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

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

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

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

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

Sincerely,

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

- **324** masters students
- **240** doctoral students

- **24.8%** female
- **28.3%** female

$17M ANNUAL FACULTY RESEARCH EXPENDITURES

- NSF **21%**
- DOD/DARPA **18%**
- DHS **27%**
- NIH **7%**
- DOE **4%**
- CORPORATE **12%**
- FEDERAL/OTHER **11%**

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

QUICK FACTS — College of Engineering

- **13** MULTI-INSTITUTIONAL RESEARCH CENTERS
  - funding by eight federal agencies
  - DOE
  - DHS
  - HHS
  - NSF
  - EPA
  - NIU
  - NIST

- **173** TENURED/TENURE-TRACK Faculty
- **40** NSF CAREER Awards

- **5** ENGINEERING DEPARTMENTS
  - Bioengineering
  - Chemical Engineering
  - Civil and Environmental Engineering
  - Electrical and Computer Engineering
  - Mechanical and Industrial Engineering

- **3566** UNDERGRADUATE students
- **3177** GRADUATE students

NEW FALL UNDERGRADUATE students
- 2015 — 2016
- 665
- 729

NEW FALL MS students
- 2015 — 2016
- 942
- 1178

- **18** NATIONAL SCIENCE FOUNDATION CAREER Awards
- **13** IEEE FELLOWS
- **$53** MILLION IN ACTIVE RESEARCH GRANTS

- **77** YOUNG INVESTIGATOR Awards
Professor Edmund Yeh received a $1 million, two-year National Science Foundation award for his project, entitled “Software Defined Network-Assisted Named Data Network for Data Intensive Experiments.” The project team will redesign the Large Hadron Collider (LHC) high energy physics program network. Northeastern is the lead on this multi-university initiative, working with the California Institute of Technology and Colorado State University.

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

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

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

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

Assistant Professor Jose Martinez-Lorenzo, jointly appointed with mechanical and industrial engineering, was awarded a $500K National Science Foundation CAREER Award for his project, entitled “4D mm-Wave Compressive Sensing and Imaging at One Thousand Volumetric Frames per Second.” One of the main applications of this system is finding security threats hidden under clothing, inside backpacks, or in public spaces, such as sports arenas.
Assistant Professor Mahshid Amirabadi was awarded a $240K grant from ARPA-E to develop “A New Class of Soft-Switching Capacitive-Link Universal Converters for Photovoltaic Application.” Focusing on commercial and utility-scale PV systems, the project will develop a new class of PV inverters that have the potential to radically increase the power density, lifetime, and efficiency while significantly reducing the costs associated with shipping, installation, repair, and replacement.

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

Assistant Professor Pau Closas has been given an Early Achievement Award by the Institute of Navigation (ION) “for mathematically profound contributions to the design of advanced navigation receivers and for efforts in disseminating GNSS technology.”

Professor Hossein Mosallaei’s paper, titled “Turnable Two Dimensional Optical Beam Steering with Reconfigurable Indium Tin Oxide Plasmonic Reflectarray Metasurface,” was selected by the editors of the Journal of Optics to be included in the “Highlights of 2016” collection.

An article, titled “Improving Security Screening: A Comparison of Multistatic Radar Configurations for Human Body Imaging,” by College of Engineering Distinguished Professor Carey Rappaport, electrical and computer engineering (ECE), and Assistant Professor Jose Martinez Lorenzo, jointly appointed in ECE, was one of four featured articles on the cover of IEEE Antennas & Propagation.

Vincent Harris, University Distinguished Professor and William Lincoln Smith Chair Professor, affiliated faculty in chemical engineering, received in collaboration with Quorvo an $8M grant (2017-2019) from the Defense Advanced Research Projects Agency for a project, “MAgnetics on GaN for Next GEneration T/R Systems (MAGNETS),” which involves the integration of active and passive elements in GaN-based Transmit and receive modules.

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

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

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

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

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

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

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

David Kaeli, College of Engineering Distinguished Professor and Agnes Chan of the College of Computer and Information Science, received a $4.6M four-year renewal award from the National Science Foundation to continue and expand participation in the CyberCorps® Scholarship for Service (SFS) program, which prepares highly-qualified cybersecurity professionals for entry into the government workforce.
## Faculty by Research Areas

### Communications and Signal Processing
- Dana Brooks
- Pau Closas
- Jennifer Dy
- Deniz Erdogmus
- Vinay Ingle
- Hanoch Lev-Ari
- Sarah Ostadabbas
- Purnima Ratlilal-Makris
- Masoud Salehi
- Dagmar Sternad
- Milica Stojanovic

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

### Power Electronics, Systems and Control
- Ali Abur
- Mahshid Amirabadi
- Bradley Lehman
- Bahram Shafai
- Eduardo Sontag
- Mario Sznaier
- Gilead Tadmor

### Computer Engineering, Networks, and Robotics
- Stefano Basagni
- Octavia Camps
- Kaushik Chowdhury
- Yunsi Fei
- Yun Raymond Fu
- Stratis Ioannidis
- David Kaeli
- Engin Kirda
- Mieczyslaw Kokar
- Miriam Leeser
- Xue Lin
- Fabrizio Lombardi
- Waleed Meleis
- Tommaso Melodia
- Ningfang Mi
- Taskin Padir
- Wil Robertson
- Gunar Schirner
- Hanumant Singh
- Devesh Tiwari
- Edmund Yeh

### Electromagnetics and Optics
- Charles DiMarzio
- Vincent Harris
- Yongmin Liu
- Edwin Marengo
- Jose Martinez Lorenzo
- Hossein Mosallaei
- Carey Rappaport
- Michael B. Silevitch
ALI ABUR
Professor, Electrical and Computer Engineering
PhD, Ohio State University, 1985
ece.neu.edu/people/abur-ali
Power system monitoring, estimation and optimization, fault location, and identification in power grids
Fellow, Institute of Electrical and Electronics Engineers

SELECTED PUBLICATIONS
Y. Lin, A. Abur
Y. Lin, A. Abur
A. Rouhani, A. Abur
C. Xu, A. Abur
G. Feng, A. Abur
M. Göl, A. Abur
A Fast Decoupled State Estimator for Systems Measured by PMUs, IEEE Transactions on Power Systems, 30(5), 2015, 2766-2771
M. Göl, A. Abur
A Hybrid State Estimator for Systems With Limited Number of PMUs, IEEE Transactions on Power Systems, 30(3), 2015, 1511-1517

SELECTED RESEARCH PROJECTS
Engineering Research Center for Ultra-Wide Area Resilient Electric Energy Transmission Network
Principal Investigator, National Science Foundation
Zonal State Estimation for Large Interconnected Systems
Principal Investigator, PJM Interconnection
CRISP: Identification and Control of Uncertain, Highly Interdependent Processes Involving Humans with Applications to Resilient Emergency Health Response
Co-Investigator, National Science Foundation

MAHSHID AMIRABADI
Assistant Professor, Electrical and Computer Engineering
PhD, Texas A&M University, 2013
ece.neu.edu/people/amirabadi-mahshid
Design, modeling and control of power converters, power electronics for renewable energy systems, microgrids, variable speed drives, and wireless power transfer

SELECTED PUBLICATIONS
M. Amirabadi
Cuk-Based Universal Converters in Discontinuous Conduction Mode of Operation, IEEE Energy Conversion Congress and Exposition, Milwaukee, WI, 2016, 1-7
S.A.KH. Mozaffari Niapour, M. Amirabadi
M. Amirabadi
A New Class of High-Power-Density Universal Power Converters, IEEE Energy Conversion Congress and Exposition, Montreal, QC, 2015, 2596-2602
M. Amirabadi, H.A. Toliyat, J. Baek
M. Amirabadi, J. Baek, H.A. Toliyat, W.C. Alexander
Soft-Switching AC-Link Three-Phase AC-AC Buck-Boost Converter, IEEE Transactions on Industrial Electronics, 62, 2015, 3-14
M. Amirabadi, J. Baek, H.A. Toliyat

SELECTED RESEARCH PROJECTS
A New Class of Modular Power Converters for Next-Generation Shipboard Power Systems
Principal Investigator, Office of Nacal Research
A New Class of Soft-Switching Capacitive-Link Universal Converters for Photovoltaic Application
Principal Investigator, Advanced Research Projects Agency-Energy
A Reliable PV Inverter for Reducing the Overall Cost of Residential PV Systems
Principal Investigator, The Massachusetts Clean Energy Center
STEFANO BASAGNI
Associate Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, University of Texas, Dallas, 2001
PhD, University of Milan, Italy, 1998
ece.neu.edu/people/basagni-stefano
Wireless networks, ad hoc networks, underwater and terrestrial sensor networking, and protocol design and testing

