Dear Colleagues and Students,

The Department of Electrical and Computer Engineering (ECE) at Northeastern University is happy to provide you with our annual Scholarship Report, describing the research and accomplishments of our esteemed faculty over the past year. This report serves as a reminder of the transformative and impactful research being done in ECE at Northeastern.

Two new tenure-track faculty joined our department, including Associate Professor Josep Jornet in the area of Networking and IoT and Assistant Professor Milad Siami in the area of Controls and Robotics. The year also saw the appointment of four new Research Professors namely: Dana Brooks, Emrecan Demirors, Sumientra Rampersad, and Zhenyun Qian. Additionally, we welcome two new Teaching Professors: Elena Bernal-Mor and Iman Salama.

In the last year, we formed three new research institutes and centers, including the Institute for the Wireless Internet of Things led by Professor Tommaso Melodia, the Institute for Experiential Robotics led by Associate Professor Taskin Padir, and the Northeastern SMART Center led by Associate Professor Matteo Rinaldi. In addition, the year saw several new projects being funded, such as continued funding at more than $4M for the Awareness and Localization of Explosives-Related Threats (ALERT) Center from the Department of Homeland Security led by COE Distinguished Professors Michael Silevitch and Carey Rappaport; a $4.3M grant by the National Science Foundation, entitled PAWR Platform POWDER-RENEW: A Platform for Open Wireless Data-driven Experimental Research with Massive MIMO Capabilities awarded to Professor Tommaso Melodia; and a $3.5M grant awarded to a team of faculty led by Associate Professor Kaushik Chowdhury for Advancing Warfighter Technologies by the US Navy, to name just a few.

Several of our faculty have also received prestigious recognitions. Professor Tommaso Melodia was named the William Lincoln Smith Chair Professor in ECE; Prof. Dagmar Sternad was named a University Distinguished Professor; Professor Bahram Shafai received the Lifetime Achievement Award from the World Automation Congress (WAC); Professors Mario Sznaier and Raymond Fu were named as Fellows of the IEEE; Professor Fu was also named Fellow of the Optical Society (OSA); and Assistant Professors Hui Fang and Pau Closas received CAREER Awards from the National Science Foundation. In addition, ECE faculty were granted 11 U.S. Patents in the last year.

These are just a few of the many research efforts and accomplishments in ECE. Several other highlights are featured in the Faculty Honors and Awards section of this Scholarship Report, and we hope you can come see all the exciting work being done in our wonderful department and college for yourself.

Sincerely,

Srinivas Tadigadapa
Chair of Electrical and Computer Engineering
s.tadigadapa@northeastern.edu
Electrical and Computer Engineering

The department offers 8 research concentrations and is either the lead or partner of 9 federally-funded research centers and institutes.

**New Research Institutes and Centers:**
- Institute for Experiential Robotics
- Institute for the Wireless Internet of Things
- Northeastern SMART Center

**$30M Annual Faculty Research Expenditures**

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<tr>
<th>Source</th>
<th>DHHS</th>
<th>NSF</th>
<th>Foundation/Non-Profit</th>
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<td>DOD</td>
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**RECENT HIRES**
- Josep Jornet
  PhD, Georgia Institute of Technology
- Milad Siami
  PhD, Lehigh University

**Masters Students**
- 298
  - 20% female

**Doctoral Students**
- 271
  - 24% female

**TENURED/TENURE-TRACK Faculty**
- 58

**Professional Society Fellows**
- Including 12 IEEE Fellows
- 24

**Young Investigator Awards, including 16 National Science Foundation CAREER Awards**
- 38

**New Research Institutes and Centers:**
- Institute for Experiential Robotics
- Institute for the Wireless Internet of Things
- Northeastern SMART Center

**College of Engineering**

With 185 tenured/tenure-track faculty and 16 multidisciplinary research centers and institutes with funding by eight federal agencies, the College of Engineering is a leader in experiential education and interdisciplinary research, with a focus on discovering solutions to global challenges to benefit society.

**NSF CAREER Awards**
- 48

**Engineering Departments**
- 5

**YOUNG INVESTIGATOR Awards**
- 90

**Graduate Students Placed on Co-op (2018-19)**
- 993

**STUDENTS ENROLLED**
- 8080
  - 52% Graduate
  - 1485 New MS (Fall 2018)
  - 48% Undergraduate
  - 675 New BS (Fall 2018)
Professor Yun Raymond Fu has been elevated to an IEEE Fellow, named a Fellow of The Optical Society, and selected as a distinguished member of the Association for Computing Machinery.

Dennis Picard Trustee Professor Mario Sznaier is a co-principal investigator for a $7.5M Department of Defense grant, in collaboration with the University of Texas at Austin and Princeton University, for a Multidisciplinary University Research Initiative (MURI) project aimed at developing artificial intelligence for UAVs. Sznaier was also elevated to an IEEE Fellow for his contributions to identification of switched systems and multiobjective control.

Assistant Professor Hui Fang has been awarded a $500K National Science Foundation CAREER Award for the project, “Transforming Neural Interfaces Using Stretchable, Transparent, Multifunctional Nanomesh Microelectrodes.”

William Lincoln Smith Chair Professor Tommaso Melodia is the founding director of Northeastern’s new Institute for the Wireless Internet of Things, which will help build the next generation of wireless technologies. The institute serves as the academic lead for the Platforms for Advanced Wireless Research Project Office, a $100 million public-private partnership to build city-scale testbeds for advanced wireless technologies, digital ecosystems, and how they can power IoT in new ways. Melodia was also selected as an IEEE Distinguished Lecturer.

Assistant Professor Bahram Shafai received the Lifetime Achievement Award from the World Automation Congress (WAC) 2018 for outstanding contributions to robust stability and control of multivariable systems and observer design for fault detection.

Assistant Professor Pau Closas received a CAREER Award from the National Science Foundation for “Secure and Ubiquitous Position, Navigation and Timing.”

Matteo Rinaldi, associate professor and director of the Northeastern SMART research center, was awarded a $1.7M grant from the U.S. Department of Energy’s Advanced Research Projects Agency-Energy (ARPA-E) for “Zero-Power Wireless Infrared Digitizing Sensors for Large Scale Energy-Smart Farm.”

Assistant Professor Sarah Ostadabbas is the Northeastern University principal investigator of a collaborative $1.2M National Science Foundation grant with the University of Pittsburgh on “SCH: INT: Collaborative Research: Detection, Assessment and Rehabilitation of Stroke-Induced Visual Neglect Using Augmented Reality (AR) and Electroencephalography (EEG).”

Assistant Professor Xue (Shelley) Lin, along with Associate Professor Thomas Wahl in the Khoury College of Computer Sciences, were awarded a $1.2M National Science Foundation grant for “Protecting Confidentiality and Integrity of Deep Neural Networks against Side-Channel and Fault Attacks.”

Assistant Professor Xue (Shelley) Lin will lead a $1.2M National Science Foundation grant, in collaboration with Professor Miriam Leeser and the University of Southern California, on developing “A Unified Software/Hardware Framework of DNN Computation and Storage Reduction Using ADMM.” The
The project aims to address the challenges when mapping complicated Deep Neural Network models into hardware for energy-efficient and performance-driven implementations needed by ubiquitous embedded and internet of things devices.

Professor Dagmar Sternad has been promoted to the rank of University Distinguished Professor, the highest honor the university can bestow upon a faculty member, for her achievements in the field of experimental and computational motor neuroscience.

Professor Deniz Erdogmus is a co-principal investigator for a $1M National Institutes of Health grant, in collaboration with the University of Southern California, for a “Multimodal Signal Analysis and Data Fusion for Post-Traumatic Epilepsy.” Erdogmus is also co-PI of a $600K National Science Foundation grant with Bioengineering Affiliated Professors Mary Jo Ondrechen (PI) and Penny Beuning (co-PI) for “Mining for Mechanistic Information to Predict Protein Function.”

Professor Hossein Mosallaei was awarded a $600K Air Force Office of Scientific Research (AFOSR) grant for “On-Demand Controllable Photonic Processors and Networks.” He was also awarded a $500K NASA grant for Optical Links for Space. In addition, his article published in Applied Physics Letters on “Neural Network Based Design of Metagratings” was selected as Editor’s Pick.

Associate Professor Kaushik Chowdhury (PI) along with Assistant Professor Stratis Ioannidis, William Lincoln Smith Chair Professor Tommaso Melodia, and Professor Jennifer Dy, received a $1.5M DARPA award to work on identifying unique radios using machine learning to identify their hardware signatures. The program aims to develop new methodologies and machine learning architectures that can correctly classify 10,000 devices with an accuracy of 99%.

Professor Nian Sun, Associate Professor Marvin Onabajo, and Assistant Professor Aatmesh Shrivastava were awarded a $1.3M National Institutes of Health collaborative grant with Massachusetts General Hospital to work on nano-scale neural radio frequency identification (NanoNeuroRFID) devices for wireless neural magnetic modulation and recording.

Professor Jose Martinez-Lorenzo (PI), mechanical and industrial engineering (MIE) and electrical and computer engineering (ECE), along with ECE Professor Tommaso Melodia, ECE Associate Professor Kaushik Chowdhury, ECE/MIE Professor Hanumant Singh, and ECE Affiliated Faculty Chris Amato were awarded a $1.5M Air Force Research Laboratory (AFRL) grant for “Robust Decentralized Classification and Coordination Algorithms for Swarms of Small Unmanned Aerial Systems.”

Associate Professor Devesh Tiwari was awarded a $500K grant from the National Science Foundation for “REYAZ: Reliability-Aware Job Scheduling for HPC Systems.” REYAZ will enable two novel capabilities: a reliability-aware job scheduling approach and a family of techniques to reduce the input/output overhead.

COE Distinguished Professor David Kaeli has received a $753K DARPA Software-Defined Hardware TA-2 grant, titled “Mitchell,” as part of a three-partner team to design a state-of-the-art domain-specific language for computationally challenging applications as well as develop supporting compiler/binary-optimization technology, with the goal for Mitchell to enable Intel's reconfigurable processors to achieve ASIC-like performance.
Isaac Kress, E/S'19, who graduated with both a chemistry and computer engineering degree, was awarded a Fulbright Fellowship, which he will use to conduct research on proteins in the brain at the Max Planck Institute of Biochemistry in Munich.

A group of Northeastern students, led by Associate Professor Taskin Padir, was selected as one of ten finalists in NASA’s 2019 Revolutionary Aerospace Systems Concepts – Academic Linkage (RASC-AL) Special Edition: Moon to Mars Ice and Prospecting Challenge for their project “Northeastern University Prospecting Underground Distilling Liquid Extractor (NU-PUDLE).”

Mo Han, PhD’22, Yagmur Gunay, PhD’21, and Ilkay Yildiz, PhD’22 received the Best Student Paper Award at the Pervasive Technologies Related to Assistive Environments (PETRA) conference, which took place in Rhodes, Greece, for their paper “From Hand-perspective Visual Information to Grasp Type Probabilities: Deep Learning via Ranking Labels.”

Dell EMC was issued a U.S. patent for an innovation that Yifan Sun, PhD’20, computer engineering, invented while on co-op at the company, and two other patent applications are pending. A recipient of Northeastern’s Outstanding Graduate Student Award for Experiential Learning, Sun developed a method to enable multiple clients to use the same graphics processing unit simultaneously. In addition to Dell EMC, Sun did a co-op at AMD and received a full time job offer upon graduation.

