistei, Romania, 2015, 360-365
- B. Shafai, M. Saif
Proportional-Integral Observer in Robust Control, Fault Detection, and Decentralized Control of Dynamic Systems, Control and Systems Engineering, Springer International Publishing, 2015, 13-43
- S.M.M. Alavi, M. Saif, B. Shafai
Accurate State Estimation in DC-DC Converters Using a Proportional Integral Observer (PIO), Proceedings of 23rd IEEE International Symposium on Industrial electronics (ISIE), 2014, 1304-1309
- R. Ghadami, B. Shafai
Distributed Observer-Based LQR Design for Multi-agent Systems, Proceeding of ISIAC, World Automation Congress, Kona, HI, 2014, 520-526
- P. Brunet, B. Shafai
Identification of Loudspeakers Using Fractional Derivatives, Journal of the Audio Engineering Society, 62(7/8), 2014, 505-515
- B. Shafai, A. Oghbaee
Positive Observer Design for Fractional Order Systems, Proceeding of ISIAC, World Automation Congress, Kona, HI, 2014, 531-537
- B. Shafai, A. Oghbaee
Positive Quadratic Stabilization of Uncertain Linear System, Proceeding of IEEE Multi-conference on Systems and Control, CAA, Antibes, France, 2014, 1412-1417
- B. Shafai, A. Oghbaee, T. Tanaka
Positive Stabilization with Maximum Stability Radius for Linear Time-Delay Systems, 2014 IEEE 53rd Annual Conference on Decision and Control, 2014, 1948-1953
- R. Ghadami, B. Shafai
Decomposition-Based Distributed Control for Continuous-Time Multi-Agent Systems, IEEE Transactions on Automatic Control, 58(1), 2013, 258-264

AATMESH SHRIVASTAVA



Assistant Professor, Electrical and
Computer Engineering

PhD, University of Virginia, 2014
ece.neu.edu/people/shrivastava-aatmesh

Self-powered and ultra-low power circuits
and system; energy-harvesting and power-
first system/computer architecture; internet-
of-things; ultra-low power bio-medical and neural circuits and
systems; exascale computing; high reliability system design

SELECTED RESEARCH PROJECTS

- N. Shafiee, S. Tewari, B. Calhoun, A. Shrivastava
Infrastructure Circuits for Lifetime Improvement of Ultra-Low Power IoT Devices, IEEE Transactions on Circuits and Systems 1: Regular Papers, PP(99), 2017, 1-13
- N.E. Roberts, K. Craig, A. Shrivastava, S. Wooters, Y. Shaksheer, D. Wentzloff, B.H. Calhoun
A 236nW-56.5dBm Sensitivity Bluetooth Low-Energy Wakeup Receiver with Energy Harvesting in 65nm CMOS, IEEE Solid-state Circuits Conference (ISSCC), 2016
- A. Shrivastava, D. Akella, B.H. Calhoun
A 1.5nW, 32.768kHz XTAL Oscillator Operational from 0.3V Supply, IEEE Journal of Solid-state Circuits, 51(3), 2016, 686-696
- A. Roy, A. Klinefelter, F.B. Yahya, X. Chen, P. Gonzalez, D. Akella, J. Boley, K. Craig, M. Faisal, S. Oh, N.E. Roberts, Y. Shaksheer, A. Shrivastava, D. Vasudevan, D.D. Wentzloff, B.H. Calhoun
A 6.45µW Self-Powered SoC with Integrated Energy-Harvesting Power Management and ULP Asymmetric Radios for Portable Biomedical Systems, IEEE Transactions on Biomedical Circuits and Systems, 9(6), 2015, 862-874 *Invited paper to the special issue on International Solid State Circuits Conference 2015
- A. Shrivastava, N.E. Roberts, O.U. Khan, D.D. Wentzloff, B.H. Calhoun
A 10mV-Input Boost Converter with Inductor Peak Current Control and Zero Detection for Thermoelectric and Solar Energy Harvesting with 220mV Cold-start and -14.5dBm, 915MHz RF Kick-Start, IEEE Journal of Solid-State Circuits, 2015 *Invited paper to the special issue on Custom Integrated Circuits Conference 2014
- A. Shrivastava, K. Craig, N.E. Roberts, D. Wentzloff, B.H. Calhoun
A 32nW Bandgap Reference Voltage Operational from 0.5V Supply for Ultra-Low Power Systems, IEEE Solid-State Circuits Conference (ISSCC), 2015

SELECTED RESEARCH PROJECTS

- A Temperature Sensor Network to Study Public Health and Community Resilience Impacts of Heat Waves at Micro-Spatial Levels in the Town of Brookline
Contact Principal Investigator, Northeastern University

MICHAEL B. SILEVITCH



Robert D. Black Professor, COE Distinguished Professor, Electrical and Computer Engineering; affiliated faculty, Civil and Environmental Engineering; Director, CenSSIS