Distinguished Scientist of the Association for Computing Machinery

SELECTED PUBLICATIONS
S. Basagni, V. Di Valerio, P. Gjanci, C. Petrioli

M. Girolami, S. Basagni, F. Furfari, S. Chessa

Y. M. Aval, Y. Han, A. Tu, S. Basagni, M. Stojanovic, Y. Fei

S. Basagni, C. Petrioli, D. Spenza

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

D. Spenza, M. Magno, S. Basagni, L. Benini, M. Paoli, et al.

Reach2-Mote: A Range Extending Passive Wake-up Wireless Sensor Node, ACM Transactions on Sensor Networks 11, 4(64), 2015, 1-64

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

DANA BROOKS
Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, Northeastern University, 1991
ece.neu.edu/people/brooks-dana
Biomedical signal and image processing, medical imaging, statistical signal processing, inverse problems, electrocardiography, bio-optical imaging, magnetic resonance imaging, transcranial neuromodulation, estimation of protein conformations from x-ray scattering, regularization, and optimization

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

SELECTED PUBLICATIONS
Optimization of Focality and Direction in Dense Electrode Array Transcranial Direct Current Stimulation (tDCS), Journal of Neural Engineering, 13(3), 2016, 36020-36033

Extensions to a Manifold Learning Framework for Time-Series Analysis on Dynamic Manifolds in Bioelectric Signals, Physical Review E, 93, 2016, 042218

Constrained Maximum Likelihood Estimation of Relative Abundances of Protein Conformation in a Heterogeneous Mixture from Small Angle X-Ray Scattering Measurements, IEEE Transactions on Signal Processing, 63(20), 2015, 5383-5394

S. Kurugol, K. Kose, B. Park, J.G. Dy, D.H. Brooks, M. Rajadhyaksha

B. Erem, J. Coll-Font, R. Martínez-Orellana, P. Stovicek, D. Brooks

SELECTED RESEARCH PROJECTS
Center for Integrative Biomedical Computing
Principal Investigator, National Institutes of Health
Automated Image Guidance for Diagnosing Skin Cancer with Confocal Microscopy
Co-Investigator, National Institutes of Health
Collaborative Research: US-German Research Proposal Optimization of Human Cortical Stimulation
Principal Investigator, National Science Foundation
KAUSHIK CHOWDHURY
Associate Professor, Electrical and Computer Engineering
PhD, Georgia Institute of Technology, 2009
ece.neu.edu/people/chowdhury-kaushik
Dynamic spectrum access, energy harvesting sensor networks, 5G technology, intra-body communication, and protocol design for wireless

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

SELECTED PUBLICATIONS

SELECTED RESEARCH PROJECTS
Cross Layer Approach to 5G Communications Co-Principal Investigator, MathWorks
End-to-end Protocol Designs that Address the Challenges of Distributed Dynamic Spectrum Access Networks Principal Investigator, Office of Naval Research CAREER: IDEA: Integrated Data and Energy Access for Wireless Sensor Networks Principal Investigator, National Science Foundation

OCTAVIA CAMPS
Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, University of Washington, 1992
ece.neu.edu/people/camps-octavia
Robust computer vision; image processing; and machine learning

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

SELECTED RESEARCH PROJECTS
Dynamic Invariants for Video Scenes Understanding Principal Investigator, National Science Foundation
Robust Identification of a Class of Structured Systems with High Dimensional Outputs and Applications Co-Principal Investigator, National Science Foundation
PAU CLOSAS
Assistant Professor, Electrical and Computer Engineering
PhD, Universitat Politècnica de Catalunya, 2009
ece.neu.edu/people/closas-pau
Statistical and array signal processing; estimation and detection theory; Bayesian inference; stochastic filtering; robust statistics; and game theory, with applications to positioning systems; wireless communications, and mathematical biology
Duran Farell for Technological Research; EURASIP Best PhD Thesis Award; 2016 Institute of Navigation Early Achievements Award

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

CHARLES DIMARZIO
Associate Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering, Mechanical and Industrial Engineering
PhD, Northeastern University, 1996
ece.neu.edu/people/dimarzio-charles
Optics, microscopy, coherent detection, interaction of light and sound waves, hyperspectral imaging, diffusive optical tomography and ultrasound, landmine detection, magneto-optic sensors, multi-model imaging, and activities include: computer modeling, designing, building and testing of hardware, and processing the resulting data

SELECTED PUBLICATIONS
J.L. Hollmann, R. Horstmeyer, C. Yang, C.A. DiMarzio
J.L. Hollmann, R. Horstmeyer, C. Yang, C.A. DiMarzio
Z. Lai, J. Kerimo, Y. Mega, C. A. DiMarzio
Stepwise Multiphoton Activation Fluorescence Reveals a New Method of Melanin Detection, Journal of Biomedical Optics, 18(6), 2013, 061225
Z.R. Hoffman, C. DiMarzio

SELECTED RESEARCH PROJECTS
Coded-Illumination Fourier Ptychography for High-content Multimodal Imaging
Principal Investigator, National Science Foundation
JENNIFER DY

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, Purdue University, 2001
ece.neu.edu/people/dy-jennifer
Machine learning, data mining, statistical pattern recognition, computer vision, and image processing

National Science Foundation CAREER Award

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

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

DENIZ ERDOGMUS

Associate Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, University of Florida, 2002
ece.neu.edu/people/erdogmus-deniz
Brain computer interfaces, cognitive and interactive systems, nonlinear and statistical signal processing, information theory, and machine learning

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

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

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

HUI FANG

Assistant Professor, Electrical and Computer Engineering
PhD, University of California, Berkeley, 2014
ece.neu.edu/people/fang-hui

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

SELECTED PUBLICATIONS

Capacitively Coupled Arrays of Multiplexed Flexible Silicon Transistors for Long-Term Cardiac Electrophysiology, Nature Biomedical Engineering, 1, 2017, 0038

K.J. Seo, Y. Qiang, I. Bilgin, S. Kar, C. Vinegoni, R. Weissleder, H. Fang
Transparent Electrophysiology Microelectrodes and Interconnects from Metal Nanomesh, ACS Nano, 11, 2017, 4365-4372


Bioreosorbable Silicon Electronics for Transient Spatiotemporal Mapping of Electrical Activity from the Cerebral Cortex, Nature Materials, 15, 2016, 782-791

Strong Interlayer Coupling In Van Der Waals Heterostructures Built From Single-Layer Chalcogenides, Proceedings of the National Academy of Sciences, 111, 2014, 6198-6202

H. Fang, H.A. Bechtel, E. Plis, M. C. Martin, S. Krishna, E. Yablonovitch, A. Javey
Quantum of Optical Absorption in Two-Dimensional Semiconductors, Proceedings of the National Academy of Sciences, 110, 2013, 11688-11691

H. Fang, M. Tosun, G. Seol, T-C. Chang, K. Takei, J. Guo, A. Javey

H. Fang, S. Chuang, T. C. Chang, K. Takei, T. Takahashi, A. Javey
High-performance Single Layered WSe2 p-FETs with Chemically Doped Contacts, Nano Letters, 12, 2012, 3788-3792

YUNSI FEI

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

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

National Science Foundation CAREER Award; College of Engineering Faculty Fellow

SELECTED PUBLICATIONS

P. Luo, K. Athanasiou, Y. Fei, T. Wahl
Algebraic Fault Analysis of SHA-3, IEEE Design, Automation and Test in Europe Conference & Exhibition, Lausanne, Switzerland, 2017

Z. Juang, Y. Fei, D.R. Kaeli
A Novel Side-Channel Timing Attack on GPUs, ACM Great Lake Symposium on VLSI, 2017

B. Jiang, Y. Fei

C. Luo, Y. Fei, A.A. Ding
Side-Channel Power Analysis of XTS-AES, IEEE Design, Automation & Test in Europe, 2017

B. Jiang, Y. Fei

Y. Han, Y. Fei, A.A. Ding

SELECTED RESEARCH PROJECTS

TWC: Medium: Automating Countermeasures and Security Evaluation Against Software Side-Channel Attacks
Principal Investigator, National Science Foundation

