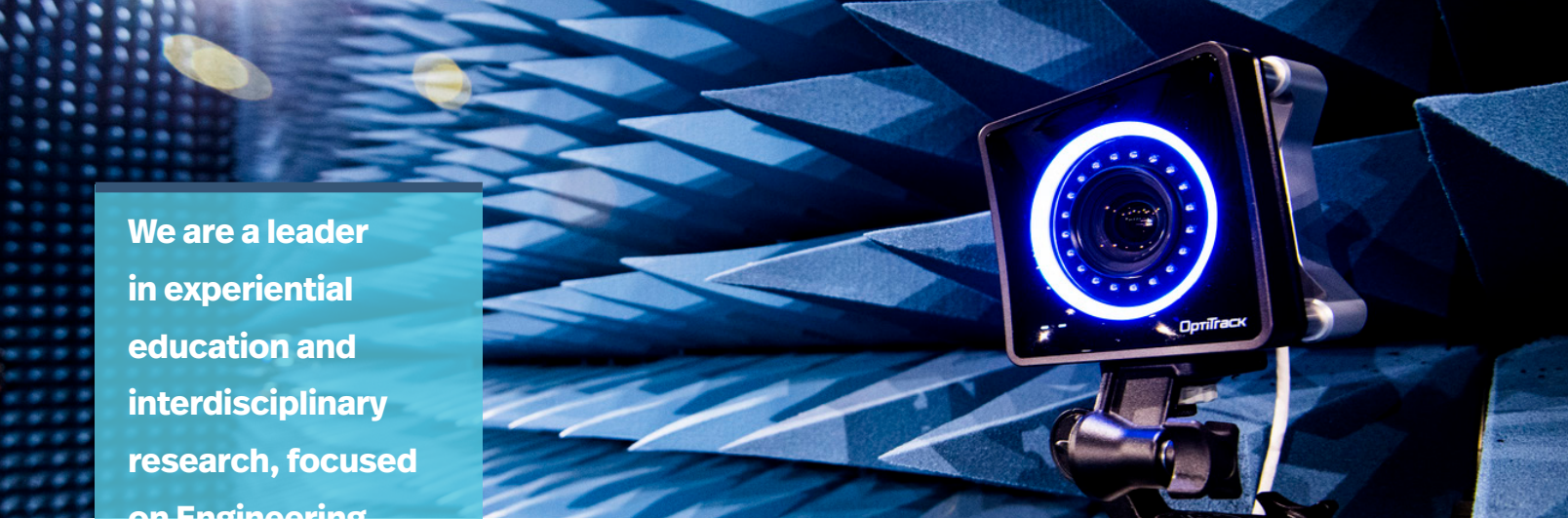


2019 | 2020

SCHOLARSHIP REPORT CIVIL AND ENVIRONMENTAL ENGINEERING

Chair's Message | 1 Quick Facts | 2 Honors | 4 Our Faculty | 8



**We are a leader
in experiential
education and
interdisciplinary
research, focused
on Engineering
for Society**

DEAR COLLEAGUES, FRIENDS, AND STUDENTS,

As we begin a new decade, current events stress for us the undeniable interconnectivity of our world. We continue to confront pressing, ongoing, and evolving global issues such as climate change, urban coastal sustainability, environmental justice, and the design of holistic urban regions. These are joined by novel threats, such as the COVID-19 pandemic. As civil and environmental engineers, we recognize these challenges as imperatives and opportunities for our profession to serve as leaders in building a more resilient world.

At Northeastern University, civil and environmental engineering education and research are focused on Urban Engineering: the interconnected topics of environmental health, civil infrastructure security, and sustainable resource engineering. Guided by these topics, we are training students with the interdisciplinary knowledge necessary to succeed in a rapidly changing world. Our focus on experiential education, both in the classroom and through our signature co-op and experiential PhD programs, ensures that our students graduate with real-world expertise and connections.

This year, we are pleased to launch our new Concentration in Data and Systems for our MS and PhD degrees in Civil Engineering. Private industry and government are increasingly reliant on data, and our profession is a key leader in this trend. This is an umbrella program that serves all civil and environmental engineering disciplines by providing a solid foundation in data-driven machine learning and artificial intelligence methods. It aims to promote a systems perspective, train students in modern programming languages, and develop a student's disciplinary fundamentals. We are also pleased to welcome three new faculty members, with expertise in atmospheric modeling, coastal engineering, and drinking water contamination.

Our scholars are engineering a resilient and sustainable future through leading-edge research. This seventh annual scholarship report details the exceptional academic and professional accomplishments of our faculty and PhD candidates for the 2019-2020 academic year. We look forward to building a better world together.

FOR THE LATEST HIGHLIGHTS, PLEASE VISIT US AT CEE.NORTHEASTERN.EDU.