The Paradigm Hyperloop team, an international team of students from Northeastern University and Memorial University of Newfoundland & Labrador, placed eighth in the world, and third in North America at the 2019 SpaceX Hyperloop competition in California.
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<tr>
<th>Research Area</th>
<th>Faculty Members</th>
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<tbody>
<tr>
<td>Computer Networks &amp; Security</td>
<td>Stefano Basagni, Kaushik Chowdhury, Yunsi Fei, Engin Kirda, Tommaso Melodia, Wil Robertson</td>
</tr>
<tr>
<td>Communications, Control &amp; Signal Processing</td>
<td>Kaushik Chowdhury, Pau Closas, Jennifer Dy, Deniz Erdogmus, Yun Raymond Fu, Vinay Ingle, Stratis Ioannidis, Josep Jornet, Hanoch Lev-Ari, Jose Martinez Lorenzo, Tommaso Melodia, Sarah Ostadabbas, Purnima Ratiyal-Makris, Masoud Salehi, Bahram Shafai, Milad Siami, Hanumant Singh, Rifat Sipahi</td>
</tr>
<tr>
<td>Computer Systems &amp; Software</td>
<td>Yunsi Fei, David Kaeli, Mieczyslaw Kokar, Miriam Leeser, Xue Lin, Fabrizio Lombardi, Ningfang Mi, Gunar Schirner, Devesh Tiwari, Yanzhi Wang, Edmund Yeh</td>
</tr>
<tr>
<td>Computer Vision, Machine Learning, &amp; Algorithms</td>
<td>Octavía Camps, Jennifer Dy, Deniz Erdogmus, Yun Raymond Fu, Stratis Ioannidis, Jose Martinez Lorenzo, Waleed Meleis, Sarah Ostadabbas, Milad Siami, Hao Sun, Yanzhi Wang</td>
</tr>
<tr>
<td>Electromagnetics, Plasma, &amp; Optics</td>
<td>Charles DiMarzio, Vincent G. Harris, Yongmin Liu, Edwin Marengo, Jose Martinez Lorenzo, Carey Rappaport, Purnima Ratiyal-Makris, Michael B. Silevitch, Nian X. Sun</td>
</tr>
<tr>
<td>Microsystems, Materials &amp; Devices</td>
<td>Cristian Cassella, Hui Fang, Yong-Bin Kim, Nicol McGruer, Marvin Onabajo, Matteo Rinaldi, Aatmesh Shrivastava, Nian Sun, Srinivas Tadigadapa</td>
</tr>
<tr>
<td>Power Electronics, Systems &amp; Controls</td>
<td>Ali Abur, Mahshid Amirabadi, Bradley Lehman, Bahram Shafai, Milad Siami, Eduardo Sontag, Mario Sznaier</td>
</tr>
<tr>
<td>Robotics</td>
<td>Jose Martinez Lorenzo, Taskin Padir, Alireza Ramezani, Bahram Shafai, Milad Siami, Hanumant Singh, Rifat Sipahi</td>
</tr>
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</table>
ALI ABUR
Professor, Electrical and Computer Engineering
PhD, Ohio State University, 1985
coe.northeastern.edu/people/abur-ali

Scholarship focus: power system monitoring, estimation and optimization, fault location, and identification in power grids

Honors and awards: Fellow, Institute of Electrical and Electronics Engineers

SELECTED PUBLICATIONS
P. Ren, A. Abur
C. Xu, A. Abur
A Fast and Robust Linear State Estimator for Very Large Scale Interconnected Power Grids, IEEE Transactions on Smart Grid, 9(5), 2018, 4975-4982
A. Öner, A. Abur
Y. Lin, A. Abur
Y. Lin, A. Abur
Strategic Use of Synchronized Phasor Measurements to Improve Network Parameter Error Detection, IEEE Transactions on Smart Grid, 9(5), 2018, 5281-5290
P. Ren, H. Lev-Ari, A. Abur

SELECTED RESEARCH PROJECTS
Engineering Research Center for Ultra-Wide Area Resilient Electric Energy Transmission Network
Co-Principal Investigator, National Science Foundation
CRISP: Identification and Control of Uncertain, Highly Interdependent Processes Involving Humans with Applications to Resilient Emergency Health Response
Co-Investigator, National Science Foundation
Robust Distributed State Estimator for Interconnected Transmission and Distribution Networks
Principal Investigator, Department of Energy

MAHSHID AMIRABADI
Assistant Professor, Electrical and Computer Engineering
PhD, Texas A&M University, 2013
coe.northeastern.edu/people/amirabadi-mahshid

Scholarship focus: design, modeling and control of power converters, power electronics for renewable energy systems, microgrids, variable speed drives, and wireless power transfer

Honors and awards: Best Paper Award, Energy Conversion Congress and Exposition 2016

SELECTED PUBLICATIONS
M. Khodabandeh, E. Afshari, M. Amirabadi
A Family of Ćuk, Zeta, and SEPIC Based Soft-Switching DC–DC Converters, IEEE Transactions on Power Electronics, 34(10), 2019, 9503-9519
K. Mozaffari, M. Amirabadi
A Highly Reliable and Efficient Class of Single-Stage High-Frequency AC-Link Converters, IEEE Transactions on Power Electronics, 34(9), 2019, 8435-8452
E. Afshari, M. Khodabandeh, M. Amirabadi
M. Khodabandeh, E. Afshari, M. Amirabadi
A Single-Stage Soft-Switching High-Frequency AC-Link PV Inverter: Design, Analysis, and Evaluation of Si-Based and SiC-Based Prototypes, IEEE Transactions on Power Electronics, 34(3), 2019, 2312-2326
K. Mozaffari, M. Amirabadi
A Versatile Family of Partial-Resonance Inductive-AC-Link Universal Converters, IEEE Transactions on Power Electronics, 34(8), 2019, 7292-7309
K. Mozaffari, M. Amirabadi, Y. Deshpande

SELECTED RESEARCH PROJECTS
A New Class of Modular Power Converters for Next-Generation Shipboard Power Systems
Principal Investigator, Office of Naval Research
A Universal Converter for DC, Single-Phase AC, and Multi-Phase AC Systems
Principal Investigator, Advanced Research Projects Agency-Energy
STEFANO BASAGNI

Associate Professor, Electrical and Computer Engineering
PhD, University of Texas, Dallas, 2001
PhD, University of Milan, Italy, 1998
coe.northeastern.edu/people/basagni-stefano

Scholarship focus: wireless networks, ad hoc networks, underwater and terrestrial sensor networking, and protocol design and testing

Honors and awards: Distinguished Scientist of the Association for Computing Machinery

SELECTED PUBLICATIONS
V. Di Valerio, F. Lo Presti, C. Petrioli, L. Picari, D. Spaccini, S. Basagni
M. Tehrani Moayyed, B. Antonescu, S. Basagni
Clustering Validation for mmWave Multipath Components in Outdoor Transmissions, Proceedings of Wireless Days, 2019, 1–8
S. Basagni, V. Di Valerio, P. Gjanci, C. Petrioli
MARLIN-Q: Multi-Modal Communications for Reliable and Low-Latency Underwater Data Delivery, Ad Hoc Networks, (82), 2019, 134–145
S. Basagni, F. Ceccarelli, C. Petrioli, N. Raman, A.V. Sheshashayee
A.V. Sheshashayee, S. Basagni

SELECTED RESEARCH PROJECTS
MRI: SEANet: Development of a Software-Defined Networking Testbed for the Internet of Underwater Things
Co-Principal Investigator, National Science Foundation
Platforms for Advanced Wireless Research Project Office Co-Principal Investigator, National Science Foundation
PROTECT: A Millimeter-Wave Programmable Radio platform and Tactical WirelEss Communication Testbed
Co-Principal Investigator, Office of Naval Research

OCTAVIA CAMPS

Professor, Electrical and Computer Engineering
PhD, University of Washington, 1992
coe.northeastern.edu/people/camps-octavia

Scholarship focus: computer Vision, Machine Learning, Artificial Intelligence and Image Processing

SELECTED PUBLICATIONS
L. Wenqian, A. Sharma, O.I. Camps, M. Sznaier
M. Gou, F. Xiong, O.I. Camps, M. Sznaier
MoNet: Moments Embedding Network, In Proceedings 2018 IEEE Conference on Computer Vision and Pattern Recog. (CVPR), Salt Lake City, Utah, 2018
M. Sznaier, O.I. Camps

SELECTED RESEARCH PROJECTS
Collaborative Research: Data Driven Control of Switched Systems with Applications to Human Behavioral Modification
Co-Principal Investigator, National Science Foundation
Confocal Video-Mosaicking Microscopy to Guide Surgery of Superficially Spreading Skin Cancers
Principal Investigator, National Institutes of Health
Dynamic and Statistical Based Invariants on Manifolds for Video Analysis
Principal Investigator, National Science Foundation
Cristian Cassella

Assistant Professor, Electrical and Computer Engineering
PhD, Carnegie Mellon University, 2015
coe.northeastern.edu/people/cassella-cristian

Scholarship focus: acoustic resonators, nonreciprocal components, zero-power sensors for IoT, nonlinear dynamics, ultrasonic transducers

Honors and awards: Winner of the Marie Skłodowska-Curie Individual Fellowship

Selected Publications

C. Cassella, J. Segovia-Fernandez
High $K^2$, Exceeding 6.4% Through Metal Frames in Aluminum Nitride 2-D Mode Resonators, IEEE transactions on Ultrasonics, Ferroelectrics, and Frequency Control 66(5), 2019, 958-964

J.M. Puder, J.S. Pulskamp, R.R. Rudy, C. Cassella, M. Rinaldi, G. Chen, S. Bhave, R.G. Polcawich
Rapid Harmonic Analysis of Piezoelectric MEMS Resonators, IEEE Transactions on Ultrasonic Ferroelectrics, and Frequency Control, 6(65), 2018, 979-990

G. Chen, C. Cassella, T. Wu, M. Rinaldi

B. Gibson, K. Qalandar, C. Cassella, G. Piazza, K. Turner

Kaushik Chowdhury

Associate Professor, Electrical and Computer Engineering
PhD, Georgia Institute of Technology, 2009
coe.northeastern.edu/people/chowdhury-kaushik

Scholarship focus: dynamic spectrum access, energy harvesting sensor networks, 5G technology, intra-body communication, and protocol design for wireless

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

Selected Publications


R. Doost-Mohammady, M.Y. Naderi, K.R. Chowdhury

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

R.G. Cid-Fuentes, M.Y. Naderi, S. Basagni, K.R. Chowdhury, A. Cabellos-Aparicio, E. Alarcón

Selected Research Projects

CAREER: Integrated Data and Energy Access for Wireless Sensor Networks
Principal Investigator, National Science Foundation
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
PAU CLOSAS
Assistant Professor, Electrical and Computer Engineering
PhD, Universitat Politècnica de Catalunya, 2009
coe.northeastern.edu/people/closas-pau

Scholarship focus: 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

Honors and awards: National Science Foundation CAREER Award, 2019; Duran Farell for Technological Research; EURASIP Best PhD Thesis Award; 2016 Institute of Navigation Early Achievements Award

SELECTED PUBLICATIONS
J. Vilà-Valls, M. Navarro, P. Closas, M. Bertinelli
E. Arias-de-Reyna, P. Closas, D. Dardari, P.M. Djuric
D. Borio, H. Li, P. Closas
Huber’s Non-Linearity for GNSS Interference Mitigation, Sensors, 18(7), 2018, 2217
P. Closas, A. Gusi-Amigó
J. Vilà-Valls, P. Closas, J.T. Curran
Multi-frequency GNSS Robust Carrier Tracking for Ionospheric Scintillation Mitigation, Journal of Space Weather and Space Climate, 7, 2017, A26
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
D. Dardari, P. Closas, P. Djuric
Indoor Tracking: Theory, Methods, and Technologies, IEEE Transactions on Vehicular Technology, 64(4), 2015, 1263-1278