Embedded Hardware-based Security and Side Channel Analysis
Principal Investigator, Analog Devices

MRI: Development of a Testbed for Side-channel Analysis and Security Evaluation-TeSCASE
Principal Investigator, National Science Foundation

STARSS: Side-Channel Analysis and Resiliency Targeting Accelerators
Co-Principal Investigator, National Science Foundation and Semiconductor Research Corporation
YUN RAYMOND FU
Associate Professor, Electrical and Computer Engineering; jointly appointed, Computer and Information Science
PhD, University of Illinois, 2008
ece.neu.edu/people/fu-yun
Machine learning and computational intelligence, social media analytics, human-computer interaction, and cyber-physical systems

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

SELECTED PUBLICATIONS
S. Li, Y. Fu
Learning Balanced and Unbalanced Graphs via Low-Rank Coding, IEEE Transactions on Knowledge and Data Engineering (T-KDE), 27(5), 2015, 1274-1287
Y. Fu
Human-Centered Social Media Analytics, Springer, 2014
Y. Kong, Y. Jia, Y. Fu
Interactive Phrases: Semantic Descriptions for Human Interaction Recognition, IEEE Transactions on Pattern Analysis and Machine Intelligence, 36(9), 2014, 1775-1788
Y. Fu
K. Li, Y. Fu
Prediction of Human Activity by Discovering Temporal Sequence Patterns, IEEE Transactions on Pattern Analysis and Machine Intelligence, 36(8), 2014, 1644-1657

SELECTED RESEARCH PROJECTS
Pinpoint Geolocation Using Multi-Source Multi-Dimensional Big Data from Social Media
Principal Investigator, Naval Postgraduate School
Deep Structures Boosted Self-Organized Behavior Pattern Learning for Anomaly Detection
Principal Investigator, Office of Naval Research
Wireless Sensing of Speech Kinematics & Acoustics for Remediation
Co-Principal Investigator, National Science Foundation
Intention Sensing Through Video-Based Imminent Activity Prediction
Principal Investigator, Army Research Office
Methods for Multimedia Search and Retrieval by Fusing Data Across Various Sources or Domains
Principal Investigator, MIT Lincoln Laboratory
Multimodal Speech Translation for Assistive Communication
Co-Principal Investigator, National Institutes of Health
Sensing and Modeling Behavior in Response to Environmental Changes
Principal Investigator, Air Force Office of Scientific Research

VINCENT G. HARRIS
University Distinguished Professor, William Lincoln Smith Professor, Electrical and Computer Engineering; affiliated faculty, Chemical Engineering
PhD, Northeastern University, 1990
ece.neu.edu/people/harris-vincent
Design and processing of advanced materials with emphasis on high frequency device applications for radar, communication, and sensing
Fellow, American Association for the Advancement of Science, Distinguished Scientist Award, The Materials, Minerals, and Metals Society; Fellow, Institute of Electrical and Electronics Engineers; Fellow, American Physical Society; Fellow, Institute of Physics; Fellow, Institute of Engineering and Technology; Institute of Metal Research’s Lee Hsun Lecture Award; Fulbright Senior Fellow; Søren Buus Outstanding; Research Award, College of Engineering

SELECTED PUBLICATIONS
A.S. Sokolov, M. Geiler, V.G. Harris
P. Taheri, R. Barua, J. Hsu, M. Zamanpour, Y. Chen, V.G. Harris
X. Wu, S. Yan, W. Liu, Z. Feng, Y. Chen, V.G. Harris
M. Bi, X. Wang, H. Lu, L. Deng, K.J. Sunday, M.L. Taheri, V.G. Harris
F. Chen, X. Wang, Y. Nie, Q. Li, J. Ouyang, Z. Feng, Y. Chen, V.G. Harris
Ferromagnetic Resonance Induced Large Microwave Magnetodielectric Effect in Cerium Doped Y3Fe5O12 Ferrites, Scientific Reports, 6, 2016, 28206
Z. Su, Q. Li, X. Wang, B. Hu, Z. Feng, Y. Chen, V.G. Harris

SELECTED RESEARCH PROJECTS
Accelerated Development of Magnetodielectrics Having Equivalent Permeability and Permittivity for RF Applications
Principal Investigator, Rogers Corp
Magnetodielectric Heterostructures and Composites
Principal Investigator, Rogers Corp
Nonlinear Properties of Ferrite Materials
Principal Investigator, Raytheon
VINAY INGLE
Associate Professor, Electrical and Computer Engineering
PhD, Rensselaer Polytechnic Institute, 1981
ece.neu.edu/people/ingle-vinaykumar

Multidimensional signal processing and hyperspectral imaging

SELECTED PUBLICATIONS
V. Ingle, J. Proakis

N. Bosowski, V. Ingle, D. Manolakis

R. Herrero, V. Ingle
Backward and Forward Linear Prediction Applied to Ultraspertal Image Processing—Effects on Rate Distortion, Signal Image and Video Processing, 10(4), 2016, 639-646

M. Pieper, D. Manolakis, E. Truslow, T. Cooley, M. Brueggeman, A. Weisner, J. Jacobson, V. Ingle
In-Scene LWIR Downwelling Radiance Estimation, SPIE 9976, Imaging Spectrometry XXI, 99760E, 2016

E. Truslow, S. Golowich, D. Manolakis, V. Ingle

R. Herrero, V. Ingle

SELECTED RESEARCH PROJECTS
Anamoly Detection in Sequential Image Frames using Low-Rank Modeling
Principal Investigator, Massachusetts Institute of Technology Lincoln Lab

Joint Exploitation of LIDAR and Hyperspectral Imagery
Principal Investigator, Massachusetts Institute of Technology Lincoln Lab

Machine Learning Algorithms for Anamoly Detection in Sequential Image Frames
Principal Investigator, Massachusetts Institute of Technology Lincoln Lab

Performance Modeling and Prediction for LWIR Hyperspectral Target Detection Systems
Principal Investigator, Massachusetts Institute of Technology Lincoln Lab

Signal Processing of Long Wave Hyperspectral Imagery
Principal Investigator, Massachusetts Institute of Technology Lincoln Lab

STRATIS IOANNIDIS
Assistant Professor, Electrical and Computer Engineering
PhD, University of Toronto, 2009
ece.neu.edu/people/ioannidis-stratis

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

SELECTED PUBLICATIONS
D. Koutra, A. Dighe, S. Bhagat, U. Weinsberg, S. Ioannidis, C. Faloutsos, J. Bolot
PNP: Fast Path Ensemble Method for Movie Design Knowledge Discovery and Data Mining, KDD, 2017

S. Ioannidis, E. Yeh

K. Nayak, X.S. Wang, S. Ioannidis, U. Weinsberg, N. Taft, E. Shi
GraphSC: Parallel Secure Computation Made Easy, Symposium on Security and Privacy (S&P), San Jose, CA, 2015

A. Karbasi, S. Ioannidis, L. Massoulié
From Small-World Networks to Comparison-Based Search, IEEE Transactions on Information Theory (IT), 2015

SELECTED RESEARCH PROJECTS
Assistive Integrative Support Tool for Retinopathy of Prematurity
Principal Investigator, National Science Foundation

Caching Networks with Optimality Guarantees
Principal Investigator, National Science Foundation

Massively Scalable Secure Computation Infrastructure Using FPGAs
Principal Investigator, National Science Foundation

Privacy-Preserving Data Mining over FPGAs in the Datacenter
Principal Investigator, Google Faculty Research Award
DAVID KAELI
COE Distinguished Professor, Electrical and Computer Engineering; affiliated faculty: Bioengineering, Computer and Information Science
PhD, Rutgers University, 1992
ece.neu.edu/people/kaeli-david
Computer architecture; GPUs; heterogeneous computing; performance analysis; security and information assurance; hardware reliability and recovery; Big Data analytics; workload characterization
Fellow, Institute of Electrical and Electronics Engineers; Distinguished Scientist, Associate of Computing Machinery; Distinguish Professor, Heterogeneous Systems Architecture Foundation; National Science Foundation CAREER Award

SELECTED PUBLICATIONS
A. Jadidi, M. Arjomand, M. Tavana, D. Kaeli, M. Kandemir, C. Das
Exploring the Potential for Collaborative Data Compression and Hard-Error Tolerance in Resistive Memories, 47th IEEE/IFIP International Conference on Dependable Systems and Networks, 2017
X. Gong, Z. Chen, A.K. Ziabari, R. Ubal, D. Kaeli
Z.-H. Jiang, Y. Fei, D. Kaeli