Sincerely,

Jerome F. Hajjar, Ph.D., P.E.
CDM Smith Professor
Department Chair
Civil and Environmental Engineering
jf.hajjar@northeastern.edu

QUICK FACTS CIVIL AND ENVIRONMENTAL ENGINEERING

44

TENURED/ TENURE-TRACK

Including T/TT
Affiliated Faculty

14

Young Investigator Awards

9

National Science Foundation CAREER Awards

11



Professional Society Fellowships

3

Federally Funded Research Centers

PROTECT,
Puerto Rico Testsite
for Exploring
Contamination Threats,
funded by NIEHS

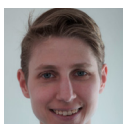
CRECE,
Center for Research
on Early Childhood
Exposure and
Development, funded
by EPA and NIEHS

ECHO, Environmental
Influences on Child
Health Outcomes,
funded by NIH

RECENT HIRES



Qin Jim Chen
PhD, Old Dominion University



Julia Hopkins
PhD, MIT



Kelsey Pieper
PhD, Virginia Tech



Hao Sun
PhD, Columbia University



Yang Zhang
PhD, University of Iowa

164

Masters Students

78

Doctoral Students

35% Graduate Students
are Women

Akram Alshawabkeh has been appointed
University Distinguished Professor for
his accomplishments and achievements
in the field of geoengineering and
environmental health.



COLLEGE OF ENGINEERING

With **189** tenured/tenure-track faculty and **18** multidisciplinary research centers and institutes with funding by eight federal agencies, the College of Engineering is a leader in experiential education and interdisciplinary research, with a focus on discovering solutions to global challenges to benefit society.

5

Engineering Departments

95

YOUNG INVESTIGATOR Awards

Including **50** NSF CAREER
Awards, and **18** DOD
Young Investigator Awards



1038

Graduate Students Placed on Co-op (2019-20)

TOTAL ENROLLMENT (2019)

8460

53% Graduate
47% Undergraduate

Enrollment Growth (2014 to 2019)

115% MS

36% PhD

24% BS





Northeastern University PROTECT Center Faculty

AKRAM ALSHAWABKEH
Director of PROTECT, University
Distinguished Professor, Snell
Professor of Engineering and
Senior Associate Dean for
Research and Graduate Education

TOM SHEAHAN
Sr. Vice Provost for
Curriculum and
Programs, and Professor of Civil
and Environmental Engineering

DAVID Kaeli
Professor of Electrical and
Computer Engineering

PHIL BROWN
University Distinguished
Professor of Sociology and Health
Sciences

JUSTIN MANJOURIDES
Associate Professor of
Biostatistics

JENNIFER DY
Professor of Electrical and
Computer Engineering

PHIL LARESE-CASANOVA
Associate Professor of Civil and
Environmental Engineering

ALISA LINCOLN
Professor of Health Sciences and
Sociology, and Associate Dean of
Research for the College of Social
Sciences and Humanities

PROTECT Research Center Continues a Bold Mission for Environmental Health

Receives \$10.7 million NIH renewal grant

PUERTO RICO IS AN ISLAND COMMUNITY with a poverty rate quadruple that of the overall U.S. The island faces severe environmental pollution and is home to 18 Superfund sites—areas identified by the U.S. government as contaminated with hazardous chemicals that require clean up. These sites, along with hundreds of other non-Superfund contaminated sites, have resulted in extensive contamination of drinking water resources. Rates of preterm births and infant mortality in Puerto Rico are among the highest of all U.S. states and territories, and there is evidence that this contamination is a contributing factor. Moreover, frequent natural disasters, such as Hurricane Maria in 2017 and a 6.4 magnitude earthquake in 2020, may result in elevated exposures to Superfund chemicals, further compounding the adverse health outcomes.

Since 2010, the PROTECT multidisciplinary and multi-institutional research center has provided much-needed understanding of the relationship between several suspect chemicals and adverse pregnancy outcomes, including the exact mechanisms by which these chemicals act on the body. PROTECT (short for Puerto Rico Testsites to Explore Contamination Threats) is led by Northeastern University under the direction of Akram Alshawabkeh, University Distinguished Professor, Snell Professor of Engineering, and Senior Associate Dean for Research and Graduate Education, in collaboration with colleagues from three colleges at Northeastern, the University of Puerto Rico, University of Georgia, and University of Michigan.

Since PROTECT's inception, the research center has built detailed and extensive data sets on environmental and prenatal conditions of over 1,500 pregnant mothers—close to 3,000 data points per

participate in areas such as exposure, socioeconomic, and health data. The data shows a compelling link between suspect chemical classes (chlorinated volatile organic compounds and phthalates) and adverse pregnancy outcomes. Analysis of tap water collected by PROTECT after Hurricane Maria showed significantly elevated detection frequency and levels of many contaminants compared to pre-hurricane data.

“Extreme weather conditions are an unfortunate part of life for the people of Puerto Rico with the devastation left behind beyond what can be seen with the human eye,” says Alshawabkeh. “Our research findings indicate that not only do chemicals from Superfund sites contaminate drinking water, but natural disasters such as hurricanes are causing heightened toxic environmental conditions by exposing people to dangerous chemicals.”