PhD, Northeastern University, 1971
ece.neu.edu/people/silevitch-michael

Subsurface sensing and imaging systems, detection of explosives related anomalies, engineered system development and engineering leadership

Life Fellow, Institute of Electrical and Electronics Engineers; 2015 National Academy of Engineering Gordon Prize, for developing an innovative method to provide graduate engineers with the necessary personal skills to become effective engineering leaders

SELECTED RESEARCH PROJECTS

ALERT: Awareness and Localization of Explosives Related Threats, A Department of Homeland Security Center of Excellence. ALERT seeks to conduct transformational research, technology and educational development for effective characterization, detection, mitigation and response to the explosives-related threats facing the country and the world

Director and Principal Investigator, Department of Homeland Security

CenSSIS: Center for Subsurface Sensing and Imaging Systems, Gordon-CenSSIS, a graduated NSF Engineering Research Center, was created to develop new technologies to detect hidden objects, and to use those technologies to meet real-world subsurface challenges in areas as diverse as noninvasive breast cancer detection and underground pollution assessment

Director and Principal Investigator, National Science Foundation

Research and Development of Reconstruction Advances in CT Based Object Detection Systems

Principal Investigator, Department of Homeland Security

HANUMANT SINGH



Professor, Electrical and Computer Engineering; jointly appointed, Marine and Environmental Sciences

PhD, Massachusetts Institute of Technology, 1995
ece.neu.edu/people/singh-hanumant

Robotic sensors, systems, platforms, and algorithms including high resolution optical and acoustic sensing; underwater vehicles (AUV, ROV, towed and manned vehicles), unmanned surface vehicles, and unmanned aerial systems; system architectures for navigation, docking and power; and the interactions between these subsystems

SELECTED PUBLICATIONS

- C. Murphy, J. Walls, T. Schneider, H. Singh, et al.
CAPTURE: A Communications Architecture for Progressive Transmission via Underwater Relays with Eavesdropping, IEEE Journal of Oceanic Engineering, 39(1), 2014, 1-13
- H. Singh, W. Freeman, et al.
Camouflaging an Object from Many Viewpoints, Proceedings of the 2014 Computer Vision and Pattern Recognition Conference, 1-8
- K.E. Smith, H. Singh, H., et al.
Discovery of a Recent, Natural Whale Fall on the Continental Slope Off Anvers Island, Western Antarctic Peninsula, Deep Sea Research Part I: Oceanographic Research Papers, 90, 2014, 76-80
- G. Williams, J. Wilkinson, T. Maksym, H. Singh, C. Kunz, et al.
Mapping Ice Thickness and Extreme Deformation of Antarctic Sea Ice from an Autonomous Underwater Vehicle, Nature Geoscience, 8, 2014, 61-67
- M. Yi Cheung, J. Leighton, U. Mitra, H. Singh, F.S. Hover
Performance of Bandit Methods in Acoustic Relay Positioning, Proceedings of the 2014 Automatic Control Conference, 2014, 4708-4714
- C. Kunz, H. Singh
Map Building Fusing Acoustic and Visual Information Using Autonomous Underwater Vehicles, Journal of Field Robotics, 30(5), 2013, 1556-4967
- H. Singh, K. Nakamura, M. Jakobssen, T. Shank, et al.
Effusive and Explosive Volcanism on the Ultraslow-Spreading Gakkel Ridge, 85°E, Geochemistry, Geophysics, Geosystems, 13(10), 2012

EDUARDO SONTAG



University Distinguished Professor, Electrical and Computer Engineering; jointly appointed, Bioengineering (starting January 2018)

PhD, University of Florida, 1977
ece.neu.edu/people/sontag-eduardo

Feedback control theory, systems biology, cancer, and biomedicine

IEEE Control Systems Field Award; IFAC Fellow; AMS Fellow; SIAM Fellow; IEEE Fellow; Reid Prize in Applied Mathematics, SIAM

SELECTED PUBLICATIONS

E.D. Sontag

A Dynamical Model of Immune Responses to Antigen Presentation Predicts Different Regions of Tumor or Pathogen Elimination, *Cell Systems*, 4, 2017, 1-11

E.D. Sontag

Dynamic Compensation, Parameter Identifiability, and Equivariances, *PLoS Computational Biology*, 13, 2017, 1005447

S. Barish, M.F. Ochs, E.D. Sontag, J.L. Gevertz

Evaluating Optimal Therapy Robustness by Virtual Expansion of a Sample Population, with a Case Study in Cancer Immunotherapy, *Proceedings of the National Academy of Sciences*, 114, 2017, 6277-6286

F. Menolascina, R. Rusconi, V.I. Fernandez, S.P. Smriga,

Z. Aminzare, E.D. Sontag, R. Stocker

Logarithmic Sensing in *Bacillus Subtilis* Aerotaxis, *Nature Systems Biology and Applications*, 3, 2017, 16036