SELECTED RESEARCH PROJECTS
Engineering Strong, Highly Conductive Nanotube Fibers via Fusion
Co-Principal Investigator, National Science Foundation
Exploring Analysis of Environment and Health Through Multiple Alternative Clustering
Co-Principal Investigator, National Science Foundation
Leveraging Intra-Chip/Inter-Chip Silicon Photonic Networks for Designing Next-Generation Accelerators
Principal Investigator, National Science Foundation
Multi-Agent Modeling Framework for Mitigating Distributed Disruptions in Critical Supply Chains
Co-Principal Investigator, National Science Foundation
Puerto Rico Testsite for Exploring Environmental Contamination Threats
Co-Principal Investigator, National Institutes of Environmental Health Sciences
Side-Channel Analysis and Resiliency Targeting Accelerators
Principal Investigator, National Science Foundation and Semiconductor Research Corporation

YONG-BIN KIM
Professor, Electrical and Computer Engineering
PhD, Colorado State University, 1996
ece.neu.edu/people/kim-yong-bin
Integrated circuit design and for nanoelectronics and nano technology, high speed system integration for signal processing and communication applications, bio-chip and bio-sensor interface circuit design, electronic neuron circuit design, low power adaptive robot controller circuit design; high performance and low power VLSI design, system-on-chip (soc), and Physical VLSI CAD

SELECTED PUBLICATIONS
G. Jeon, Y.-B. Kim
A 4Gb/s Half-Rate DFE with Switched-Cap and IIR Summation for Data Correction, IEEE International Symposium on Circuits and Systems, Baltimore, MD, 2017, 2392-2395
G. Jeon, Y.-B. Kim
Switched Capacitor and Infinite Impulse Response Summation for a Quad-Rate DFE 4Gb/s Data Rate, ACM GLSVLSI Conference, Banff, Alberta, Canada, 2017, 439-442
H. Zhu, W. Yang, G. Engel, Y.-B. Kim
A Two-Parameter Calibration Technique Tracking Temperature Variations for Current Source Mismatch in DACs, IEEE Transactions on Circuits and Systems II, 64(4), 2017, 387-391
W. Wei, K. Namba, F. Lombardi, Y.-B. Kim
Y. Choi, Y.-B. Kim
H. Zhu, R. Kapusta, Y.-B. Kim
I. Jung, Y.-B. Kim

SELECTED RESEARCH PROJECTS
Semi-Self Calibration of High Speed Transceiver for DRAM Interface
Principal Investigator, Hynix Semiconductor
Compact and Power Efficient Integrated Voltage Tunable RF Multiferroic Inductors with Wide Tunable Inductance
Principal Investigator, Winchester Technology
ENGIN KIRDA
Professor, Electrical and Computer Engineering; jointly appointed, Computer and Information Science
PhD, Technical University of Vienna, 2002
ece.neu.edu/people/kirda-engin
Malware analysis and detection; web security; social network security; reverse engineering; intrusion detection

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

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

ZIGZAG: Secure Execution of Client-Side Web Application Components
Principal Investigator, Office of Naval Research

MIECZYSŁAW KOKAR
Professor, Electrical and Computer Engineering
PhD, Wroclaw University of Technology, 1973
ece.neu.edu/people/kokar-mieczyslaw
Cognitive radio; software engineering-self-controlling software; information fusion

SELECTED PUBLICATIONS
Y. Chen, J. Moskal, M.M. Kokar, K. Chowdhury
L. Lechowicz, M.M. Kokar
Y. Chen, M.M. Kokar, J. Moskal, D. Suresh
D. Suresh, M.M. Kokar, J. Moskal, Y. Chen
IEEE DySPAN 1900.5 Efforts To Support Spectrum Access Standardization, 2013 IEEE Military Communications Conference (MILCOM 2013), San Diego, 2013
B. Ulicny, J. Moskal, M.M. Kokar
S. Li, M.M. Kokar

SELECTED RESEARCH PROJECTS
Converged Collaborative Elements for RF Task Operations
Principal Investigator, DARPA
**MIRIAM LEESER**

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

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

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

**SELECTED PUBLICATIONS**


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

X. Fang, M. Leeser  
Open-Source Variable-Precision Floating-Point Library for Major Commercial FPGAs, *ACM Transactions on Reconfigurable Technology Systems*, 9(3), 2016

N. Moore, M. Leeser, L. Smith King  

M. Leeser, S. Mukherjee, J. Brock  
Fast Reconstruction of 3D Volumes from 2D CT Projection Data with GPUs, *Biomed Central Research Notes*, 7(528), 2014

X. Wang, M. Leeser  
VFloat: A Variable Precision Fixed and Floating-Point Library for Reconfigurable Hardware, *ACM Transactions on Reconfigurable Technology and Systems*, 3(3), 2010, 1-34

X. Wang, M. Leeser  

**SELECTED RESEARCH PROJECTS**

Ensuring Reliability and Portability of Scientific Software for Heterogeneous Architectures  
Co-Principal Investigator, National Science Foundation

Hardware/Software Implementations of WiFi and LTE Communications  
Principal Investigator, Mathworks

**BRAD LEHMAN**

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

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

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

**SELECTED PUBLICATIONS**

W. Huang, B. Lehman  

W. Huang, B. Lehman  

D.O. Neacsu, Y. Zheng, B. Lehman  
An SD Card Flash-Memory-Based Implementation of a Multioptimal Three-Phase PWM Generator, *IEEE Transactions on Power Electronics*, 31(1), 2016, 39-51

J. Zhang, B.M. Hodge, S. Lu, H.F. Hamann, B. Lehman  

G. Spagnuolo, G. Petrone, B. Lehman, C.A. Ramos Paja, Y. Zhao, M.L. Orozco Gutierrez  
Control of Photovoltaic Arrays: Dynamical Reconfiguration for Fighting Mismatched Conditions and Meeting Load Requests, *IEEE Industrial Electronics Magazine*, 9(1), 2015, 62-76

**SELECTED RESEARCH PROJECTS**

A Multi-Model Machine Learning-Solar Forecasting Technology  
Principal Investigator, United States Department of Energy

Advanced 100W Solar Blanket for Squad Power  
Principal Investigator, Department of Defense
HANOC LEV-ARI
Professor, Electrical and Computer Engineering
PhD, Stanford University, 1984
ece.neu.edu/people/lev-ari-hanoch
Adaptive filtering; statistical signal processing; spectrum analysis and estimation; networked dynamic state estimation
Fellow, Institute of Electrical and Electronics Engineers

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

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

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

P.E. Argyropoulos, H. Lev-Ari
Wavelet Customization for Improved Fault Location Quality in Power Networks, IEEE Transactions on Power Delivery, 30(5), 2015, 2215-2223

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

L. Peng, H. Lev-Ari

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

XUE LIN
Assistant Professor, Electrical and Computer Engineering
PhD, University of Southern California, 2016
ece.neu.edu/people/lin-xue
Near-threshold computer for low-power embedded systems; high-performance and mobile cloud computing systems; machine learning and computing in (embedded) cyber-physical systems

SELECTED PUBLICATIONS
Q. Xie, X. Lin, Y. Wang, S. Chen

Y. Wang, X. Lin, M. Pedram

X. Lin, Y. Wang, Q. Xie, M. Pedram

SELECTED RESEARCH PROJECTS
A Framework of Simultaneous Acceleration and Storage Reduction on Deep Neural Networks Using Structured Matrices
Principal Investigator, National Science Foundation
YONGMIN LIU
Assistant Professor, joint faculty appointment in Mechanical and Industrial Engineering and Electrical and Computer Engineering
PhD, University of California, Berkeley, 2009
mie.neu.edu/people/liu-yongmin
Nano optics; nanoscale materials and engineering; nano devices; plasmonics; metamaterials; applied physics
NSF CAREER Award, Office of Naval Research Young Investigator Award; SPIE Rising Researcher; 3M Non-Tenured Faculty Award