SELECTED RESEARCH PROJECTS
CAREER: Secure and Ubiquitous Position, Navigation and Timing
Principal Investigator, National Science Foundation
Securing GNSS-Based infrastructures
Principal Investigator, National Science Foundation

CHARLES DIMARZIO
Associate Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering, Mechanical and Industrial Engineering
PhD, Northeastern University, 1996
coe.northeastern.edu/people/dimarzio-charles

Scholarship focus: optics, microscopy, coherent detection, interaction of light and sound waves, hyperspectral imaging, diffusive optical tomography and ultrasound, lidar and remote sensing, multi-model imaging, Activities include: computer modeling, designing, building and testing of hardware, and processing the resulting data

SELECTED PUBLICATIONS
Z.R. Hoffman, C.A. DiMarzio
Z.R. Hoffman, C.A. DiMarzio
Super-Resolution Structured Illumination in Optically Thick Specimens Without Fluorescent Tagging, Journal of Biomedical Optics, 22(11), 2017, 1–11
A. Vakili, J.L. Hollmann, R.G. Holt, C.A. DiMarzio
Enhanced Tagging of Light Utilizing Acoustic Radiation Force with Speckle Pattern Analysis, Journal of Biomedical optics, 22(10), 2017, 106004
J.L. Hollmann, R. Horstmeyer, C. Yang, C.A. DiMarzio

SELECTED RESEARCH PROJECTS
Coded-Illumination Fourier Ptychography for High-Content MultiModal Imaging
Principal Investigator, National Science Foundation
Light Scattering Research
Principal Investigator, Draper Labs
JENNIFER DY

Professor, Electrical and Computer Engineering
PhD, Purdue University, 2001
coe.northeastern.edu/people/dy-jennifer

Scholarship focus: machine learning, data mining, statistical pattern recognition, computer vision, and image processing

Honors and awards: 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

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

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

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, University of Florida, 2002
coe.northeastern.edu/people/erdogmus-deniz

Scholarship focus: machine learning, signal and image analytics, cyber-human systems

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

SELECTED PUBLICATIONS
P. Gonzalez-Navarro, Y.M. Marghi, B. Azari, M. Akcakaya, D. Erdogmus
An Event-Driven AR-Process Model with Rapid Trial Sequences for EEG-Based BCIs, IEEE Transactions on Neural Systems and Rehabilitation Engineering, 2019, 798-804

O. Ozdenizci, D. Erdogmus
Information Theoretic Feature Transformation Learning for Brain Interfaces, IEEE Transactions on Neural Systems and Rehabilitation Engineering, 2019

S. Salehi, S. Khan, D. Erdogmus, A. Gholipour

A. Kocanaogullari, Y.M. Marghi, M. Akcakaya, D. Erdogmus

SELECTED RESEARCH PROJECTS
Autism Inpatient Collection Phase III
Co-Investigator, Simons Foundation Autism Research Initiative

Collaborative Research: Assistive Integrative Support Tool for Retinopathy of Prematurity
Principal Investigator, National Science Foundation

Collaborative Research: EEG-guided Electrical Stimulation for Immersive Virtual Reality
Co-Principal Investigator, National Science Foundation

Collaborative Research: Nested Control of Assistive Robots Through Human Intent Inference
Principal Investigator, National Science Foundation

Collaborative Research: Understanding Motor Cortical Organization Through Engineering Innovation to TMS-based Brain Mapping
Co-Principal Investigator, National Science Foundation
HUI FANG

Assistant Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering and Mechanical and Industrial Engineering
PhD, University of California, Berkeley, 2014
coe.northeastern.edu/people/fang-hui

Scholarship focus: nano-electronics, bio-electronics, materials surfaces and interfaces

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS
Transparent Arrays of Bilayer-Nanomesh Microelectrodes for Simultaneous Electrophysiology and 2-Photon Imaging in the Brain, Science Advances, 4(9), 2018, eaat0626
Capacitively Coupled Arrays of Multiplexed Flexible Silicon Transistors for Long-Term Cardiac Electrophysiology, Nature Biomedical Engineering, 1, 2017, 0038
Strong Interlayer Coupling In Van Der Waals Heterostructures Built From Single-Layer Chalcogenides, Proceedings of the National Academy of Sciences, 111, 2014, 6198-6202

SELECTED RESEARCH PROJECTS
Transforming Neural Interfaces Using Stretchable, Transparent, Multifunctional Nanomesh Microelectrodes
Principal Investigator, National Science Foundation
Transfer Printed, Single-Crystalline Si Nanomesh Thin Films
Principal Investigator, National Science Foundation

YUNSI FEI

Professor, Electrical and Computer Engineering
PhD, Princeton University, 2004
coe.northeastern.edu/people/fei-yunsi

Scholarship focus: computer architecture, embedded systems, hardware-oriented security, design automation, mobile computing, and underwater sensor networks

Honors and awards: National Science Foundation CAREER Award; College of Engineering Faculty Fellow

SELECTED PUBLICATIONS
P. Zhao, S. Wang, C. Gongye, Y. Wang, Y. Fei, X. Lin
P. Luo, K. Athanasiou, Y. Fei, T. Wahl
Algebraic Fault Analysis of SHA-3 Under Relaxed Fault Models, IEEE Trans. on Information Forensics and Security, 13(7), 2018
C. Luo, Y. Fei, D. Kaeli
Effective Simple-Power Analysis Attacks of Elliptic Curve Cryptography on Embedded Systems, ACM Int. Conf. Computer-Aided Design (ICCAD), 2018
C. Luo, Y. Fei, D. Kaeli
GPU Acceleration of RSA is Vulnerable to Side-Channel Timing Attacks, ACM Int. Conf. Computer-Aided Design (ICCAD), 2018
M. Sabbagh, Y. Fei, T. Wahl, A. Ding
SCADET: A side-Channel Attack Detection Tool for Tracking Prime+Probe, ACM International Conference Computer-Aided Design (ICCAD), 2018

SELECTED RESEARCH PROJECTS
Embedded Hardware-Based Security and Side Channel Analysis
Principal Investigator, Analog Devices
Protecting Confidentiality and Integrity of Deep Neural Networks against Side-Channel and Fault Attacks
Principal Investigator, National Science Foundation
STARSS: Side-Channel Analysis and Resiliency Targeting Accelerators
Co-Principal Investigator, National Science Foundation and Semiconductor Research Corporation
Automating Countermeasures and Security Evaluation Against Software Side-Channel Attacks
Principal Investigator, National Science Foundation
YUN RAYMOND FU

Professor, Electrical and Computer Engineering; jointly appointed, Computer Science
PhD, University of Illinois, 2008
coe.northeastern.edu/people/fu-yun

Scholarship focus: machine learning and computational intelligence, social media analytics, human-computer interaction, and cyber-physical systems

Honors and awards: IEEE Fellow; OSA Fellow; SPIE Fellow; IAPR Fellow; Office of Naval Research Young Investigator Award; Army Research Office Young Investigator Award; International Neural Network Society’s Young Investigator Award; IEEE CIS Outstanding Early Career Award; ACM Future of Computing Academy Member; Søren Buus Outstanding Research Award

SELECTED PUBLICATIONS
H. Liu, Z.G. Tao, Y. Fu
Partition Level Constrained Clustering, IEEE Transactions on Pattern Analysis and Machine Intelligence, 2018

S. Li, M. Shao, Y. Fu
Person Re-Identification by Cross-View Multi-Level Dictionary Learning, IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), 2018

K. Li, Z. Wu, K.C. Peng, J. Ernst, Y. Fu
Tell Me Where To Look: Guided Attention Inference Network, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018

J.P. Robinson, M. Shao, Y. Wu, H. Liu, T. Gillis, Y. Fu
Visual Kinship Recognition of Families In the Wild (FIW), IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), 2018

SELECTED RESEARCH PROJECTS
EAGER: Vision-Based Activity Forecasting by Mining Temporal Causalities
Principal Investigator, National Science Foundation

Deeply Learned Visual Commonsense and Its Applications
Principal Investigator, Samsung Global Research Outreach

Deep Structures Boosted Self-Organized Behavior Pattern Learning for Anomaly Detection
Principal Investigator, Office of Naval Research

VINCENT G. HARRIS

University Distinguished Professor, William Lincoln Smith Professor, Electrical and Computer Engineering; affiliated faculty, Chemical Engineering
PhD, Northeastern University, 1990
coe.northeastern.edu/people/harris-vincent

Scholarship focus: design and processing of advanced materials with emphasis on high frequency device applications for radar, communication, and sensing

Honors and awards: Fellow, Fulbright; 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
P. Andalib, Y. Chen, V.G. Harris
Concurrent Core Loss Suppression and High Permeability by Introduction of Highly Insulating Intergranular Magnetic Inclusions to MnZn Ferrite, IEEE Magnetics Letters, 9, 2018

Z. Zheng, Q. Feng, Y. Chen, V.G. Harris
High-Frequency Magnetic Properties of Ca-Substituted CoZ and CoW Barium Hexaferrite Composites, IEEE Transactions on Magnetics, 54 (6), 2018, 1-6

V.G. Harris, V. Šepelák

G. Li, Y. Chen, V.G. Harris
Particle-Size Distribution Modified Effective Medium Theory and Validation by Magnetoelectric Co-Ti Substituted BaM Ferrite Composites, Journal of Magnetism and Magnetic Materials, 453, 2018, 44-47

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

MAGnetics on GaN for Next GEneration T/R Systems
Principal Investigator, Defense Advanced Research Programs Agency, Subaward from Qorvo

Nonlinear Properties of Ferrite Materials
Principal Investigator, Raytheon
VINAY INGLE

Associate Professor, Electrical and Computer Engineering
PhD, Rensselaer Polytechnic Institute, 1981
coe.northeastern.edu/people/ingle-vinaykumar

Scholarship focus: multidimensional signal processing and hyperspectral imaging

SELECTED PUBLICATIONS
D. Manolakis, N. Bosowski, V. Ingle
M. Pieper, V. Ingle, D. Manolakis
M. Pieper, D. Manolakis, E. Truslow, T. Cooley, M. Brueggeman, J. Jacobson, A. Weisner, V. Ingle
V. Ingle, J. Proakis

SELECTED RESEARCH PROJECTS
Algorithms for Threat Detection
Principal Investigator, MIT Lincoln Lab
Anomaly Detection in Sequential Image Frames using Low-Rank Modeling
Principal Investigator, Massachusetts Institute of Technology Lincoln Lab
Investigation of Hyperspectral Target Detection Algorithms
Principal Investigator, MIT Lincoln Lab
Performance Modeling and Prediction for LWIR Hyperspectral Target Detection Systems
Principal Investigator, Massachusetts Institute of Technology Lincoln Lab

STRATIS IOANNIDIS

Assistant Professor, Electrical and Computer Engineering
PhD, University of Toronto, 2009
coe.northeastern.edu/people/ioannidis-stratis

Scholarship focus: distributed systems, networking, machine learning, big data, and privacy