J. K. Kim, E.D. Sontag

Reduction of Multiscale Stochastic Biochemical Reaction Networks Using Exact Moment Derivation, *PLoS Computational Biology*, 13(6)m, 2017, 1005571

E.V. Nikolaev, E.D. Sontag

Quorum-Sensing Synchronization of Synthetic Toggle Switches: A Design Based on Monotone Dynamical Systems Theory, *PLoS Computational Biology*, 12, 2016, e1004881

SELECTED RESEARCH PROJECTS

Theory-Based Engineering of Biomolecular Circuits in Living Cells

Co-Principal Investigator, Air Force Office of Scientific Research

Model-Guided Discovery and Optimization of Navy-Relevant Cell-Based Sensors

Co-Principal Investigator, Office of Naval research

Design Principles of Molecular Computing Using Engineered Enzymes

Co-Principal Investigator, National Science Foundation

Self-Modifying and Fast Analog Molecular Computing with Designed Enzymes

Co-Principal Investigator, DARPA

DAGMAR STERNAD



Professor, Biology; jointly appointed: Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, University of Connecticut, 1995
ece.neu.edu/people/sternad-dagmar

Motor control and learning, variability and stability, virtual rehabilitation, dynamic modeling, rhythmic and discrete movements

as primitives for action

Klein Lectureship Award; Distinguished Lecturer on Life and the Sciences of Complexity, Center for the Ecological Study of Perception and Action

SELECTED PUBLICATIONS

S.W. Park, H. Marino, S. Charles, D. Sternad, N. Hogan

Moving Slowly is Hard for Humans: Limitations of Dynamic Primitives, *Journal of Neurophysiology*, 118(1), 2017, 69-83

P. Stein, E.L. Saltzman, K.G. Holt, D. Sternad

Is Failed Predictive Control a Risk Factor for Focal Dystonia?, *Motor Disorders*, 31(12), 2016, 1772-1777

C.J. Hasson, Z. Zhang, M.O. Abe, D. Sternad

Neuromotor Noise is Malleable by Amplification of Perceived Error, *PLoS Computational Biology*, 2016

M.E. Huber, N. Kuznetsov, D. Sternad

Persistence of Reduced Neuromotor Noise in Long-term Motor Skill Learning, *Journal of Neurophysiology*, 116(6), 2016, 2922-2935

SELECTED RESEARCH PROJECTS

Collaborative Research: Towards Robots with Human Dexterity
Principal Investigator, National Science Foundation

Collaborative Research: Challenging the Cognitive-control Divide
Principal Investigator, National Science Foundation

Predictability in Complex Object Control

Principal Investigator, National Institutes of Health

Quantification of Predictive Motor Impairments in Individuals with ASD

Principal Investigator, National Institutes of Health

CRCNS US-German-Israeli Collaborative Research Proposal: Hierarchical Coordination of Complex Actions.

Principal Investigator, National Science Foundation

Multi-Center Trial of Augmented Sensory Feedback in Children with Dyskinetic CP

Co-Investigator, National Institute of Health

MILICA STOJANOVIC



Professor, Electrical and Computer Engineering;
affiliated faculty, Bioengineering

PhD, Northeastern University, 1993
ece.neu.edu/people/stojanovic-milica

Wireless communications and networks,
underwater acoustic transmission,
statistical system characterization, adaptive
signal processing

Distinguished Technical Achievement Award, IEEE Ocean
Engineering Society; Fellow, Institute of Electrical and
Electronics Engineers

SELECTED PUBLICATIONS

R. Ahmed, M. Stojanovic

Joint Power and Rate Control for Packet Coding over Fading
Channels, IEEE Journal of Oceanic Engineering, 42(3),
2016, 697-710

Y. Aval, S.K. Wilson, M. Stojanovic

Capacity of Acoustic Channels and Practical Power-Allocation
Strategies, IEEE Journal of Oceanic Engineering, Special Issue
on Underwater Communications, 40(4), 2015, 785-795

Y. Aval, M. Stojanovic

Differentially Coherent Multichannel Detection of Acoustic
OFDM Signals, IEEE Journal of Oceanic Engineering, 40(2),
2015, 251-268

P. Qarabaqi, M. Stojanovic

Statistical Characterization and Computationally Efficient
Modeling of a Class of Underwater Acoustic Channels, IEEE
Journal of Oceanic Engineering, Special Issue on Underwater
Communications, 38(4), 2013, 701-717

S. Yerramalli, M. Stojanovic, U. Mitra

Partial FFT Demodulation: A Detection Method for Doppler
Distorted OFDM Systems, IEEE Transactions on Signal
Processing, 60(11), 2012, 5906-5918

J. Heidemann, M. Stojanovic, M. Zorzi

Underwater Sensor Networks: Applications, Advances, and
Challenges, Philosophical Transactions of the Royal Society A,
2012, 158-175