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

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

FABRIZIO LOMBARDI
ITC Endowed Professor, Electrical and Computer Engineering
PhD, University of London, 1982
ece.neu.edu/people/lombardi-fabrizio
Fault-tolerant computing; VLSI CAD; testing, configurable computing, distributed systems
Fellow, Institute of Electrical and Electronics Engineers; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS
H. Jiang, C. Shen, J. Han, F. Lombardi, P. Jonker
K. Namba, F. Lombardi
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 Magnetolectric 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
X. Cui, D. Wenwen, F. Lombardi, W. Liu
A Parallel Decimal Multiplier Using Hybrid Binary Coded Decimal (BCD) Codes, Proceedings of the IEEE International Symposium on Arithmetics, San Jose, 2016, 150-155
P. Zhu, J. Han, Y. Guo, F. Lombardi
Reliability and Criticality Analysis of Communication Networks by Stochastic Computation, IEEE Network Magazine, 30(6), 2016, 70-76
K. Namba, F. Lombardi
EDWIN MARENGO
Associate Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, Northeastern University, 1997
ece.neu.edu/people/marengo-fuentes-edwin

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

National Science Foundation CAREER Award

SELECTED PUBLICATIONS
J. Tu, E.A. Marengo

E.A. Marengo, J. Tu

E.A. Marengo

E.A. Marengo

E.A. Marengo, J. Tu

E.A. Marengo

JOSE MARTINEZ LORENZO
Assistant Professor, Mechanical and Industrial Engineering; jointly appointed, Electrical and Computer Engineering
PhD, University of Vigo, 2005
ece.neu.edu/people/martinez-lorenzo-jose-angel

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

SELECTED PUBLICATIONS
I.A. Osaretin, M.W. Shields, J.A. Martinez-Lorenzo, W.J. Blackwell

Fourier-Based Imaging for Multistatic Radar Systems, IEEE Transactions on Microwave Theory and Techniques, 62(8), 2014, 1798-1810

On the Combination of SAR and Model Based Techniques for High-Resolution Real-Time Two-Dimensional Reconstruction, IEEE Transactions on Antennas and Propagation, 62(10), 2014, 5180-5189

Y. Rodriguez-Vaqueiro, J.A. Martinez-Lorenzo

SELECTED RESEARCH PROJECTS
Advanced Algorithm Development for Multiband GPR Radar Detection of Buried Mines
Co-Principal Investigator, US Army Night Vision and Electronic Sensors Directorate

Advanced Imaging and Detection of Security Threats using Compressive Sensing
Principal Investigator, Department of Homeland Security

Advanced Mechanical-Electromagnetic Applications for next Generation Environmental Monitoring
Principal Investigator, National Oceanic and Atmospheric Administration

Multi-Modality Electromagnetic Detection and Localization of Implanted Explosives Using Ultra low Field MRI and Nuclear Quadrupole Resonance
Co-Principal Investigator, Defense Advanced Research Projects Agency
NICOL McGRUER

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

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

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

Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

Simulation of Dielectrophoretic Assembly of Carbon Nanotubes Using 3D Finite Element Analysis, Nanotechnology, 26(15), 2015, e155602

A. Basu, R.P. Hennessy, G.G. Adams, N.E. McGruer

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

H. Pan, Y.-C. Wu, G.G. Adams, G.P. Miller, N. McGruer


P. Ryan, Y.-C. Wu, S. Somu, G. Adams, N. McGruer

SELECTED RESEARCH PROJECTS

PLASMID (Plasmonic Microelectromechanical Infrared Digitizer), Zero-Power Sensor
Co-Principal Investigator, Defense Advanced Research Projects Agency

Zero Power Sensors (ZePS), RF Wake-up
Co-Principal Investigator, Defense Advanced Research Projects Agency

WALEED MELEIS

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

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

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

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

SELECTED PUBLICATIONS

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


L. Hayward, S. Ventura, M. Mahanna, W. Meleis

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

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

Detecting Solid Masses in Phantom Breast Using Mechanical Indentation, Experimental Mechanics, 54(6), 2014, 935-942

J. Tai, J. Zhang, J. Li, W. Meleis, N. Mi
TOMMASO MELODIA
Associate Professor, Electrical and Computer Engineering
PhD, Georgia Institute of Technology, 2007
ece.neu.edu/people/melodia-tommaso
Modeling, optimization, and experimental evaluation of wireless networked systems; networked implantable medical systems; multimedia sensor networks; secure tactical cognitive radio networks; underwater networks; mobile cloud computing
National Science Foundation CAREER Award

SELECTED PUBLICATIONS
Z. Guan, T. Melodia
G.E. Santagati, T. Melodia
Z. Guan, G.E. Santagati, T. Melodia
S. Pudlewski, N. Cen, Z. Guan, T. Melodia

SELECTED RESEARCH PROJECTS
PAWR: Platforms for Advanced Wireless Research
Director of Research, National Science Foundation
NeTS: Small: Beyond Separate-then-centralize: A Cellular Operating System to Optimize Software-defined 5G Wireless Networks
Principal Investigator, National Science Foundation
CAREER: Towards Ultrasonic Networking for Implantable Biomedical Devices
Principal Investigator, National Science Foundation
Small: Towards Real-time Video Streaming in the Internet of Underwater Things
Principal Investigator, National Science Foundation
Toward Maximal Spectral-Efficiency Networking
Principal Investigator, Air Force Research Laboratory

NINGFANG MI
Associate Professor, Electrical and Computer Engineering
PhD, College of William and Mary, 2009
ece.neu.edu/people/mi-ningfang
Capacity planning; MapReduce/Hadoop scheduling; cloud computing; resource management; performance evaluation; workload characterization; simulation; virtualization
National Science Foundation CAREER Award; IBM Faculty Award; Air Force Office of Scientific Research Young Investigator Award

SELECTED PUBLICATIONS
H. Gao, Z. Yang, J. Bhimani, T. Wang, J. Wang, N. Mi, B. Sheng
J. Bhimani, N. Mi, M. Leeser, Z. Yang
Y. Yao, J. Wang, B. Sheng, C.C. Tan, N. Mi
Self-Adjusting Slot Configurations for Homogeneous and Heterogeneous Hadoop Clusters, IEEE Transactions on Cloud Computing, 5(2), 2017, 344-357
Z. Yang, M. Awasthi, M. Ghosh, N. Mi
A Fresh Perspective on Total Cost of Ownership Models for Flash Storage in Datacenters, 8th IEEE International Conference on Cloud Computing Technology and Science, Luxembourg, 2016
J. Tai, D. Liu, Z. Yang, X. Zhu, J. Lo, N. Mi
Y. Yao, J. Tai, B. Sheng, N. Mi

SELECTED RESEARCH PROJECTS
AFOSR YIP: Creating an Integrated Management Layer to Administer Heterogeneous Resources in Dynamic Workflow Clusters
Principal Investigator, Air Force Office of Scientific Research
CAREER: Capacity Planning Methodologies for Large Clusters with Heterogeneous Architectures and Diverse Applications
Principal Investigator, National Science Foundation
HOSSEIN MOSALLAEI

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, University of California, Los Angeles, 2001
ece.neu.edu/people/mosallaei-hossein

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

SELECTED PUBLICATIONS

S. Jafar-Zanjani, M.M. Salary, H. Mosallaei
Metafabrics for Thermoregulation and Energy-Harvesting Applications, ACS Photonics, 4(4), 2017, 915-927

A. Forouzmand, H. Mosallaei
Real-Time Controllable and Multi-Functional Metasurfaces Utilizing Indium Tin Oxide Materials: A Phased Array Prospective, IEEE Transactions on Nanotechnology, 16(2), 2017, 296-306

A. Forouzmand, H. Mosallaei

M.M. Salary, A. Forouzmand, H. Mosallaei
Model Order Reduction of Large-Scale Metasurfaces Using a Hierarchical Dipole Approximation, ACS Photonics, 4(1), 2016, 63-75

J. Cheng, H. Mosallaei
Truly Achromatic Optical Metasurfaces: A Filter Circuit Theory Based-Design, JOSA B, 32(10), 2015, 2115-2121

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

SELECTED RESEARCH PROJECTS

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

MARVIN ONABAJO

Assistant Professor, Electrical and Computer Engineering
PhD, Texas A&M University, 2011
ece.neu.edu/people/onabajo-marvin

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

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

SELECTED PUBLICATIONS

C.-H. Chang, S.A. Zahari, K. Wang, L. Xu, I. Farah, M. Onabajo
An Analog Front-End Chip with Self-Calibrated Input Impedance for Monitoring of Biosignals via Dry Electrode-Skin Interfaces, IEEE Transactions on Circuits and Systems I: Regular Papers, 2017

L. Xu, C.-H. Chang, M. Onabajo
A 0.77mW 2.4GHz RF Front-end with -4.5dBm In-Band IIP3 Through Inherent Filtering, IEEE Microwave and Wireless Components Letters, 26(5), 2016, 352-354