SELECTED PUBLICATIONS
Accelerated Experimental Design for Pairwise Comparisons, SDM, 2019
A Severity Score for Retinopathy of Prematurity, KDD, 2019
Classification and Comparison via Neural Networks, Elsevier Journal of Neural Networks, 2019
M. Mahdian, A. Moharrer, S. Ioannidis, E. Yeh
Kelly Cache Networks, INFOCOM, 2019
J. Bento, S. Ioannidis
A Family of Tractable Graph Distances, SDM, 2018
A. Moharrer, S. Ioannidis
Distributing Frank-Wolfe via Map-Reduce, Knowledge and Information Systems Journal, 2018

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
CAREER: Leveraging Sparsity in Massively Distributed Optimization
Principal Investigator, National Science Foundation
Deep Learning Convolutional Neural Networks for Radio Identification
Co-Principal Investigator, Defence Advanced Research Projects Agency
Design and Computation of Scalable Graph Distances in Metric Spaces: A Unified Multiscale Interpretable Perspective
Principal Investigator, National Science Foundation
Massively Scalable Secure Computation Infrastructure Using FPGAs
Principal Investigator, National Science Foundation
JOSEP M. JORNET
Associate Professor, Electrical and Computer Engineering
PhD, Georgia Institute of Technology, 2013
coe.northeastern.edu/people/jornet-josep

Scholarship focus: terahertz communications, Wireless nano-bio-communication networks, Internet of Nano-Things

SELECTED PUBLICATIONS
Q. Xia, J.M. Jornet
Expedited Neighbor Discovery in Directional Terahertz Communication Networks Enhanced by Antenna Side-lobe Information, IEEE Transactions on Vehicular Technology, 2019
Optogenomic Interfaces: Bridging Biological Networks with the Electronic Digital World, Proceedings of the IEEE, 2019
Z. Hossain, C. Mollica, J. Federici, J.M. Jornet
Stochastic Interference Modeling and Experimental Validation for Pulse-based Terahertz Communication, IEEE Transactions on Wireless Communications, 99, 2019

SELECTED RESEARCH PROJECTS
CAREER: Realizing Ultra-Broadband Terahertz Communication Networks
Principal Investigator, National Science Foundation
Collaborative Research: Scaling WLANs in Spectrum, User Density, and Robustness
Co-Principal Investigator, National Science Foundation
An Integrated Testbed for True Terahertz Communications
Principal Investigator, National Science Foundation
Enabling Frequency-Agile Ultra-Broadband Airborne Networks in the THz Band
Principal Investigator, Air Force Research Lab
Networked Nanophotonic Devices for Stem Cell Regulation: From Optogenetics to Optogenomics
Principal Investigator, National Science Foundation

DAVID KAELI
COE Distinguished Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, Rutgers University, 1992
coe.northeastern.edu/people/kaeli-david

Scholarship focus: computer architecture, GPUs, heterogeneous computing, performance analysis, security and information assurance, hardware reliability and recovery, big data analytics, workload characterization

Honors and awards: 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
Analyzing and Increasing the Reliability of Convolutional Neural Networks on GPUs, IEEE Transactions on Reliability, 68(2), 2019, 663-677
L. Wang, X. Zhao, D. Kaeli, Z. Wang, L. Eeckhout
Intra-Cluster Coalescing and Distributed-Block Scheduling to Reduce GPU NoC Pressure, IEEE Transactions on Computers, 68(7), 2019, 1064-1076

SELECTED RESEARCH PROJECTS
A Framework of Simultaneous Acceleration and Storage Reduction on Deep Neural Networks Using Structured Matrices
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
TA2: Dynamic Hardware/Software Compilers for High-Level Languages
Principal Investigator, Defense Advanced Research Projects Agency Software-Defined Hardware Program
YONG-BIN KIM

Professor, Electrical and Computer Engineering
PhD, Colorado State University, 1996
coe.northeastern.edu/people/kim-yong-bin

Scholarship focus: 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
Area Efficient 4GB/s Clock Data Recovery Using Improved Phase Interpolator with Error Monitor, 2018 IEEE International Midwest Symposium on Circuits and Systems on Circuits and Systems (MWSCAS), Windsor, Canada, 2018, 206-209

Y. Choi, G. Jeon, Y.-B. Kim, H.K. Jung
Transceiver Design for LVSTL Signal Interface with a Low Power On-Chip Self Calibration Scheme, Elsevierie Integration the VLSI Journal, 63, 2018, 148-159

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

SELECTED RESEARCH PROJECTS

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

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

ENGIN KIRDA

Professor, Electrical and Computer Engineering; jointly appointed, Computer and Information Science
PhD, Technical University of Vienna, 2002
coe.northeastern.edu/people/kirda-engin

Scholarship focus: 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

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

L. Bilge, E. Kirda, C. Kruegel, M. Balduzzi

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

Collaborative: Automated Reverse Engineering of Commodity Software
Co-Principal Investigator, National Science Foundation
MIECZYSLAW KOKAR

Professor, Electrical and Computer Engineering

PhD, Wroclaw University of Technology, 1973
coe.northeastern.edu/people/kokar-mieczyslaw

Scholarship focus: cognitive radio; software engineering-self-controlling software; information fusion

SELECTED PUBLICATIONS

S. Lu, M.M. Kokar


J. Moskal, A. Whittington, M. Kokar, B. Abbott

S. Singh, M.M. Kokar

J. Moskal, M.M. Kokar, O. Hurez-Martin

Y. Chen, M.M. Kokar, J. Moskal, D. Suresh

L. Lechowicz, M.M. Kokar

SELECTED RESEARCH PROJECTS

Converged Collaborative Elements for RF Task Operations
Principal Investigator, Defense Advanced Research Projects Agency

MIRIAM LEESER

Professor, Electrical and Computer Engineering

PhD, Cambridge University, 1988
coe.northeastern.edu/people/leeser-miriam

Scholarship focus: accelerators for compute intensive applications: Field Programmable Gate Arrays (FPGAs) and graphics processing units (GPUs); applications including biocomputing, data privacy, machine learning, software-defined radio; uses and implementations of computer arithmetic

Honors and awards: Fulbright Scholar

SELECTED PUBLICATIONS


B. Drozdenko, M. Zimmermann, T. Dao, K. Chowdhury, M. Leeser

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

M. Blott, T.B. Preußer, N. Fraser, G. Gambardella, K. O’Brien, Y. Umuroglu, M. Leeser
Scaling Neural Network Performance Through Customized Hardware Architectures on Reconfigurable Logic, In 2017 IEEE International Conference on Computer Design (ICCD), 2017, 419-422

X. Fang, S. Ioannidis, M. Leeser

SELECTED RESEARCH PROJECTS

Massively Scalable Secure Computation Infrastructure Using FPGAs
Co-Principal Investigator, National Science Foundation
Hardware/Software Implementations of Wireless Communications for 5G and Beyond
Principal Investigator, Mathworks
BRAD LEHMAN

Professor, Electrical and Computer Engineering
PhD, Georgia Institute of Technology, 1992
coe.northeastern.edu/people/lehman-bradley

Scholarship focus: 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


SELECTED PUBLICATIONS
X. Zhang, Y. Li, S. Lu, H.F. Hamann, B. Hodge, B. Lehman,

M. Matam, V.R. Barry, B. Lehman
Performance Improvement of Dynamic PV Array Under Partial Shade Conditions Using M2 Algorithm, IET Renewable Power Generation, 13(8), 2019, 1239-1249

A.A. Stonier, B. Lehman

D.T. Khanmiri, R. Ball, B. Lehman

M. Forouzesh, Y.P. Siwakoti, S.A. Gorji, F. Blaabjerg, B. Lehman

SELECTED RESEARCH PROJECTS
Arc Fault Protection in Solar PV Systems
Principal Investigator, Mersen Corporation

S-STEM: Student-Pathways Opening World Engineering Resources
Principal Investigator, National Science Foundation

HANOCHE LEV-ARI

Professor, Electrical and Computer Engineering
PhD, Stanford University, 1984
coe.northeastern.edu/people/lev-ari-hanoch

Scholarship focus: adaptive filtering; statistical signal processing; networked dynamic state estimation; signal processing in electric energy systems

Honors and awards: Fellow, Institute of Electrical and Electronics Engineers

SELECTED PUBLICATIONS
P. Ren, A. Abur, H. Lev-Ari
Tracking Transmission Line Parameters in Power Grids Observed by PMUs, 13th IEEE PES PowerTech Conference, Milano, Italy, 2019

A. Ghanavati, H. Lev-Ari, A.M. Stankovic


B. Yan, H. Lev-Ari, A.M. Stankovic

P. Ren, H. Lev-Ari, A. Abur

P. Hajiyani, H. Lev-Ari, A.M. Stankovic

P. Ren, H. Lev-Ari, A. Abur

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  
coe.northeastern.edu/people/lin-xue

**Scholarship focus:** adversarial machine learning; deep learning acceleration and hardware implementation; cyber-physical systems

**SELECTED PUBLICATIONS**

P. Zhao, S. Wang, C. Gongye, Y. Wang, Y. Fei, X. Lin  

K. Xu, S. Liu, P. Zhao, P.-Y. Chen, H. Zhang, Q. Fan, D. Erdogmus, Y. Wang, X. Lin  

K. Xu, H. Chen, S. Liu, P.-Y. Chen, T.-W. Wen, M. Hong, X. Lin  
Topology Attack and Defense for Graph Neural Networks: an Optimization Perspective, Proceedings of International Joint Conferences on Artificial Intelligence Organization (IJCAI), 2019

P. Zhao, S. Liu, Y. Wang, X. Lin  
An ADMM-Based Universal Framework for Adversarial Attacks on Deep Neural Networks, Proceedings of ACM Multimedia (ACM MM), 2018

S. Wang, X. Wang, P. Zhao, D.Kaeli, P. Chin, X.Lin  
Defensive Dropout for Hardening Deep Neural Networks Under Adversarial Attacks, Proceedings of International Conference on Computer Aided Design (ICCAD), 2018

**SELECTED RESEARCH PROJECTS**

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

ADMM-NN: A Unified Software/Hardware Framework of DNN Computation and Storage Reduction Using ADMM  
Principal Investigator, National Science Foundation

Cultivating Robustness for Deep Learning  
Principal Investigator, Air Force Research Laboratory

**YONGMIN LIU**

Associate Professor, joint faculty appointment in Mechanical and Industrial Engineering and Electrical and Computer Engineering  
PhD, University of California, Berkeley, 2009  
coe.northeastern.edu/people/liu-yongmin

**Scholarship focus:** nano optics; nanoscale materials and engineering; nano devices; plasmonics; metamaterials; applied physics

**Honors and awards:** National Science Foundation CAREER Award, Office of Naval Research Young Investigator Award; SPIE Rising Researcher; 3M Non-Tenured Faculty Award, College of Engineering Faculty Fellow

**SELECTED PUBLICATIONS**

W. Ma, F. Cheng, Y.M. Liu  
Deep-Learning-Enabled On-Demand Design of Chiral Metamaterials, ACS Nano, 12(6), 2018, 6326–6334

Efficient Generation of Microwave Plasmonic Vortices via a Single Deep-Subwavelength Meta-Particle, Laser & Photonics Reviews, 12, 2018, 1800010

Origami-Based Reconfigurable Metamaterials for Tunable Chirality, Advanced Materials, 29, 2017, 1700412

K. Yao, Y.M. Liu  
Controlling Electric and Magnetic Resonances for Ultracompact Nanoantennas with Tunable Directionality, ACS Photonics, 3, 2016, 953-963