SELECTED RESEARCH PROJECTS

NeTS: Large: Collaborative Research: Exploration and
Exploitation in Actuated Communication Networks

Principal Investigator, National Science Foundation

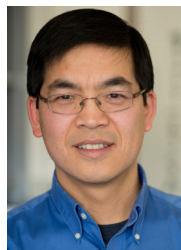
Intelligent Coordination and Adaptive Classification for Naval
Autonomous Systems

Principal Investigator, Office of Naval Research

MRI: Development of the Northeastern University Marine
Observatory Network (NU MONET)

Co-Principal Investigator, National Science Foundation

NIAN SUN



Professor, Electrical and Computer Engineering;
affiliated faculty, Bioengineering

PhD, Stanford University, 2002
ece.neu.edu/people/sun-nian-xiang

Magnetic, ferroelectric and magnetoelectric
materials; RF/microwave magnetic and
magnetoelectric devices design, fabrication
and testing; materials properties at RF/

microwave frequency; range self-assembly of magnetic
nanostructures

Fellow, Institute of Physics; Fellow, Institute of Engineering
and Technology; Office of Naval Research Young Investigator
Award; National Science Foundation CAREER Award; Søren Buus
Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

Z. Zhou, M. Trassin, Y. Gao, Y. Gao, D. Chen,...N.X. Sun

Probing Electric Field Control of Magnetism Using Ferromagnetic
Resonance, Nature Communications, 6, 2015, 6082

T. Nan, Y. Hui, M. Rinaldi, N.X. Sun

Self-biased 215MHz Magnetoelectric NEMS Resonator for
Ultra-sensitive DC Magnetic Field Detection, Scientific Reports,
3, 2013, 1985

M. Liu, Z. Zhou, T. Nan, B.M. Howe, G.J. Brown, N.X. Sun

Voltage Tuning of Ferromagnetic Resonance with Bistable
Magnetization Switching in Energy-Efficient Magnetoelectric
Composites, Advanced Materials, 25(10), 2013, 1435-1439

J. Lou, M. Liu, D. Reed, Y. Ren, N.X. Sun

Giant Electric Field Tuning of Magnetism in Novel Multiferroic
FeGaB/Lead Zinc Niobate Lead Titanate Heterostructures,
Advanced Materials, 21(46), 2009, 4711-4715

S.X. Wang, N.X. Sun, M. Yamaguchi, S. Yabukami

Sandwich Films: Properties of a New Soft Magnetic Material,
Nature, 407, 2000, 150-151

SELECTED RESEARCH PROJECTS

Integrated Thermoelectric Materials and Devices

Principal Investigator, Analog Devices, Incorporated

Multiferroic Materials for RF Applications

Principal Investigator, Defense Advanced Research Projects Agency

Nanofabricated Neural Probes with Ultra-sensitive Integrated
Compact RF NEMS Magnetoelectric Sensors for Electro-
magneto-brain Activity Mapping

Principal Investigator, Keck Foundation

Novel Multiferroic Heterostructures for Translational Compact
and Power Efficient Voltage Tunable Devices

Principal Investigator, National Science Foundation

Power Efficient Voltage Tunable Spin Hall Nano Oscillators with
Multiferroic Heterostructures

Principal Investigator, Air Force Research Laboratory

Sensitive and Selective Chemical Sensor Using Molecularly-
Imprinted Single Layer Graphene

Principal Investigator, Air Force

MARIO SZNAIER



Dennis Picard Trustee Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, University of Washington, 1989
ece.neu.edu/people/sznaier-mario

Robust control; reduced order models; video-based control; applications to dynamics in imaging and video processing; information extraction from high volume data streams

IEEE Control Systems Society Distinguished Member Award

SELECTED PUBLICATIONS

B. Yilmaz, C. Lagoa, M. Sznaiier

An Efficient Atomic Norm Minimization Approach to Identification of Low Order Models, 2013 IEEE 52nd Annual Conference on Decision and Control, 2013, 5834-5839

M. Ayazoglu, B. Yilmaz, M. Sznaiier, O. Camps

Finding Causal Interactions in Video Sequences, IEEE International Conference on Computer Vision, Sydney, 2013

C. Dicle, O. Camps, M. Sznaiier

The Way They Move: Tracking Multiple Targets with Similar Appearance, IEEE International Conference on Computer Vision, Sydney, Australia, 2013

K. Bekiroglu, M. Sznaiier, C. Lagoa, B. Shafai

Vision Based Control of an Autonomous Blimp with Actuator Saturation Using Pulse Width Modulation, Proceedings of the 2013 IEEE International Conference on Control Applications, 2013, 1036-1041

Y. Cheng, Y. Wang, M. Sznaiier

Worst Case Optimal Estimators for Switched Linear Systems, Proceedings of the 52nd IEEE Conference on Decision and Control, 2013, 4036-4041