H. Chauhan, V. Kvartenko, R. Coxe, T. Weber, M. Onabajo

Efficient Broadband Current-Mode Adder-Quantizer Design for Continuous-Time Sigma-Delta Modulators, IEEE Transactions on Very Large Scale Integration Systems, 23(9), 2015, 1920-1930

H. Chauhan, Y. Choi, M. Onabajo, I. Jung, Y.-B. Kim

SELECTED RESEARCH PROJECTS

CAREER: Low-Power Transceiver Design Methods for Wireless Medical Monitoring
Principal Investigator, National Science Foundation
Integrated Self-Calibrated Analog Front-end for Biopotential and Bioimpedance Measurements
Principal Investigator, National Science Foundation
SARAH OSTADABBAS
Assistant Professor, Electrical and Computer Engineering
PhD, University of Texas at Dallas, 2014
ece.neu.edu/people/ostadabbas-sarah

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

SELECTED PUBLICATIONS
B. Rezaei, X. Huang, J. Yee, S. Ostadabbas
Long-Term Non-Contact Tracking of Caged Rodents, IEEE International Conference on Acoustics, Speech and Signal Processing, 2017

A. Farnoosh, M. Nourani, S. Ostadabbas
Spatially-Continuous Plantar Pressure Reconstruction Using Compressive Sensing, Machine Learning in Health Care, 2017

B. Rezaei, J. Lowe, J. Yee, S. Porges, S. Ostadabbas

Tongue-Controlled Robotic Rehabilitation: A Feasibility Study in People with Stroke, Journal of Rehabilitation Research and Development (JRRD), 53(6), 2016, 989-1006


S. Ostadabbas, M. Ghovanloo, A.J. Butler
Developing A Tongue Controlled Exoskeleton for a Wrist Tracking Exercise: A Preliminary Study, Journal of Medical Devices (JMD), 9, 2015

S. Ostadabbas, M. Nourani, R. Yousefi, M. Pompeo
A Knowledge-Based Modeling for Plantar Pressure Image Reconstruction, IEEE Transactions on Biomedical Engineering (TBME), 61(10), 2014, 2538-2549

SELECTED RESEARCH PROJECTS
Compressive Sensing for In-Shoe Pressure Monitoring
Principal Investigator, Mathworks Microgrant

Decoding Situational Empathy: A Graph Theoretic Approach Towards Introducing a Quantitative Empathy Measure
Principal Investigator, Northeastern Tier 1 Grant

TASKIN PADIR
Associate Professor, Electrical and Computer Engineering; affiliated faculty Mechanical and Industrial Engineering
PhD, Purdue University, 2004
ece.neu.edu/people/padir-taskin

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

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

SELECTED PUBLICATIONS
D. Sinyukov, T. Padir

V. Dimitrov, J. Vazquez, T. Padir


T. Padir, H. Yanco, R. Platt

X. Long, M. Wonsick, V. Dimitrov, T. Padir
Task-Oriented Planning Algorithm for Humanoid Robots Based on a Foot Repositionable Inverse Kinematics Engine, IEEE-RAS International Conference on Humanoid Robots (Humanoids), Cancun, Mexico, 2016

SELECTED RESEARCH PROJECTS
Accessible Testing on Humanoid-Robot-R5 and Evaluation of NASA Administered (ATHENA) Space Robotics Challenge
Principal Investigator, National Aeronautics and Space Administration

Autonomy and Navigation for Advanced UUVs
Principal Investigator, Massachusetts Seaport Economic Development Council

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

LocATER: Localization and Accountability Technology for Emergency Responders
Principal Investigator, National Science Foundation
CAREY RAPPAPORT

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

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

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

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

SELECTED PUBLICATIONS

G. Ghazi, C. Rappaport, J.A. Martinez-Lorenzo

B. Gonzalez-Valdes, Y. Alvarez, S. Mantzavinos, C.M. Rappaport, F. Las-Heras, J.A. Martinez-Lorenzo

Millimeter Wave Imaging Architecture for the On-the-Move Whole Body Imaging, IEEE Transactions on Antennas and Propagation, 64(6), 2016, 2328-2338

C. Rappaport, B. Gonzalez-Valdes,

Three-Dimensional Compressed Sensing-Based Millimeter-Wave Imaging, IEEE Transactions on Antennas and Propagation, 63(12), 2015, 5868-5873

SELECTED RESEARCH PROJECTS

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

Improved Millimeter Wave Radar AIT Characterization of Concealed Low-Contrast Body-Bourne Threats
Principal Investigator, Department of Homeland Security

PURNIMA RATILAL-MAKRIS

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

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

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

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

SELECTED PUBLICATIONS

Z. Gong, A.D. Jain, D. Tran, P. Ratilal, et al.
Ecosystem Scale Acoustic Sensing Reveals Humpback Whale Behavior Synchronous with Herring Spawning Processes and Re-Evaluation Finds No Effect of Sonar on Humpback Song Occurrence in the Gulf of Maine in Fall 2006, PLoS ONE, 9(10), 2014, e104733

D. Tran, W. Huang, A. Bohn, D. Wang, N. Makris, P. Ratilal, et al.

Z. Gong, D. Tran, P. Ratilal

Z. Gong, T. Chen, P. Ratilal, N. Makris

D. Tran, M. Andrews, P. Ratilal

M. Andrews, Z. Gong, P. Ratilal
Effects of Multiple Scattering, Attenuation and Dispersion in Waveguide Sensing of Fish, Journal of the Acoustical Society of America, 130, 2011, 1253-1271
MATTEO RINALDI
Associate Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, University of Pennsylvania, 2010
ece.neu.edu/people/rinaldi-matteo

Understanding and exploiting the fundamental properties of micro/nanomechanical structures and advanced nanomaterials to engineer new classes of micro and nanoelectromechanical systems (M/NEMS) with unique and enabling features applied to the areas of chemical, physical and biological sensing and low power reconfigurable radio communication systems

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

SELECTED PUBLICATIONS
C. Cassella, Y. Hui, Z. Qian, G. Hummel, M. Rinaldi
C. Cassella, G. Chen, Z. Qian, G. Hummel, M. Rinaldi
Y. Hui, J. S. Gomez-Diaz, Z. Qian, A. Alu’, M. Rinaldi
Plasmonic Piezoelectric Nanomechanical Resonator for Spectrally Selective Infrared Sensing, Nature Communications, 7, 2016, 11249
Z. Qian, F. Liu, Y. Hui, S. Kar, M. Rinaldi

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

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

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
Hidden GEMs: Automated Discovery of Access Control Vulnerabilities in Graphical User Interfaces, Proceedings of the IEEE Symposium on Security and Privacy (Oakland), San Jose, CA, 2014, 1-14
M. Weissbacher, T. Lauinger, W. Robertson
K. Onarlioglu, C. Mulliner, W. Robertson, E. Kirda

SELECTED RESEARCH PROJECTS
Automated Inference of High-Level Program Structure  
Principal Investigator, Office of Naval Research
Continuum: Finding Space and Time Vulnerabilities in Java Programs  
Principal Investigator, Defense Advanced Research Projects Agency
DarkDroid: Exposing the Dark Side of Android Marketplaces  
Co-Principal Investigator, Defense Advanced Research Projects Agency
Firmalice: Modeling and Identifying Malice in Firmware  
Co-Principal Investigator, Defense Advanced Research Projects Agency
Multi-Disciplinary Preparation of Next Generation Information Assurance Practitioners  
Co-Principal Investigator, National Science Foundation
MASOUD SALEHI
Associate Professor, Electrical and Computer Engineering
PhD, Stanford University, 1979
ece.neu.edu/people/salehi-masoud
Error correcting codes; information theory; digital communications

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

GUNAR SCHIRNER
Associate Professor, Electrical and Computer Engineering
PhD, University of California, Irvine, 2008
ece.neu.edu/people/schirner-gunar
Embedded computer systems; novel architectures for embedded vision; cyber-physical systems; system-level design and methodologies; hardware/software co-design

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

SELECTED RESEARCH PROJECTS
Collaborative Research: Holistic Design Methodology for Automated Implementation of Human-in-the-loop Cyber-physical Systems Principal Investigator, National Science Foundation
Power Efficient Emerging Heterogeneous Platforms Principal Investigator, National Science Foundation
BAHRAM SHAFAI
Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering