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

**SELECTED RESEARCH PROJECTS**

CAREER: Spin Plasmonics for Ultrafast All-Optical Manipulation of Magnetization in Hybrid Metal-Ferromagnet Structures  
Principal Investigator, National Science Foundation

Multi-Functional Optical Meta-Systems Enabled by Deep-Learning-Aided Inverse Design  
Principal Investigator, National Science Foundation
FABRIZIO LOMBARDI

ITC Endowed Professor, Electrical and Computer Engineering
PhD, University of London, 1982
coe.northeastern.edu/people/lombardi-fabrizio

Scholarship focus: fault-tolerant computing; VLSI CAD; testing, configurable computing, distributed systems

Honors and awards: 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

K. Namba, F. Lombardi

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

H.A.F. Almurib, F. Lombardi, T. Nandha Kumar

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 Magnetoelastic 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

EDWIN MARENGO

Associate Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, Northeastern University, 1997
coe.northeastern.edu/people/marengo-fuentes-edwin

Scholarship focus: 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

Honors and awards: National Science Foundation CAREER Award

SELECTED PUBLICATIONS

E.A. Marengo, E. S. Galagarza, R. Solimene

E.A. Marengo
Quasi-Born Approximation Scattering and Inverse Scattering of Multiple Scattering Targets, IET Radar, Sonar and Navigation, 11, 2017, 1276-1284

J. Tu, E.A. Marengo

E.A. Marengo, J. Tu

E.A. Marengo, J. Tu
Optical Theorem Detectors for Active Scatterers, Waves in Random and Complex Media, 25, 2015, 682-707

E.A. Marengo

E.A. Marengo

E.A. Marengo, J. Tu

E.A. Marengo
JOSE MARTINEZ LORENZO

Associate Professor, Mechanical and Industrial Engineering; jointly appointed, Electrical and Computer Engineering
PhD, University of Vigo, 2005
coe.northeastern.edu/people/martinez-lorenzo-jose-angel

Scholarship focus: 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
A. Molaei, A. Bisulco, L. Tirado, A. Zhu, D. Cachay, A.G. Dagheyan, and J.A. Martinez-Lorenzo
3D Printed E-Band Compressive Horn Antenna for High- Sensing-Capacity Imaging Applications, IEEE Antennas and Wireless Propagation Letters, 2018, 1
J.L. Crespo-Vázquez, C.J.C. Gonzalez, E. Díaz-Dorado, J.A. Martinez-Lorenzo, M. Noor-E-Alam
A.G. Dagheyan, C. Liu, A. Molaei, J.H. Juesas, J.A. Martinez-Lorenzo
Holey-Cavity-Based Compressive Sensing for Ultrasound Imaging, Sensors, 18(6), 2018, 1674
J.H. Juesas, J.E. Thatcher, Y. Lu, J.J. Squiers, D. King
W. Fan, J.M. DiMaio, J.A. Martinez-Lorenzo
Y. Rodríguez-Vaqueiro, P. Paayam, R. Sipahi, J.A. Martinez-Lorenzo

SELECTED RESEARCH PROJECTS
CAREER: 4D mm-Wave Compressive Sensing and Imaging at One Thousand Volumetric Frames per Second
Principal Investigator, National Science Foundation
Improved Millimeter Wave Radar AIT Characterization of Concealed Low-Contrast Body-Borne Threats
Co-Principal Investigator, Department of Homeland Security

NICOL MCGRUER

Professor, Electrical and Computer Engineering; affiliated faculty: Mechanical and Industrial Engineering, Bioengineering
PhD, Michigan State University, 1983
coe.northeastern.edu/people/mcgruer-nicol

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

Honors and awards: Søren Buus Outstanding Research Award, College of Engineering, Joel and Spira Excellence in Teaching Award

SELECTED PUBLICATIONS
Z. Qian, S. Kang, V. Rajaram, C. Cassella, N.E. McGruer, M. Rinaldi
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
Y.-C. Wu, N. McGruer, G.G. Adams
Hot-Switched Lifetime and Damage Characteristics of MEMS Switch Contacts, Journal of Micromechanics and Microengineering, 23(5), 2013, e055003

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
TOMMASO MELODIA

William Lincoln Smith Professor, Electrical and Computer Engineering; Director, Institute for the Wireless Internet of Things

PhD, Georgia Institute of Technology, 2007
coe.northeastern.edu/people/melodia-tommaso

Scholarship focus: 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

Honors and awards: National Science Foundation CAREER Award, IEEE Fellow, IEEE Communications Society Distinguished Lecturer, Soren Buus Outstanding Research Award

SELECTED PUBLICATIONS

L. Zhang, F. Restuccia, T. Melodia, S. Pudlewski

S. D’Oro, F. Restuccia, A. Talamonti, T. Melodia

F. Restuccia, S. D’Oro, A. Al-Shawabka, M. Belgiovin, L. Angioloni, S. Ioannidis, K. Chowdhury, T. Melodia

WALEED MELEIS

Interim Associate Dean of Graduate Education, Associate Professor and Electrical and Computer Engineering; affiliated faculty, Bioengineering

PhD, University of Michigan, 1996
coe.northeastern.edu/people/meleis-waleed

Scholarship focus: combinatorial optimization; algorithm design and analysis; scheduling; large-scale machine learning; parallel computing

Honors and awards: COE Outstanding Faculty Service Award, 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, W. Meleis
Adaptive Adjacency Kanerva Coding for Memory-Constrained Reinforcement Learning, In International Conference on Machine Learning and Data Mining in Pattern Recognition (MLDM), Springer, New York, 2018

D. Levac, H. Dumas, W. Meleis
Development and Preliminary Usability Evaluation of a Tablet-Based Interactive Movement Tool for Pediatric Rehabilitation, JMIR Rehabilitation Assistive Technologies 25(2), 2018, e1030

W. Li, F. Zhou, K. Chowdhury, W. Meleis

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 Paolo, Brazil, 2017

NINGFANG MI

Associate Professor, Electrical and Computer Engineering
PhD, College of William and Mary, 2009
coe.northeastern.edu/people/mi-ningfang

Scholarship focus: capacity planning; MapReduce/Hadoop scheduling; cloud computing; resource management; performance evaluation; workload characterization; simulation

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

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

Y. Yao, H. Gao, J. Wang, B. Sheng, N. Mi

J. Bhimani, Z. Yang, N. Mi, J. Yang, Q. Xu, M. Awasthi, R. Pandurangan, V. Balakrishnan

J. Bhimani, N. Mi, Z. Yang, J. Yang, R. Pandurangan, C. Choi, V. Balakrishnan
FIOS: Feature Based I/O Stream Identification for Improving Endurance of Multi-Stream SSDs, IEEE International Conference on Cloud Computing (CLOUD’18), 2018


SELECTED RESEARCH PROJECTS
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
coe.northeastern.edu/people/mosallaei-hossein

Scholarship focus: electromagnetics and optics; quantum systems; nanoscale materials and metamaterials, nanoantennas; THz-IR-Visible Devices; multiscale computation and mathematical-numerical models

SELECTED PUBLICATIONS
A. Forouzmand, M.M. Salary, S. Inampudi, H. Mosallaei
A Tunable Multigate Indium-Tin-Oxide-Assisted All-Dielectric Metasurface, Advanced Optical Materials, 6(7), 2018, 1701275

A. Forouzmand, H. Mosallaei
Dynamic Beam Control via Mie-Resonance Based Phase-Change Metasurface: A Theoretical Investigation, Optics Express, 26(14) 2018

S. Inampudi, J. Cheng, M.M. Salary, H. Mosallaei
Unidirectional Thermal Radiation from SiC Metasurface, Journal of the Optical Society of America B, 35(1), 2018

M.M. Salary, S. Inampudi, H. Mosallaei

Electromagnetic Study of the Chlorosome Antenna Complex of Chlorobium-Tepidum, ACS Nano, 2014

J. Cheng, D. Ansari, H. Mosallaei
Wave Manipulation with Designer Dielectric Metasurfaces, Optics Letters, 39(21), 2014, 6285-6288

SELECTED RESEARCH PROJECTS
Nanoantennas for Engineering Waves on the Surface
Principal Investigator, Air Force Office of Scientific Research
MARVIN ONABAJO
Associate Professor, Electrical and Computer Engineering
PhD, Texas A&M University, 2011
coe.northeastern.edu/people/onabajo-marvin

Scholarship focus: 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

Honors and awards: National Science Foundation CAREER Award; Martin Essigman Outstanding Teaching Award, College of Engineering; ARO Young Investigator Program Award

SELECTED PUBLICATIONS
M.A.A. Ibrahim, M. Onabajo

C.H. Chang, M. Onabajo

G. Jha, M.A.A. Ibrahim, M. Onabajo

SELECTED RESEARCH PROJECTS
An On-Chip Thermal Sensing Method to Detect Malicious Integrated Circuits
Principal Investigator, Army Research Office
CAREER: Low-Power Transceiver Design Methods for Wireless Medicalx Monitoring
Principal Investigator, National Science Foundation
Novel Implantable Smart Magnetoelastic NanoRFIDs for Large-Scale Neural Magnetic Recording and Modulation
Co-Principal Investigator, National Institutes of Health
Ultra-Low Power Analog Computing and Dry Skin-Electrode Contact Interface Design Techniques for Systems-On-A-Chip with EEG Sensing and Feature Extraction
Co-Principal Investigator, National Science Foundation

SARAH OSTADABBAS
Assistant Professor, Electrical and Computer Engineering
PhD, University of Texas at Dallas, 2014
coe.northeastern.edu/people/ostadabbas-sarah

Scholarship focus: machine learning/ pattern recognition; computer vision, affective computing, human-machine interaction

SELECTED PUBLICATIONS
S. Liu, Y. Yin, S. Ostadabbas
In-Bed Pose Estimation: Deep Learning with Shallow Dataset, Journal of Translational Engineering in Health and Medicine (JTEHM), 7(1), 2019, 1-12

C. Chou, X. Jin, A. Mueller, S. Ostadabbas
Multimodal Data Fusion—Moving from Domain-Specific Algorithms to Trans-Domain Understanding for Accelerated Solution Development, Multimodal Data Fusion (MMDF) Special Issue, IEEE Sensors Letters, 3(1), 2019, 1-4

B. Rezaei, S. Ostadabbas
Moving Object Detection through Robust Matrix Completion Augmented with Objectness, IEEE Journal of Selected Topics in Signal Processing (J-STSP), 2018

S. Liu, S. Ostadabbas
Inner Space Preserving Generative Pose Machine, European Conference on Computer Vision, 2018, Munich, Germany

Y. Yin, M. Nabian, M. Fan, C. Chou, M. Gendron, S. Ostadabbas
Facial Expression and Peripheral Physiology Fusion to Decode Individualized Affective Experience, Affective Computing Workshop of the 27th International Joint Conference on Artificial Intelligence (IJCAI-2018)

A. Farnoosh, M. Nabian, P. Closas, S. Ostadabbas

S. Liu, S. Ostadabbas
A Vision-Based System for In-Bed Posture Tracking, Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (ICCV/ACVR’17) 1373-1382

SELECTED RESEARCH PROJECTS
CRII: SCH: Semi-Supervised Physics-Based Generative Model for Data Augmentation and Cross-Modality Data Reconstruction
Principal Investigator, National Science Foundation
NCS-FO: Leveraging Deep Probabilistic Models to Understand the Neural Bases of Subjective Experience
Co-Principal Investigator, National Science Foundation-Neural and Cognitive Systems
TASKIN PADIR