SELECTED RESEARCH PROJECTS

Robust Identification and Model (in) Validation of Switched Hammerstein/Wiener Systems and Applications

Principal Investigator, National Science Foundation

SRINIVAS TADIGADAPA



Professor and Chair of Electrical and Computer Engineering (starting January 2018)

PhD, Cambridge University, 1994
ece.neu.edu/people/tadigadapa-srinvas

Sensor Devices and Smart Sensor Systems realized through interdisciplinary field of microelectromechanical systems (MEMS); including the design, optimization, fabrication, testing, and networking of such transducers; fabrication of novel micro and nano-sensors and actuators by integrating non-traditional materials using silicon planar microfabrication techniques and exploring phenomenon at the micro-nano interfaces; development of sustainable sensing solutions for biomedical applications including investigation of robust magnetic technologies for interfacing to the brain

IEEE Fellow; Alexander von Humboldt Fellowship in Germany; Walton Fellowship, Science Foundation of Ireland; Fellow of the Institute of Physics, London; Life-Fellow of the Cambridge Philosophical Society; Founding Editor-in-Chief of IEEE Sensors Letters Journal

SELECTED PUBLICATIONS

D. Gaddes, W. Brian Reeves, S. Tadigadapa

A Calorimetric Biosensing System for Quantification of Urinary Creatinine, ACS Sensors, 2017

E. Freeman, J. Harper, N. Goel, I. Gilbert, J. Unguris, S. Schiff, S. Tadigadapa

Improving The Magnetoelectric Performance of Metglas/Pzt Laminates by Annealing in Magnetic Field, Smart Materials & Structures, 2017

D. Kim, J. Kelly, N. Samarth, S. Tadigadapa

Microfabricated Testbench Designed to Measure Thermal and Thermoelectric Properties of Low-Dimensional Materials, Journal of Microelectromechanical Systems, 2017

H. Min, W. Zhang, C. Ashraf, D. Allara, A.C.T. Van Duin, S. Tadigadapa
Modified Random Sequential Adsorption Model For Understanding Kinetics of Proteins Adsorption at a Liquid-Solid Interface, Langmuir, 2017

D. Gaddes, H. Jung, A. Pena-Francesch, G. Dion, S. Tadigadapa, W.J. Dressick, M.C. Demirel

Self-Healing Textile: Enzyme Encapsulated Layer-By-Layer Structural Proteins, ACS Applied Materials & Interfaces, 8(31), 2016, 20371-20378

SELECTED RESEARCH PROJECTS

Implantable Brain Microelectromechanical Magnetic Sensing and Stimulation (MEMS-MAGSS)

Co-Principal Investigator, National Institutes of Health

GILEAD TADMOR



Professor, Electrical and Computer Engineering;
affiliated faculty, Bioengineering

PhD, Weizmann Institute of Science, 1984
ece.neu.edu/people/tadmor-gilead

Control systems; dynamical systems; low
order modeling and estimation in complex
systems; medical imaging

SELECTED PUBLICATIONS

- V. Troshin, A. Seifert, D. Sidilkover, G. Tadmor
Proper Orthogonal Decomposition of Flow-Field in Non-
Stationary Geometry, *Journal of Computational Physics*, 311,
2016, 329-337
- B. Erem, R. Martinez Orellana, D.E. Hyde, J.M. Peters, F.H. Duffy,
P. Stovicek, S.K. Warfield, R.S. MacLeod, G. Tadmor, D.H. Brooks
Extensions to a Manifold Learning Framework for Time Series
Analysis on Dynamic Manifolds in Bioelectric Signals, *Physical
Review E*, 93, 2016, 042218
- K. Aleksic-Roeßner, R. King, O. Lehmann, G. Tadmor, et al.
On the Need of Nonlinear Control for Efficient Model-based
Wake Stabilization, *Theoretical and Computational Fluid
Dynamics*, 28(1), 2014, 23-49
- L. Mirkin, T. Shima, G. Tadmor
Sampled-Data H^2 Optimization of Systems with I/O Delays via
Analog Loop Shifting, *IEEE Transactions on Automatic Control*,
59, 2014, 787-791
- M. Schlegel, B.R. Noack, P. Jordan, A. Dillman, G. Tadmor, et al.
On Least-Order Flow Representations of Aerodynamics and
Aeroacoustics, *Journal of Fluid Mechanics*, 697, 2012, 367-398
- S. Laxminarayan, G. Tadmor, et al.
Modeling Habituation in Rat EEG Evoked Responses via a Neural
Mass Model with Feedback, *Biological Cybernetics*, 105, 2011,
371-397
- A. Cavalieri, G. Daviller, P. Comte, P. Jordan, G. Tadmor, et al.
Using Large Eddy Simulation to Explore Sound-Source
Mechanisms in Jets, *Journal of Sound and Vibration*, 330, 2011,
4098-4113