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

Control Systems; digital signal processing; robust and optimal control

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

SELECTED PUBLICATIONS

B. Shafai, S. Nazari, A. Oghbaee

B. Shafai, M. Saif

S.M.M. Alavi, M. Saif, B. Shafai
Accurate State Estimation in DC-DC Converters Using a Proportional Integral Observer (PIO), Proceedings of 23rd IEEE International Symposium on Industrial electronics (ISIE), 2014, 1304-1309

R. Ghadami, B. Shafai

P. Brunet, B. Shafai

B. Shafai, A Oghbaee

B. Shafai, A Oghbaee
Positive Quadratic Stabilization of Uncertain Linear System, Proceeding of IEEE Multi-conference on Systems and Control, CAA, Antibes, France, 2014, 1412-1417

B. Shafai, A. Oghbaee, T. Tanaka

R. Ghadami, B. Shafai
Decomposition-Based Distributed Control for Continuous-Time Multi-Agent Systems, IEEE Transactions on Automatic Control, 58(1), 2013, 258-264

AATMESH SHRIVASTAVA
Assistant Professor, Electrical and Computer Engineering

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

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

SELECTED RESEARCH PROJECTS

N. Shafiee, S. Tewari, B. Calhoun, A. Shrivastava


A. Shrivastava, D. Akella, B.H. Calhoun
A 1.5nW, 32.768kHz XTAL Oscillator Operational from 0.3V Supply, IEEE Journal of Solid-state Circuits, 51(3), 2016, 686-696


Contact Principal Investigator, Northeastern University
MICHAEL B. SILEVITCH

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

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

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

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

SELECTED RESEARCH PROJECTS

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

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

Research and Development of Reconstruction Advances in CT Based Object Detection Systems
  Principal Investigator, Department of Homeland Security

HANUMANT SINGH

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

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

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

SELECTED PUBLICATIONS

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

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

K.E. Smith, H. Singh, H., et al.
  Discovery of a Recent, Natural Whale Fall on the Continental Slope Off Anvers Island, Western Antarctic Peninsula, Deep Sea Research Part I: Oceanographic Research Papers, 90, 2014, 76-80


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 (starting January 2018)

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

Feedback control theory, systems biology, cancer, and biomedicine

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

SELECTED PUBLICATIONS

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

E.D. Sontag
Dynamic Compensation, Parameter Identifiability, and Equivariances, PLoS Computational Biology, 13, 2017, 1005447

S. Barish, M.F. Ochs, E.D. Sontag, J.L. Gevertz
Evaluating Optimal Therapy Robustness by Virtual Expansion of a Sample Population, with a Case Study in Cancer Immunotherapy, Proceedings of the National Academy of Sciences, 114, 2017, 6277-6286


J. K. Kim, E.D. Sontag
Reduction of Multiscale Stochastic Biochemical Reaction Networks Using Exact Moment Derivation, PLoS Computational Biology, 13(6)m, 2017, 1005571

E.V. Nikolaev, E.D. Sontag
Quorum-Sensing Synchronization of Synthetic Toggle Switches: A Design Based on Monotone Dynamical Systems Theory, PLoS Computational Biology, 12, 2016, e1004881

SELECTED RESEARCH PROJECTS

Theory-Based Engineering of Biomolecular Circuits in Living Cells
Co-Principal Investigator, Air Force Office of Scientific Research
Model-Guided Discovery and Optimization of Navy-Relevant Cell-Based Sensors
Co-Principal Investigator, Office of Naval research
Design Principles of Molecular Computing Using Engineered Enzymes
Co-Principal Investigator, National Science Foundation
Self-Modifying and Fast Analog Molecular Computing with Designed Enzymes
Co-Principal Investigator, DARPA

DAGMAR STERNAD

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

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

Motor control and learning, variability and stability, virtual rehabilitation, dynamic modeling, rhythmic and discrete movements as primitives for action

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

SELECTED PUBLICATIONS

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

P. Stein, E.L. Saltzman, K.G. Holt, D. Sternad
Is Failed Predictive Control a Risk Factor for Focal Dystonia?, Motor Disorders, 31(12), 2016, 1772-1777

C.J. Hasson, Z. Zhang, M.O. Abe, D. Sternad
Neuromotor Noise is Malleable by Amplification of Perceived Error, PLoS Computational Biology, 2016

M.E. Huber, N. Kuznetsov, D. Sternad
Persistence of Reduced Neuromotor Noise in Long-term Motor Skill Learning, Journal of Neurophysiology, 116(6), 2016, 2922-2935

SELECTED RESEARCH PROJECTS

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

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

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

Quantification of Predictive Motor Impairments in Individuals with ASD
Principal Investigator, National Institutes of Health

CRCNS US-German-Israeli Collaborative Research Proposal: Hierarchical Coordination of Complex Actions.
Principal Investigator, National Science Foundation

Multi-Center Trial of Augmented Sensory Feedback in Children with Dyskinetic CP
Co-Investigator, National Institute of Health
MILICA STOJANOVIC

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, Northeastern University, 1993
ece.neu.edu/people/stojanovic-milica
Wireless communications and networks, underwater acoustic transmission, statistical system characterization, adaptive signal processing

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

SELECTED PUBLICATIONS

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

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

Y. Aval, M. Stojanovic

P. Qarabaqi, M. Stojanovic

S. Yerramalli, M. Stojanovic, U. Mitra

J. Heidemann, M. Stojanovic, M. Zorzi

SELECTED RESEARCH PROJECTS

NeTS: Large: Collaborative Research: Exploration and Exploitation in Actuated Communication Networks
Principal Investigator, National Science Foundation

Intelligent Coordination and Adaptive Classification for Naval Autonomous Systems
Principal Investigator, Office of Naval Research

MRI: Development of the Northeastern University Marine Observatory NETwork (NU MONET)
Co-Principal Investigator, National Science Foundation

NIAN SUN

Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, Stanford University, 2002
ece.neu.edu/people/sun-nian-xiang
Magnetic, ferroelectric and magnetoelectric materials; RF/microwave magnetic and magnetoelectric devices design, fabrication and testing; materials properties at RF/microwave frequency; range self-assembly of magnetic nanostructures
Fellow, Institute of Physics; Fellow, Institute of Engineering and Technology; Office of Naval Research Young Investigator Award; National Science Foundation CAREER Award; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

Z. Zhou, M. Trassin, Y. Gao, Y. Gao, D. Chen...N.X. Sun
Probing Electric Field Control of Magnetism Using Ferromagnetic Resonance, Nature Communications, 6, 2015, 6082

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

M. Liu, Z. Zhou, T. Nan, B.M. Howe, G.J. Brown, N.X. Sun
Voltage Tuning of Ferromagnetic Resonance with Bistable Magnetization Switching in Energy-Efficient Magnetoelectric Composites, Advanced Materials, 25(10), 2013, 1435-1439

J. Lou, M. Liu, D. Reed, Y. Ren, N.X. Sun
Giant Electric Field Tuning of Magnetism in Novel Multiferroic FeGaB/Lead Zinc Niobate Lead Titanate Heterostructures, Advanced Materials, 21(46), 2009, 4711-4715

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

SELECTED RESEARCH PROJECTS

Integrated Thermoelectric Materials and Devices
Principal Investigator, Analog Devices, Incorporated

Multiferroic Materials for RF Applications
Principal Investigator, Defense Advanced Research Projects Agency

Nanofabricated Neural Probes with Ultra-sensitive Integrated Compact RF NEMS Magnetoelectric Sensors for Electromagneto-brain Activity Mapping
Principal Investigator, Keck Foundation

Novel Multiferroic Heterostructures for Translational Compact and Power Efficient Voltage Tunable Devices
Principal Investigator, National Science Foundation

Power Efficient Voltage Tunable Spin Hall Nano Oscillators with Multiferroic Heterostructures
Principal Investigator, Air Force Research Laboratory

Sensitive and Selective Chemical Sensor Using Molecularly-Imprinted Single Layer Graphene
Principal Investigator, Air Force
MARIO SZNAIER
Dennis Picard Trustee Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, University of Washington, 1989
ece.neu.edu/people/sznaier-mario

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

IEEE Control Systems Society Distinguished Member Award

SELECTED PUBLICATIONS
B. Yilmaz, C. Lagoa, M. Sznaier
An Efficient Atomic Norm Minimization Approach to Identification of Low Order Models, 2013 IEEE 52nd Annual Conference on Decision and Control, 2013, 5834-5839