Associate Professor, Electrical and Computer Engineering; affiliated faculty Mechanical and Industrial Engineering
PhD, Purdue University, 2004
coe.northeastern.edu/people/padir-taskin

Scholarship focus: humanoid robots; dexterous manipulation; model-based robot design; human- supervised robot autonomy; medical cyber-physical systems

Honors and awards: Kalenian Award for Entrepreneurial Spirit; HEART: Humans Empowered with Assistive Robot Technologies; COE Fostering Engineering Innovation in Education Award

SELECTED PUBLICATIONS
A.O. Onol, P. Long, T. Padir
Contact-Implicit Trajectory Optimization Based on a Variable Smooth Contact Model and Successive Convexification, IEEE International Conference on Robotics and Automation (ICRA), 2019

M. Zhong, J. Wu, Y. Yan, J. Hajjar, T. Padir

X. Long, M. Wonsick, V. Dimitrov, T. Padir

X. Long, P. Long, T. Padir

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

Collaborative Research: Cooperative Control of Humanoid Robots for Remote Operations in Nuclear Environments
Principal Investigator, Department of Energy

Collaborative Robotics to Foster Innovation in Seafood Handling
Principal Investigator, Advanced Robotics for Manufacturing (DOD)

ALIREZA RAMEZANI

Assistant Professor, Electrical and Computer Engineering
PhD, University of Michigan, 2014
coe.northeastern.edu/people/ramezani-alireza

Scholarship focus: analysis and feedback control of nonlinear systems; control of bipedal and aerial robot locomotion; bio-inspired robotics

SELECTED PUBLICATIONS
J. E. Hoff, A. Ramezani, S.-J. Chung, S. Hutchinson
Optimizing the Structure and Movement of a Robotic Bat with Biological Kinematic Synergies, International Journal of Robotics Research (IJRR), 37(10), 2018, 1233-1252

A. Ramezani, S.-J. Chung, S. Hutchinson
A Biomimetic Robotic Platform to Study Flight Specializations of Bats, Science (Robotics-AAAS), 2(3), 2017, eaal2505

A. Ramezani, X. Shi, S.-J. Chung, S. Hutchinson

A. Ramezani, X. Shi, S.-J. Chung, S. Hutchinson

J. E. Hoff, A. Ramezani, S.-J. Chung, S. Hutchinson
Synergistic Design of a Bio-Inspire Micro Aerial Vehicle with Articulated Wings, Robotics Science and Systems Conference (RSS), University of Michigan, Ann Arbor, MI, 2016
PURNIMA RATILAL-MAKRIS
Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, Massachusetts Institute of Technology, 2002
coe.northeastern.edu/people/ratilal-makris-purnima

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

Honors and awards: Fellow, Acoustical Society of America; Presidential Early Career Award for Scientists and Engineers; Office of Naval Research Young Investigator Award

SELECTED PUBLICATIONS
Detection, Localization and Classification of Multiple Mechanized Ocean Vessels over Continental-Shelf Scale Regions with Passive Ocean Acoustic Waveguide Remote Sensing, Remote Sensing, 10(11), 2018, 1699

D. Wang, P. Ratilal

SELECTED RESEARCH PROJECTS
Awareness and Localization of Explosive-Related Threats (ALERT)
Co-Principal Investigator, Department of Homeland Security

CAREY RAPPAPORT
COE Distinguished Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering; Associate Director, CenSSIS
PhD, Massachusetts Institute of Technology, 1987
coe.northeastern.edu/people/rappaport-carey

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

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

SELECTED PUBLICATIONS
M. Tajdini, B. Gonzalez-Valdes, J.A. Martinez-Lorenzo, A. Morgenthaler, C. Rappaport

Y. Fuse, B. Gonzalez-Valdes, J.A. Martinez-Lorenzo, C. Rappaport
Model-Based Clutter Reduction Method for Forward Looking Ground Penetrating Radar Imaging Ground Penetrating Radar, 1(2), 2018, 96-112

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

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-Bourne Threats
Principal Investigator, Department of Homeland Security
MATTEO RINALDI
Associate Professor, Electrical and Computer Engineering
PhD, University of Pennsylvania, 2010
coe.northeastern.edu/people/rinaldi-matteo

Scholarship focus: 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.

Honors and awards: 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

C. Cassella, G. Chen, Z. Qian, G. Hummel, M. Rinaldi

Y. Hui, J. S. Gomez-Diaz, Z. Qian, A. Alu’, M. Rinaldi

Z. Qian, F. Liu, Y. Hui, S. Kar, M. Rinaldi

SELECTED RESEARCH PROJECTS
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

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

WILLIAM ROBERTSON
Assistant Professor, Computer & Information Science; jointly appointed, Electrical and Computer Engineering
PhD, University of California, Santa Barbara, 2009
coe.northeastern.edu/people/robertson-wil

Scholarship focus: trustworthy computing architectures; web security; statistical machine learning for anomaly detection; malware analysis using adversarial program analysis; reverse engineering; intrusion detection.

SELECTED PUBLICATIONS

M. Weissbacher, W. Robertson, E. Kirda, C. Kruegel, G. Vigna

C. Mulliner, W. Robertson, E. Kirda

M. Weissbacher, T. Lauinger, W. Robertson

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
coe.northeastern.edu/people/salehi-masoud

Scholarship focus: error correcting codes; information theory; digital communications

SELECTED PUBLICATIONS
K. Firouzbakht, G. Noubir, M. Salehi
Multi-Carrier Jamming Mitigation: A Proactive Game Theoretic Approach, in Proactive and Dynamic Network Defense, Springer Verlag, 2019, 249-264
M. Sadeghzadeh, M. Maleki, M. Salehi
Large-Scale Analysis of Regularized Block Diagonalization Precoding for Physical Layer Security of Multi-User MIMO Wireless Networks, IEEE Transactions on Vehicular Technology, 68(6), 2019, 5820-5834
M. Sadeghzadeh, M. Maleki, M. Salehi, H.R. Bahrami
M. Sadeghzadeh, M. Maleki, M. Salehi, H. 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
M. Sadeghzadeh, M. Maleki, M. Salehi
Large Scale Analysis of Regularized Block Diagonalization Precoding for Physical Layer Security in Multi-User Wireless Networks, IEEE Globecom Conference, Singapore, 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, 2014, 569-574
J.G. Proakis, M. Salehi

GUNAR SCHIRNER
Associate Professor, Electrical and Computer Engineering
PhD, University of California, Irvine, 2008
coe.northeastern.edu/people/schirner-gunar

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

SELECTED PUBLICATIONS
N. Teimouri, H. Tabkhi, G. Schirner
J. Zhang, H. Tabkhi, G. Schirner
DS-DSE: Domain-Specific Design Space Exploration for Streaming Applications, Design Automation and Test in Europe (DATE), Dresden, Germany, March 2018
N. Teimouri, H. Tabkhi, G. Schirner
Improving Scalability of CMPs with Dense ACCs Coverage, Design Automation and Test in Europe (DATE), Dresden, Germany, March 2016
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
C. Zhang, H. Tabkhi, G. Schirner
Studying Inter-Warp Divergence Aware Execution on GPUs, IEEE Computer Architecture Letters, 15(2), 2015, 117-120
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

SELECTED RESEARCH PROJECTS
Collaborative Research: Nested Control of Assistive Robots through Human Intent Inference
Co-Principal Investigator, National Science Foundation
Domain-Specific Computing enabling Real-Time AI Inference on the Edge for Expeditionary Cyber Missions
Principal Investigator, Office of Naval Research
BAHRAM SHAFAI
Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, George Washington University, 1985
coe.northeastern.edu/people/shafai-bahram

Scholarship focus: control systems; digital signal processing; robust and optimal control

Honors and awards: Associate Editor, Editorial Board and Program Chair of ISIAC-WAC; Senior Life Member, Institute of Electrical and Electronics Engineers, Lifetime Achievement Award from World Automation Congress, 2018; Certificate of Appreciation for Technical Seminar Institute of Electrical and Electronics Engineers, Young Professionals

SELECTED PUBLICATIONS
G. Eftekhari Yazdi, H. Nezamfar, M. Moghadamfalahi, M. Akcakaya, B. Shafai, D. Erdogmus
A. Oghbaee, B. Shafai, S. Nazari
A. Oghbaee, B. Shafai
Eigenvalue Assignment for Positive Discrete-Time Linear Systems, *Proceedings of ISIAC-WAC*, 2018
S. Nazari, B. Shafai
S. Nazari, B. Shafai, A. Oghbaee
B. Shafai, C. Li
A. Oghbaee, B. Shafai, M. Sznaier

AATMESH SHRIVASTAVA
Assistant Professor, Electrical and Computer Engineering
PhD, University of Virginia, 2014
coe.northeastern.edu/people/shrivastava-aatmesh

Scholarship focus: ultra-low Power circuits and systems, analog computing, precision circuits, hardware security

SELECTED PUBLICATIONS
N. Mirchandani, A. Shrivastava
CMOS Based Ultra-Low Power High-Precision Analog Vector Matrix Multiplication Circuit with ±0.1% Error for Vision Application, *Midwest Symposium on Circuits and Systems (MWSCAS)-Invited*, 2019
N. Mirchandani, A. Shrivastava
N. Shafiee, S. Tewari, B. Calhoun, A. Shrivastava
Infrastructure Circuits for Lifetime Improvement of Ultra-Low Power IoT Devices, in *IEEE Transactions on Circuits and Systems I: Regular Papers*, 64(9), 2017, 2598-2610
A. Shrivastava, D. Akella Kamakshi, B.H. Calhoun
A 1.5 nW, 32.768 kHz XTAL Oscillator Operational From A 0.3 V Supply, *IEEE Journal of Solid-State Circuits*, 51(3), 2016, 686-696

SELECTED RESEARCH PROJECTS
Ultra-Low Power Analog Computing and Dry Skin-Electrode Contact Interface Design Techniques for Systems-On-A-Chip with EEG Sensing and Feature Extraction
Principal Investigator, National Science Foundation
Novel Implantable Smart Magnetoelastic NanoRFIDs for Large-Scale Neural Magnetic Recording and Modulation
Co-Principal Investigator, National Institute of Health
MILAD SIAMI

Assistant Professor, Electrical and Computer Engineering

PhD, Lehigh University, 2017
coe.northeastern.edu/people/siami-milad

Scholarship focus: sparse sensing and control in cyber-physical networks and robotics; distributed systems theory and applications; network optimization and control; hard limits and tradeoffs in large-scale dynamical networks

SELECTED PUBLICATIONS

Y. Ghaedsharaf, M. Siami, C. Somarakis, N. Motee
Performance Improvement in Noisy Linear Consensus Networks with Time-Delay, IEEE Transactions on Automatic Control, 64(6), 2019, 2457-2472

M. Siami, N. Motee
Abstraction of Linear Dynamical Networks with Guaranteed Systemic Performance Measures, IEEE Transactions on Automatic Control, 63(10), 2018, 3301-3316

M. Siami, S. Bolouki, B. Bamieh, N. Motee
Centrality measures in Linear Consensus Networks with Structured Network Uncertainties, IEEE Transaction on Control of Network Systems, 5(3), 2018, 924-934

M. Siami, N. Motee
Growing Linear Dynamical Networks Endowed by Spectral Systemic Performance Measures, IEEE Transactions on Automatic Control, 63(7), 2018, 2091-2106

M. Siami, J. Skaf
Structural Analysis and Design of Distributed System Throttlers, IEEE Transactions on Automatic Control, 63(2), 2018, 540-547