EDMUND YEH



Professor, Electrical and Computer Engineering

PhD, Massachusetts Institute of
Technology, 2001
ece.neu.edu/people/yeh-edmund

Future internet architecture, cross-layer
design and optimization of wireless networks,
wireless network science, network economics,
wireless sensor networks, network information theory and
coding, smart power grids

Alexander von Humboldt Fellowship; Best Paper Award, IEEE
International Conference on Communications; Army Research
Office Young Investigator Program Award; Senior Member of the
Institute of Electrical and Electronics Engineers; Secretary, IEEE
Information Theory Society

SELECTED PUBLICATIONS

- E. Yeh, R.A. Berry
Throughput Optimal Control of Cooperative Relay Networks,
IEEE Transactions on Information Theory, 53(10), 2007,
3827-3833
- R.A. Berry, E. Yeh
Cross-Layer Wireless Resource Allocation, *IEEE Signal
Processing Magazine*, 21(5), 2004, 59-68
- E. Yeh, A.S. Cohen
Throughput and Delay Optimal Resource Allocation in
Multiaccess Fading Channels, *Proceedings of the International
Symposium on Information Theory (ISIT)*, Yokohama, Japan,
2003, 245
- L. Zhang, D. Estrin, J. Burke, V. Jacobson, E. Yeh, et al.
Named Data Networking (NDN) Project, Technical Report ndn-
0001, PARC, 2010
- A. Bedekar, S. Borst, K. Ramanan, P. Whiting, E. Yeh
Downlink Scheduling in CDMA Data Networks, *Global
Telecommunications Conference*, Rio De Janeiro, Brazil, 1999,
2653-2657

SELECTED RESEARCH PROJECTS

- Modeling, Analysis and Control for Robust Interdependent
Networks
Co-Principal Investigator, Defense Threat Reduction Agency
- NeTS: Small: Collaborative Research: Large Scale Networks and
Information Flow: From Emergent Behavior to Algorithm Design
Principal Investigator, National Science Foundation
- Scalable Distributed and Dynamic Forwarding and Caching
Algorithms for Named Data Networks
Principal Investigator, Cisco Systems, Incorporated

Brad J. Courville

PhD 2017, Electrical and Computer Engineering;
Advisor, David Kaeli

IMPROVED SIMULATION OF THE NVIDIA KEPLER MEMORY HIERARCHY THROUGH MICROBENCHMARKING

In this dissertation we utilize microbenchmarks to highlight a number of microarchitectural properties of an NVIDIA Kepler GPU. The goal is to develop an understanding of the memory access timings and cache parameters present in the Kepler memory hierarchy. This knowledge is then integrated into the Multi2sim Kepler model to improve simulation accuracy. These enhancements improve the timing accuracy of the MultiSim Kepler model by an average of 10.8% and a maximum of 26.8% with for memory intensive benchmarks when compared to physical hardware.

See full dissertation at coe.neu.edu/17/BradJCourville

Emre Can Demirors

PhD 2017, Electrical Engineering; Advisor, Tommaso Melodia

RECONFIGURABLE ARCHITECTURES FOR RF AND UNDERWATER ACOUSTIC WIRELESS NETWORKS

This dissertation will then discuss the design, implementation, and experimental evaluation of a new high-rate software-defined acoustic modem (SDAM) with real-time adaptation capabilities for UW-A communications. The proposed SDAM offers (i) higher data rates compared to existing commercial and experimental acoustic modems and (ii) capability of reconfiguring its physical layer in real time under rapidly varying environmental conditions. The performance of the proposed SDAM was evaluated in both water tank and lake environments.

See full dissertation at coe.neu.edu/17/EmreCanDemirors

Velin Dimitrov

PhD 2017, Electrical and Computer Engineering;
Advisor, Taskin Padiir

MODEL-BASED ROBOT CONTROL IN HUMAN-IN-THE-LOOP CYBER PHYSICAL SYSTEMS

In this dissertation we present a shared control architecture to enable the systematic design, modeling, and implementation of elements necessary for effective integration of robots in HiLCPS, with examples of systems in assistive, disaster, and space robotics. The implementation of shared control concepts in wheeled ground vehicles and bipedal humanoid robots are described in detail with emphasis on the challenges and problems encountered in their successful implementation. Additionally, contributions to the NASA RASC-AL Robo Ops Challenge, NASA Sample Return Robot Challenge, DARPA Robotics Challenge, and NASA Space Robotics Challenge are noted as examples of conducting research within the confines of competitive challenges. We identify common methods and concepts between the different applications of HiLCPS and show their progression and adaptation for different cross-domain implementations.