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

C. Dicle, O. Camps, M. Sznaier
The Way They Move: Tracking Multiple Targets with Similar Appearance, IEEE International Conference on Computer Vision, Sydney, Australia, 2013

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

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

SELECTED RESEARCH PROJECTS
Robust Identification and Model (in) Validation of Switched Hammerstein/Wiener Systems and Applications
Principal Investigator, National Science Foundation

SRINIVAS TADIGADAPA
Professor and Chair of Electrical and Computer Engineering (starting January 2018)
PhD, Cambridge University, 1994
ece.neu.edu/people/tadigadapa-srinivas

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

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

SELECTED PUBLICATIONS
D. Gaddes, W. Brian Reeves, S. Tadigadapa
A Calorimetric Biosensing System for Quantification of Urinary Creatinine, ACS Sensors, 2017

E. Freeman, J. Harper, N. Goel, I. Gilbert, J. Unguris, S. Schiff, S. Tadigadapa
Improving The Magnetoelastic Performance of Metglas/Pzt Laminates by Annealing in Magnetic Field, Smart Materials & Structures, 2017

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

H. Min, W. Zhang, C. Ashraf, D. Allara, A.C.T. Van Duin, S. Tadigadapa

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

SELECTED RESEARCH PROJECTS
Implantable Brain Microelectromechanical Magnetic Sensing and Stimulation (MEMS-MAGSS)
Co-Principal Investigator, National Institutes of Health
GILEAD TADMOR
Professor, Electrical and Computer Engineering; affiliated faculty, Bioengineering
PhD, Weizmann Institute of Science, 1984
ece.neu.edu/people/tadmor-gilead
Control systems; dynamical systems; low order modeling and estimation in complex systems; medical imaging

SELECTED PUBLICATIONS
V. Troshin, A. Seifert, D. Sidilkover, G. Tadmor
Extensions to a Manifold Learning Framework for Time Series Analysis on Dynamic Manifolds in Bioelectric Signals, Physical Review E, 93, 2016, 042218
On the Need of Nonlinear Control for Efficient Model-based Wake Stabilization, Theoretical and Computational Fluid Dynamics, 28(1), 2014, 23-49
L. Mirkin, T. Shima, G. Tadmor
S. Laxminarayan, G. Tadmor, et al.
Modeling Habituation in Rat EEG Evoked Responses via a Neural Mass Model with Feedback, Biological Cybernetics, 105, 2011, 371-397

EDMUND YEH
Professor, Electrical and Computer Engineering
PhD, Massachusetts Institute of Technology, 2001
ece.neu.edu/people/yeh-edmund
Future internet architecture, cross-layer design and optimization of wireless networks, wireless network science, network economics, wireless sensor networks, network information theory and coding, smart power grids
Alexander von Humboldt Fellowship; Best Paper Award, IEEE International Conference on Communications; Army Research Office Young Investigator Program Award; Senior Member of the Institute of Electrical and Electronics Engineers; Secretary, IEEE Information Theory Society

SELECTED PUBLICATIONS
E. Yeh, R.A. Berry
R.A. Berry, E. Yeh
E. Yeh, A.S. Cohen
A. Bedekar, S. Borst, K. Ramanan, P. Whiting, E. Yeh
Downlink Scheduling in CDMA Data Networks, Global Telecommunications Conference, Rio De Janeiro, Brazil, 1999, 2653-2657

SELECTED RESEARCH PROJECTS
Modeling, Analysis and Control for Robust Interdependent Networks
Co-Principal Investigator, Defense Threat Reduction Agency
NeTS: Small; Collaborative Research: Large Scale Networks and Information Flow: From Emergent Behavior to Algorithm Design
Principal Investigator, National Science Foundation
Scalable Distributed and Dynamic Forwarding and Caching Algorithms for Named Data Networks
Principal Investigator, Cisco Systems, Incorporated
Brad J. Courville
PhD 2017, Electrical and Computer Engineering; Advisor, David Kaeli

IMPROVED SIMULATION OF THE NVIDIA KEPLER MEMORY HIERARCHY THROUGH MICROBENCHMARKING

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

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

Emrecan Demirors
PhD 2017, Electrical Engineering; Advisor, Tommaso Melodia

RECONFIGURABLE ARCHITECTURES FOR RF AND UNDERWATER ACOUSTIC WIRELESS NETWORKS

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

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

Velin Dimitrov
PhD 2017, Electrical and Computer Engineering; Advisor, Taskin Padir

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

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

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

Benjamin Drozdenko
PhD 2017, Computer Engineering; Advisor, Miriam Leeser

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

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

See full dissertation at coe.neu.edu/17/BenjaminDrozdenko
Sheng Li
PhD 2017, Computer Engineering; Advisor, Yun Fu

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

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

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

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

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

Fanny Nina Paravecino
PhD 2017, Computer Engineering; Advisor, David Kaeli

CHARACTERIZATION AND EXPLOITATION OF NESTED PARALLELISM AND CONCURRENT KERNEL EXECUTION TO ACCELERATE HIGH PERFORMANCE APPLICATIONS
In this thesis, we present novel approaches to characterize application behavior that can exploit nested parallelism and concurrent kernel execution introduced on recent GPU architectures. To identify bottlenecks that can be improved through the exploitation of nested parallelism and concurrent kernel execution, we proposed a set of metrics for a range of GPU kernels.

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

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

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

See full dissertation at coe.neu.edu/17/StephanieWhiteQuinn
G. Enrico Santagati
PhD 2017, Computer Engineering; Advisor, Tommaso Melodia
ULTRASONIC NETWORKING TECHNOLOGIES FOR THE INTERNET OF IMPLANTABLE AND WEARABLE THINGS
This dissertation discusses the design and development of wireless networking technologies for implantable and wearable devices based on ultrasonic communications. Wirelessly networked systems of implantable and wearable medical devices endowed with sensors and actuators will be the basis of many innovative, sometimes revolutionary therapies. However, biological tissues are composed primarily of water, and radio-frequency (RF) electromagnetic waves, which are the physical basis of currently used wireless technologies like Wi-Fi and Bluetooth, do not propagate well in water and heat body tissues. Additionally, RF communications can be easily jammed or eavesdropped, raising important privacy and security red flags, and a risk for the patient.

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

Su Sheng
PhD 2017, Electrical Engineering; Advisor, Brad Lehman
PHOTOVOLTAIC NANOGRID: PARALLEL OPERATING INVERTERS AND ENERGY MANAGEMENT FLOW
This thesis first presents the design of a lightweight, compact and high reliability modified sine wave inverter. The inverter is integrated with foldable photovoltaic (PV) panel, maximum power point tracking (MPPT) charger and rechargeable battery to construct a portable PV nanogrid that can supply both DC and AC loads, for campers, hikers and especially soldiers on the move. This dissertation proposes methods to safely parallel the modified sine wave inverters without adding filtering inductors or capacitors. The methods merge approaches used to parallel pure sine wave inverters with methods sometimes used to parallel DC-DC converters. The developed approaches are then extended to parallel cascaded H-bridge multilevel inverters.

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

Alireza Rouhani
PhD 2017, Electrical Engineering; Advisor, Ali Abur
ROBUST DYNAMIC STATE ESTIMATION IN POWER SYSTEMS
This dissertation introduces an UKF based DSE which is named Constrained Iterated Unscented Kalman Filter (CIUKF). One of the main features of the proposed DSE is that it is capable to identify the unknown parameters of the synchronous generators such as inertia constants and transient reactances while estimating the dynamic state variables of the synchronous generator.

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

Ramanathan Subramanian
PhD 2017, Electrical and Computer Engineering; Advisor, Kaushik Chowdhury
AN EXPERIMENTAL INVESTIGATION OF HOT SWITCHING CONTACT DAMAGE IN RF MEMS SWITCHES
This dissertation addresses several challenges in the design of medium access protocols for short-range wireless networks that can operate in distinct spectrum band(s). The publicly available code base, protocols, analytical models, algorithms and the insights resulting from simulation-based case studies will help researchers in significantly reducing the development time and effort. This will enable future reliable link layer designs and architecting robust network of radios, paving the way for the emergence of far-reaching wireless applications.

See full dissertation at coe.neu.edu/17/RamanathanSubramanian
Meenupriya Swaminathan
PhD 2017, Electrical and Computer Engineering; Advisor, Kaushik Chowdhury

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

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

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

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

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

Xin Xie
PhD 2017, Electrical Engineering; Advisor, Carol Livermore

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

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

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