S. Bolouki, R.P. Malhame, M. Siami, N. Motee

M. Siami, N. Motee
New Spectral Bounds on H2-Norm of Linear Dynamical Networks, Automatica, 80, 2017, 305-312

M. Siami, N. Motee
Fundamental Limits and Tradeoffs on Disturbance Propagation in Large-Scale Dynamical Networks, IEEE Transactions on Automatic Control, 61(12), 2016, 4055-4062

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
coe.northeastern.edu/people/silevitch-michael

Scholarship focus: subsurface sensing and imaging systems, detection of explosives related anomalies, engineered system development and engineering leadership

Honors and awards: 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, Mechanical and Industrial Engineering
PhD, Massachusetts Institute of Technology, 1995
coe.northeastern.edu/people/singh-hanumant

Scholarship focus: 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

H. Singh, W. Freeman, et al.
Camouflaging an Object from Many Viewpoints, Proceedings of the 2014 Computer Vision and Pattern Recognition Conference, 1-8

C. Murphy, J. Walls, T. Schneider, H. Singh, et al.

K.E. Smith, H. Singh, 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


C. Kunz, H. Singh

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
PhD, University of Florida, 1977
coe.northeastern.edu/people/sontag-eduardo

Scholarship focus: feedback control theory, systems biology, cancer, and biomedicine

Honors and awards: IEEE Control Systems Field Award; IFAC Fellow; AMS Fellow; SIAM Fellow; IEEE Fellow; Reid Prize in Applied Mathematics, SIAM; Bode Prize, IEEE

SELECTED PUBLICATIONS

J.M. Greene, J.L. Gevertz, E.D. Sontag
A Mathematical Approach to Distinguish Spontaneous from Induced Evolution of Drug Resistance during Cancer Treatment, JCO Clinical Cancer Informatics, 3, 2019, 1-20

E.V. Nikolaev, A. Zloza, E.D. Sontag
Immunobiological Reconstruction of Influenza Lung Infection -Melanoma Skin Cancer Interactions, Frontiers in Immunology, 10, 2019, 4

M. A. Al-Radhawi, D. Del Vecchio, E.D. Sontag
Multi-Modality in Gene Regulatory Networks with Slow Gene Binding, PLoS Computational Biology, 15, 2019, e1006784

E.V. Nikolaev, S.J. Rahi, E.D. Sontag
Chaos in Simple Periodically-Forced Biological Models, Biophysical Journal, 114, 2018, 1232-1240

T.H. Segall-Shapiro, E.D. Sontag, C.A. Voigt
Engineered Promoters Enable Constant Gene Expression at any Copy Number in Bacteria, Nature Biotechnology, 36, 2018, 352-358

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

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
DAGMAR STERNAD

University Distinguished Professor, Biology; jointly appointed: Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, University of Connecticut, 1995
coe.northeastern.edu/people/sternad-dagmar

Scholarship focus: motor control and learning, variability and stability, human-robot interaction, dynamic modeling

Honors and awards: Faculty of the Year, Award from Residential Life, Klein Lectureship Award; Distinguished Lecturer on Life and the Sciences of Complexity, University of Connecticut

SELECTED PUBLICATIONS
Z. Zhang, D. Sternad
The Primacy of Rhythm: How Discrete Actions Merge into a Stable Rhythmic Pattern, Journal of Neurophysiology, 121, 2019, 574-587

S. Bazzi, J. Ebert, N. Hogan, D. Sternad
Convergence and Predictability in Human Control of Dynamically Complex Objects, Chaos: An Interdisciplinary Journal of Nonlinear Science, 28(10), 2018, 103103

Z. Zhang, D. Guo, M.E. Huber, S.W. Park, D. Sternad
Exploiting the Geometry of Solution Space to Reduce Sensitivity to Neuromotor Noise, PLoS Computational Biology, 14(2), 2018, e1006013

D. Sternad
It’s Not (Only) the Mean that Matters: Variability, Noise and Exploration in Skill Acquisition, Current Opinion in Behavioral Sciences, 20, 2018, 183-195

P. Maurice, N. Hogan, D. Sternad
Predictability, Effort, and (Anti-)Resonance in Complex Object Control, Journal of Neurophysiology, 120(2), 2018, 765-780

SELECTED RESEARCH PROJECTS
Collaborative Research: Learning to Control Dynamically Complex Objects
Co-Investigator, National Science Foundation

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

Predictability in Complex Object Control
Principal Investigator, National Institutes of Health

MILICA STOJANOVIC

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, Northeastern University, 1993
coe.northeastern.edu/people/stojanovic-milica

Scholarship focus: wireless communications and networks, underwater acoustic transmission, statistical system characterization, adaptive signal processing

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

SELECTED PUBLICATIONS
R. Ahmed, M. Stojanovic

A. Tadayon, M. Stojanovic

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

Y. Aval, M. Stojanovic

P. Qarabaqi, M. Stojanovic

SELECTED RESEARCH PROJECTS
Active Communication, Sensing and Control in Actuated Underwater Sensing Networks
Principal Investigator, Office of Naval Research

Development of a Software-Defined Networking Testbed for the Internet of Underwater Things
Principal Investigator, National Science Foundation
NIAN SUN

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, Stanford University, 2002
coe.northeastern.edu/people/sun-nian-xiang

Scholarship focus: micro/nanofabricated sensors, including antennas, electrochemical gas sensors, magnetic field sensors, strain and pressure sensors, etc.; magnetic, ferroelectric and magnetoelectric materials; RF/microwave magnetic and magnetoelectric devices design, fabrication and testing; materials properties at RF/microwave frequency

Honors and awards: 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

Highly Sensitive Integrated Flexible Tactile Sensors with Piezoresistive Ge 2 Sb 2 Te 5 Thin Films, npj Flexible Electronics, (1), 2018, 17

Acoustically Actuated Ultra-Compact NEMS Magnetoelectric Antennas, Nature communications, 8(1), 2017, 296

Coexistence of Low Damping and Strong Magnetoelastic Coupling in Epitaxial Spinel Ferrite Thin Films, Advanced Materials 29(34), 2017, 1701130

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

SELECTED RESEARCH PROJECTS

Novel Implantable Smart Magnetoelectric NanoRFIDs for Large-Scale Neural Magnetic Recording and Modulation
Principal Investigator, National Institutes of Health

NSF Nanosystems Engineering Research Center (ERC) for Translational Applications of Nanoscale Multiferroic Systems (TANMS)
Co-Principal Investigator, National Science Foundation Engineering Research Centers

MARIO SZNAIER

Dennis Picard Trustee Professor, Electrical and Computer Engineering
PhD, University of Washington, 1989
coe.northeastern.edu/people/sznaier-mario

Scholarship focus: robust control, control oriented identification, semi-algebraic optimization, information extraction from high volume data streams, dynamics-enabled machine learning

Honors and awards: IEEE Control Systems Society Distinguished Member Award, IEEE Fellow

SELECTED PUBLICATIONS

W. Lucia, G. Franzè, M. Sznaier

B. Yilmaz, K. Bekiroglu, C. Lagoa, M. Sznaier
A Randomized Algorithm for Parsimonious Model Identification, IEEE Transactions on Automatic Control, 63(2), 2018, 532-539

Y. Wang, J. Lopez, M. Sznaier
Convex Optimization Approaches to Information Structured Decentralized Control, IEEE Transactions on Automatic Control, 63(10), 2018, 3393-3403

K. Bekiroglu, M. Ayazoglu, C. Lagoa, M. Sznaier
Hankel Matrix Rank as Indicator of Ghost in Bearing-Only Tracking, IEEE Transactions on Aerospace and Electronic Systems, 54(6), 2018, 2713-2723

M. Gou, F. Xiong, O. Camps, M. Sznaier
MoNet: Moments Embedding Network, IEEE/CVF Conference on Computer Vision and Pattern Recognition, Salt Lake City, UT, 2018, 3175-3183

M. Sznaier, O. Camps

SELECTED RESEARCH PROJECTS

CRISP Type 2: Identification and Control of Uncertain, Highly Interdependent Processes Involving Humans with Applications to Resilient Emergency Health Response
Principal Investigator, National Science Foundation

Data Driven Control of Switched Systems with Applications to Human Behavioral Modification
Principal Investigator, National Science Foundation

Verifiable, Control-Oriented Learning on the Fly
Principal Investigator at Northeastern University, Multidisciplinary University Research Initiatives, Air Force Office of Scientific Research
SRINIVAS TADIGADAPA
Professor and Chair of Electrical and Computer Engineering
PhD, Cambridge University, 1994
tadigadapa-srinvas

Scholarship focus: 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 micofabrication 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

Honors and awards: 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. Butler, N. Goel, L. Goodnight, S. Tadigadapa, A. Ebrahimi
Detection of Bacterial Metabolism in Lag-Phase using Impedance Spectroscopy of Agar-Integrated 3D Microelectrodes, Biosensors and Bioelectronics, 129, 2019, 269-276
D. Kumaran, D. Gaddes, E. Freeman, S. Tadigadapa, M. Panchagnula
C. Zhang, S. Tadigadapa

SELECTED RESEARCH PROJECTS
Continuous Urine Assay Instrumentation for Monitoring Kidney Function
Principal Investigator, National Science Foundation
Implantable Brain Microelectromechanical Magnetic Sensing and Stimulation (MEMS-MAGSS)
Co-Principal Investigator, National Institutes of Health

DEVESH TIWARI
Assistant Professor, Electrical and Computer Engineering
PhD, North Carolina State University, 2013
tiwari-devesh

Scholarship focus: large scale high performance computing systems; Data-intensive computing; cloud computing; machine learning and big data analytics

SELECTED PUBLICATIONS
J. Bhimani, T. Patel, N. Mi, D. Tiwari
What Does Vibration Do To Your SSD?, In Proceedings of the 56th Annual Design Automation Conference (DAC), 2019
N. Bin, J. Xue, S. Gupta, T. Patel, C. Engelmann, E. Smirni, D. Tiwari
Reliability Characterization of Solid State Drives in a Scalable Production Datacenter, In Proceedings of the IEEE International Conference on Big Data, 2018
G. Rohan, T. Patel, G. Cooperman, D. Tiwari
Shiraz: Exploiting System Reliability and Application Resilience Characteristics to Improve Large Scale System Throughput, In Proceedings of 48th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), 2018

SELECTED RESEARCH PROJECTS
A Statistical Learning and Modeling Approach for Analyzing Failures in Heterogeneous Large-scale Systems
Principal Investigator, Oak Ridge National Laboratory/Department of Energy
MEWA: New Methods for Performance Benchmarking and Evaluation of Emerging Data-Intensive Workloads on Heterogeneous Computing Accelerators
Principal Investigator, MIT Lincoln Laboratory/Air Force Research Lab
Running Exascale-targeted HPC workloads in the Cloud at Lower Cost, Better Performance and with More Predictability
Principal Investigator, Amazon
YANZHI WANG
Assistant Professor, Electrical and Computer Engineering
PhD, University of Southern California, 2014
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Scholarship focus: energy-efficient and high-performance implementations of deep learning and artificial intelligence systems; neuromorphic computing and non-von Neumann computing paradigms; cyber-security in deep learning systems; emerging deep learning algorithms/systems such as Bayesian neural networks, generative adversarial networks (GANs) and deep reinforcement learning