See full dissertation at coe.neu.edu/17/VelinDimitrov

Benjamin Drozdenko

PhD 2017, Computer Engineering; Advisor, Miriam Leeser

ENABLING PROTOCOL COEXISTENCE : HARDWARE-SOFTWARE CODESIGN OF WIRELESS TRANSCIVERS ON HETEROGENEOUS COMPUTING ARCHITECTURES

This dissertation introduces new Field Programmable Gate Array (FPGA)-based design techniques to receive multiple protocols on the same computing platform. Our methods incorporate tunable parameters, such as FIR filter length and number of bits per fixed-point word, to explore design tradeoffs regarding clock cycle, resource utilization, power consumption, and detection accuracy. This research separates the physical (PHY) layer receive chains into a set of building blocks, including rate transition, pattern detection, and Orthogonal Frequency Division Multiplexing (OFDM) demodulation. This research introduces a practical resampling technique to accommodate several protocol rates while taking FPGA resource utilization into account.

See full dissertation at coe.neu.edu/17/BenjaminDrozdenko

Sheng Li

PhD 2017, Computer Engineering; Advisor, Yun Fu

ROBUST DATA REPRESENTATIONS FOR VISUAL LEARNING

This dissertation aims to address the challenges in processing noisy visual data captured in real world. The proposed robust data representations have shown promising performance in a wide range of visual learning tasks, such as image clustering, face recognition, human motion segmentation, and multimodal classification.

See full dissertation at coe.neu.edu/17/ShengLi

Payden Wells McBee

PhD 2017, Electrical and Computer Engineering; Advisor, Jennifer G. Dy

EXPLORING FEATURE SETS FROM SATELLITE IMAGERY IN SOCIO-ECONOMIC PREDICTIONS IN SUB-SAHARAN AFRICA

In this thesis, we use information from remote sensing to provide that insight into stability. Remote sensing provides an avenue of analyzing regions in which other data collection methods may otherwise prove too dangerous or expensive. Our analysis concerns social science questions of neighborhoods in Sub-Saharan African countries. Specifically, we examine and derive feature sets from satellite imagery in order to improve the classification accuracy of survey questions concerning economic well-being and crime in Botswana, Kenya, and Zimbabwe. Using feature selection techniques on our current library, we determine that features relating to edge density and vegetation are most pertinent to the predictive capabilities of multiple classifiers.

See full dissertation at coe.neu.edu/17/PaydenWellsMcBee

Fanny Nina Paravecino

PhD 2017, Computer Engineering; Advisor, David Kaeli

CHARACTERIZATION AND EXPLOITATION OF NESTED PARALLELISM AND CONCURRENT KERNEL EXECUTION TO ACCELERATE HIGH PERFORMANCE APPLICATIONS

In this thesis, we present novel approaches to characterize application behavior that can exploit nested parallelism and concurrent kernel execution introduced on recent GPU architectures. To identify bottlenecks that can be improved through the exploitation of nested parallelism and concurrent kernel execution, we proposed a set of metrics for a range of GPU kernels.

See full dissertation at coe.neu.edu/17/FannyNinaParavecino

Stephanie White Quinn

PhD 2017, Electrical and Computer Engineering; Advisor, Michael B. Silevitch

ENERGY GLEANING TO INCREASE THE EFFICIENCY OF 2-AXIS TIME-POSITION TRACKING PHOTOVOLTAIC ARRAYS UNDER VARIABLY CLOUDY SKIES

This dissertation derives and validates a simple formula for directly calculating the optimal tilt angle of a 2-axis time-position tracking PV array under varying sky conditions. By modifying the conventional tilt angle as the sky conditions change, the tracking PV array can glean the additional small amounts of irradiation that are overlooked and unused on cloudy days. The validity of this formula was verified using 36 months of weather data from an installation in the northeastern United States where clear skies occur about 40% of the time. Simulations indicated that modifying the conventional tracking angles in response to changing cloud cover results in 2.26% increase in collected insolation and 2.33% increase in AC energy over a 36-month period when compared with conventional 2-axis time-position tracking.

See full dissertation at coe.neu.edu/17/StephanieWhiteQuinn

Alireza Rouhani

PhD 2017, Electrical Engineering; Advisor, Ali Abur

ROBUST DYNAMIC STATE ESTIMATION IN POWER SYSTEMS

This dissertation introduces an UKF based DSE which is named Constrained Iterated Unscented Kalman Filter (CIUKF). One of the main features of the proposed DSE is that it is capable to identify the unknown parameters of the synchronous generators such as inertia constants and transient reactances while estimating the dynamic state variables of the synchronous generator.

See full dissertation at coe.neu.edu/17/AlirezaRouhani

G. Enrico Santagati

PhD 2017, Computer Engineering; Advisor, Tommaso Melodia

ULTRASONIC NETWORKING TECHNOLOGIES FOR THE INTERNET OF IMPLANTABLE AND WEARABLE THINGS

This dissertation discusses the design and development of wireless networking technologies for implantable and wearable devices based on ultrasonic communications.