SELECTED PUBLICATIONS
A 65nm 0.39-to-140.3TOPS/W 1-to-12b Unified Neural Network Processor Using Block-Circulant-Enabled Transpose-Domain Acceleration With 8.1X Higher TOPS/mm2 and 6T HBST-TRAM-Based 2D Data-Reuse Architecture, in Proceedings of International Solid-State Circuits Conference (ISSCC), 2019
A. Ren, T. Zhang, S. Ye, J. Li, W. Xu, X. Qian, X. Lin, Y. Wang
R. Cai, A. Ren, O. Chen, N. Liu, C. Ding, X. Qian, J. Han, W. Luo, N. Yoshikawa, Y. Wang

SELECTED RESEARCH PROJECTS
Fast and Accurate Memristor-Based Algorithms for Social Network Analysis
Principal Investigator, National Science Foundation
Enabling Multimodal Sensing, Real-Time Onboard Detection and Adaptive Control for Fully Autonomous Unmanned Aerial Systems
Co-Principal Investigator, National Science Foundation
Collaborative Research: Big Data Enabled Wireless Networking: A Deep Learning Approach
Co-Principal Investigator, National Science Foundation

EDMUND YEH
Professor, Electrical and Computer Engineering
PhD, Massachusetts Institute of Technology, 2001
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Scholarship focus: data-centric network architectures, fog/edge computing, resilient network infrastructures, network science, network information theory and coding, cross-layer control and optimization of wireless networks, network economics

Honors and awards: Alexander von Humboldt Research Fellowship; Army Research Office Young Investigator Award; Best Paper Award, IEEE International Conference on Communications (ICC), 2015; Best Paper Award, ACM Conference on Information-Centric Networking (ICN), 2017; Best Paper Award, IEEE International Conference on Ubiquitous and Future Networks (ICUFN), 2012; Faculty Research Team Award, 2017

SELECTED PUBLICATIONS
K. Kamran, E. Yeh, Q. Ma
DECO: Joint Computation, Forwarding and Data Placement in Data-Driven Computing Networks, Proceedings of ACM MobiHoc, Catania, Italy, July 2-5, 2019
D. Malak, M. Medard, E. Yeh
Tiny Codes for Guaranteeable Delay, IEEE Journal on Selected Areas in Communications, 37(4), 2019, 809-825
S. Ioannidis, E. Yeh
Adaptive Caching Networks with Optimality Guarantees, IEEE/ACM Transactions on Networking, 26(2), 2018, 737-750
Y. Cui, M. Medard, E. Yeh, D. Leith, K. Duffy
Optimization-Based Linear Network Coding for General Connections of Continuous Flows, IEEE/ACM Transactions on Networking, 26(5), 2018, 2033-2047

SELECTED RESEARCH PROJECTS
Generalized Network Assisted Transport (GNAT)
Principal Investigator, Defense Advanced Research Projects Agency
Joint Optimization of Routing and Caching in Wireless Heterogeneous Networks
Principal Investigator, Intel Corporation
SDN-Assisted NDN for Data Intensive Experiments
Principal Investigator, National Science Foundation
Parisa Andalib  
PhD 2019, Electrical Engineering; Advisor, Vincent Harris  

**Enhanced Thermal Management in High Frequency Ferrite-Based Inductor Cores Via Grain Boundary Nanoengineering Strategies**

Ferrite materials possess a unique combination of properties including permeability, permittivity, and low RF losses. There exist no other materials with such wide-ranging value to electronic applications in terms of power generation, conditioning, and conversion. These power management functions are required by not only enormous systems, such as our national power grid, but also our smaller systems, such as mobile communication platforms and components, where microinductors are integrated with semiconductor circuitry. These seemingly desperate needs provide bookends for the U.S. interests in size, frequency, and technology maturity to address societal needs in energy conservation and performance.

See full dissertation at [coe.northeastern.edu/19/ParisaAndalib](http://coe.northeastern.edu/19/ParisaAndalib)

Paraskevas Argyropoulos  
PhD 2018, Electrical Engineering; Advisor, Hanoch Lev-Ari  

**Subband-Domain Universal Line Modeling for Robust Power System Transient Simulation**

Currently available transient simulation packages which include frequency dependent transmission line (FDTL) elements rely on the use of either the J. Marti method or the Universal Line Modeling (ULM) method. The advantage of the J. Marti method is that the N-phase FDTL can be modeled by N-independent single-phase FDTL circuits which is very robust for transposed or nearly transposed FDTLs. The disadvantages of this method become evident as one deviates from the transposed-line assumption such as in the case of asymmetric-lines or underground cables. The Universal Line Modeling (ULM) method is a generalization of the J. Marti method and opts to model the FDTL directly in the phase-domain.

See full dissertation at [coe.northeastern.edu/18/ParaskevasArgyropoulos](http://coe.northeastern.edu/18/ParaskevasArgyropoulos)

Junxiang Chen  
PhD 2018, Computer Engineering; Advisor, Jennifer Dy  

**Interpretable Clustering Methods**

Clustering is a task that divides objects into groups based on the similarity between objects. It is usually used as a tool for exploratory knowledge discovery, i.e., it is used to extract potentially useful and previously unknown knowledge from data, before experts have any insight. Because of the exploratory nature of clustering tasks, it is usually not adequate to simply provide clustering results that separate samples into groups. The domain scientists or data analysts in general also want to gain insight into the data. Therefore, it is desired to develop interpretable clustering models, which help the experts to attain deeper knowledge, by understanding what characterizes a cluster and how a cluster is distinguished from others.

See full dissertation at [coe.northeastern.edu/18/JunxiangChen](http://coe.northeastern.edu/18/JunxiangChen)

Afsaneh Ghanavati  
PhD 2018, Computer Engineering; Advisor, Hanoch Lev-Ari  

**A Sub-Cycle Approach to Dynamic Phasors with Application to Dynamic Power Quality Metrics**

Emerging energy conversion systems are characterized by increased rates and magnitudes of transients due to distributed generation, feedback-controlled loads and new entities like microgrids. A characterization of power quality in transients is thus gaining in importance in all power networks. Dynamic phasors offer a natural way to extend metrics based on steady state quantities such as phasor magnitude and RMS values to transients. The widespread use of high-bandwidth sensors enables a characterization of both steady-state and transient operation. However, the volume of so generated data is such that it necessitates extensive pre-processing and extraction of events of interest in estimation and control. An important issue then becomes how to pre-process that input data set, hoping to avoid excessive storage, communication and computation requirements.

See full dissertation at [coe.northeastern.edu/18/AfsanehGhanavati](http://coe.northeastern.edu/18/AfsanehGhanavati)
Xiang Gong
PhD 2018, Computer Engineering; Advisor, David Kaeli

**Improving GPU Performance Through Instruction Redistribution and Diversification**

As throughput-oriented accelerators, GPUs provide tremendous processing power by executing a massive number of threads in parallel. However, exploiting high degrees of thread-level parallelism (TLP) does not always translate to the peak performance that GPUs can offer, leaving the GPUs resources often under-utilized.

See full dissertation at coe.northeastern.edu/18/XiangGong

Xiangyu Li
PhD 2018, Computer Engineering; Advisor, David Kaeli

**Exploiting Large-Scale Data Analytics Platforms with Accelerator Hardware**

The volume of data being generated today across multiple application domains including scientific exploration, web search, e-commerce and medical research, has continued to grow unbounded. The value of leveraging machine learning to analyze big data has led to the growth in popularity of high-level distributed computing frameworks such as Apache Hadoop and Spark. These frameworks have significantly improved the programmability of distributed systems to accelerate big data analysis, whose workload is typically beyond the processing and storage capabilities of a single machine.

See full dissertation at coe.northeastern.edu/18/XiangyuLi

Yuzhang Lin
PhD 2018, Electrical and Computer Engineering; Advisor, Ali Abur

**Reliable and Efficient Methods for Identification of Parameter and Measurement Errors in Power Networks**

The detection, identification, and correction of parameter and measurement errors (referred to as “error processing” below) are one of the core problems in the modeling and monitoring of electric power networks. In this dissertation, analyses and methodologies are proposed in order to tackle different aspects of this problem.

See full dissertation at coe.northeastern.edu/18/YuzhangLin

Yeganeh M Marghi
PhD 2019, Electrical Engineering; Advisor, Deniz Erdogmus

**Event-driven Signal Model and Active Recursive Intent Estimation For Brain-computer Interfaces**

Brain-Computer Interface (BCI) systems can provide a new pathway of communication and control that can be used in both medical and non-medical domains. Electroencephalogram (EEG) signals have been shown to be effective in inferring user intent in BCI applications. However, in many cases, EEG-based communication lacks sufficient accuracy and speed due to three major limitations: 1) inefficient learning process (querying) to gain information for inference, 2) excessive querying to surpass a hard pre-defined threshold, and 3) insufficient classification performance to estimate the user intent.

See full dissertation at coe.northeastern.edu/19/Yeganeh M Marghi
Luis Tirado
PhD 2019, Electrical Engineering; Advisor, Jose Martinez-Lorenzo

On-the-move Detection Of Security Threats Using 3d Mm-Wave Radar Imaging
There is a critical need to develop new imaging systems capable of detecting security threats, both at near-field ranges (1-5m) and standoff ranges (10-40 meters). Millimeter wave (mm-wave) radar possesses unique features that makes it well-suited for addressing such a need; these include but are not limited to the following: (i) ability to penetrate through clothing, thus revealing potential threats that may be concealed under clothing; (ii) ability to provide depth information and complex scattering signatures, so it can detect and differentiate between weak dielectric and strong metallic threats, like TNT or metallic pipes and shrapnel.

See full dissertation at coe.northeastern.edu/19/LuisTirado

Zhengyu Yang
PhD 2018, Computer Engineering; Advisor, Ningfang Mi

Flash-Based Storage Management in Cloud Computing Datacenter Infrastructure
A basic credendum of cloud computing can be summarized as: user devices are light terminals to assign jobs and gather results, while those heavy computations are conducted on remote distributed server clusters. This light-terminal-heavy-server structure makes high availability no longer an option, but a requirement in todays datacenters. Furthermore, when bringing compute and storage capabilities into balance, we find that the biggest challenge here is closing the gap between compute and storage performance to shift storages curve back towards Moores law. In detail, the time consumed to wait for I/Os is the main cause of idling and wasting CPU resources, since a large number of popular cloud applications are I/O intensive, such as video streaming, file sync and backup, and data iteration for machine learning.

See full dissertation at coe.northeastern.edu/19/ZhengyuYang

Chenxi Xu
PhD 2019, Electrical Engineering; Advisor, Ali Abur

Computationally Efficient PMU-Based L1 Estimators for Large Power Systems
Phasor Measurement Units (PMUs) are increasingly deployed in power systems because of their nice characteristics like fast data acquisition rate and GPS clock synchronization. With the explicit usage of PMU measurements, Least Absolute Value (LAV) State Estimator (SE), together with its built-in Bad Data (BD) rejection capability, can be formulated as a Linear Programming (LP) problem and solved efficiently by high-performance LP solvers. This dissertation reviews the foundational research on power system state estimation and proposes several novel LAV SEs with high robustness and computational performance for Very Large Scale Interconnected (VLSI) power grids when the system is measured by only PMUs.

See full dissertation at coe.northeastern.edu/19/ChenxiXu
Professor Hanumant Singh, electrical and computer engineering, jointly appointed in mechanical and industrial engineering, works with PhD student Pushyami Kaveti on the electronic housing end caps for the Seabed in the Interdisciplinary Science and Engineering Complex at Northeastern University.
Hui Fang, an assistant professor of electrical and computer engineering at Northeastern, has developed a new neurotechnology to allow simultaneous electrical and optical brain mapping at high resolution.