Wirelessly networked systems of implantable and wearable medical devices endowed with sensors and actuators will be the basis of many innovative, sometimes revolutionary therapies. However, biological tissues are composed primarily of water, and radio-frequency (RF) electromagnetic waves, which are the physical basis of currently used wireless technologies like Wi-Fi and Bluetooth, do not propagate well in water and heat body tissues. Additionally, RF communications can be easily jammed or eavesdropped, raising important privacy and security red flags, and a risk for the patient.

See full dissertation at coe.neu.edu/17/GENricoSantagati

Su Sheng

PhD 2017, Electrical Engineering; Advisor, Brad Lehman

PHOTOVOLTAIC NANOGRID: PARALLEL OPERATING INVERTERS AND ENERGY MANAGEMENT FLOW

This thesis first presents the design of a lightweight, compact and high reliability modified sine wave inverter. The inverter is integrated with foldable photovoltaic (PV) panel, maximum power point tracking (MPPT) charger and rechargeable battery to construct a portable PV nanogrid that can supply both DC and AC loads, for campers, hikers and especially soldiers on the move. This dissertation proposes methods to safely parallel the modified sine wave inverters without adding filtering inductors or capacitors. The methods merge approaches used to parallel pure sine wave inverters with methods sometimes used to parallel DC-DC converters. The developed approaches are then extended to parallel cascaded H-bridge multilevel inverters.

See full dissertation at coe.neu.edu/S17/SuSheng

Ramanathan Subramanian

PhD 2017, Electrical and Computer Engineering; Advisor, Kaushik Chowdhury

AN EXPERIMENTAL INVESTIGATION OF HOT SWITCHING CONTACT DAMAGE IN RF MEMS SWITCHES

This dissertation addresses several challenges in the design of medium access protocols for short-range wireless networks that can operate in distinct spectrum band(s). The publicly available code base, protocols, analytical models, algorithms and the insights resulting from simulation-based case studies will help researchers in significantly reducing the development time and effort. This will enable future reliable link layer designs and architecting robust network of radios, paving the way for the emergence of far-reaching wireless applications.

See full dissertation at coe.neu.edu/17/RamanathanSubramanian

Meenupriya Swaminathan

PhD 2017, Electrical and Computer Engineering;
Advisor, Kaushik Chowdhury

WIRELESS INTRA-BODY COMMUNICATION FOR IMPLANTABLE AND WEARABLE BODY DEVICES USING GALVANIC COUPLING

This dissertation addresses the unique challenges pertaining to signal propagation through human tissue and takes experimentally proven steps towards practical intra-body networking. The tissue channel models, algorithms, protocols and safety guidelines devised can be integrated to build continuous, safe and energy efficient intra-body wireless communication that connects multiple implants and wearables to external world, paving way for the emergence of revolutionary medical applications.

See full dissertation at coe.neu.edu/17/MeenupriyaSwaminathan

Jing Yang

PhD 2017, Electrical and Computer Engineering;
Advisor, Yong-Bin Kim

CLOCK DISTRIBUTION ON STANDING WAVE WITH CMOS ACTIVE INDUCTOR LOADING

In this thesis, we extend the idea of clock distribution with inductive loading further by applying CMOS active inductor as inductive loading. Compared to passive inductor design, active inductor can potentially achieve tunable design with reduced area overhead and high Q value. Moreover, it is compatible with CMOS technology process and easily integrated into chipsets. The thesis first presents a global clock distribution design by generating standing wave oscillations along inductively loaded micro-strip lines. Transmission line modeling is setting up and analyzed. An improved X-tree clock topology is employed and cross-coupled pair (CCP) is used to reduce loss on transmission line.

See full dissertation at coe.neu.edu/17/JingYang

Xin Xie

PhD 2017, Electrical Engineering; Advisor, Carol Livermore

HIGH PERFORMANCE MICRO ACTUATORS FOR TACTILE DISPLAYS

In this work, a new type of tactile actuator is designed, modeled, implemented, and characterized. The technologies needed to create these actuators are created as well. In these actuators, the small, in-plane motions from an extensional actuator are converted and amplified by a scissor mechanism into larger, out-of-plane motions that are suitable for tactile sensing by human finger pads. These actuators offer the possibility of providing large displacement and high force from a limited device area that is comparable to the resolution of human finger pads. The design, fabrication and characterization of several technology generations of MEMS-enabled, vibrational tactile actuators are presented. In the first generation, flexural hinges created by additive manufacturing and in photodefinable epoxy are used to implement the jointed scissor architecture. In the second generation, a down-scaled architecture is created by implementing flexural hinges in a more compact geometry and a laminated architecture.

See full dissertation at coe.neu.edu/17/XinXie

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DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

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360 Huntington Avenue
Boston, MA 02115

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COVER IMAGE

Anthony Bisculco, E'18, electrical engineering, works on a radar device in the Sica Lab in the Egan Research Center.