In March 2020, PROTECT was awarded a five-year \$10.7 million grant from the National Institutes of Health to continue and expand its work. This next phase of PROTECT research will include the study of an additional 1,000 pregnant women and look at a mixture of chemicals beyond the initial two suspect chemical classes. The impacts of natural hazards on contaminant transport and exposure will be studied further, as will the underlying biological mechanisms by which contaminant exposure can lead to adverse pregnancy outcomes. Additionally, new water treatment technologies will be developed for portable water treatment systems. New statistical methods and data mining, machine learning, and visualization tools will be developed to allow PROTECT researchers to analyze data sets. PROTECT will also employ innovative approaches to engage and educate the community, and a broad suite of training, and professional and tailored activities will be provided to trainees to meet their needs and goals.

Alshawabkeh says, “Through improved understanding of the link between adverse pregnancy outcomes and contamination, together with sustainable technologies to reduce risk, our goal is to help improve health outcomes in Puerto Rico and beyond.”

FACULTY BY RESEARCH AREAS

Civil Infrastructure Security

Joseph Ayers	Andrew Myers
Dionisio P. Bernal	Mark Patterson
Luca Caracoglia	Mehrdad Sasani
Qin Jim Chen	Thomas Sheahan
Stephen Flynn	Craig Shillaber
Peter Furth	Michael B. Silevitch
Auroop R. Ganguly	Hao Sun
Jerome F. Hajjar	Ali Touran
Michael Kane	Sara Wadia-Fascetti
Haris Koutsopoulos	Ming L. Wang
Yiannis Levendis	Qi "Ryan" Wang
Sinan Müftü	Mishac Yegian

Environmental Health

Akram Alshawabkeh	Philip Larese-Casanova
R. Edward Beighley	Amy Mueller
Qin Jim Chen	Samuel Munoz
Matthew J. Eckelman	Annalisa Onnis-Hayden
Loretta A. Fernandez	Mark Patterson
Auroop R. Ganguly	Kelsey Pieper
Edgar D. Goluch	Ameet Pinto
Tarik Gouhier	Thomas Sheahan
Jonathan Grabowski	Aron Stubbins
Brian Helmuth	Geoffrey C. Trussell
Julia Hopkins	Yang Zhang
Randall Hughes	

Sustainable Resource Engineering

Luca Caracoglia	Haris Koutsopoulos
Matthew J. Eckelman	Michelle Laboy
David Fannon	Mark Patterson
Peter Furth	Craig Shillaber
Auroop R. Ganguly	Jennie C. Stephens
Tarik Gouhier	Ali Touran
Jonathan Grabowski	Geoffrey C. Trussell
Jerome F. Hajjar	Ming L. Wang
Brian Helmuth	Qi "Ryan" Wang
Julia Hopkins	Yang Zhang
Randall Hughes	
Michael Kane	

Faculty Honors and Awards

Selected Highlights



The U.S. Department of Energy awarded Assistant Professor **Michael Kane** (PI), civil and environmental engineering (CEE), Associate Professor **David Fannon**, College of Arts,

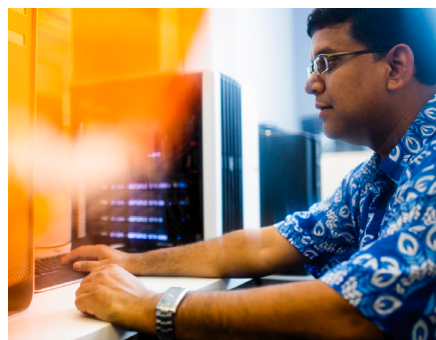
Media, and Design, jointly appointed in CEE, and Affiliated Faculty Misha Pavel, electrical and computer engineering, a **\$2.2 million grant** to create an open dataset characterizing occupant-centric control of grid-interactive efficient buildings. The researchers, in collaboration with the National Renewable Energy Lab and industry partners, are looking to design smarter occupant-centric building control algorithms that learn user behavior, are easy to

use, and can correctly predict HVAC performance and power draw. The project takes a novel approach to cost-effectively produce and share a large dataset on characterizing grid-interactive efficient buildings and occupant behavior.



Assistant Professor **Hao Sun**, civil and environmental engineering (CEE), Assistant Professor Yanzhi Wang, electrical and computer engineering (ECE), and CEE Professor and Chair **Jerome**

Hajjar were awarded a \$600K National Science Foundation grant for "**Physics-Reinforced Deep Learning for Structural Metamodeling**." The research will develop new computational methods to advance modeling, analysis, and assessment of civil structural systems subjected to earthquakes.



Professor **Auroop Ganguly**, civil and environmental engineering, is the lead PI on a **\$3 million grant** for "NICE: Networked Infrastructures under Compound Extremes" from the DoD's Strategic Environmental Research and Development Program (SERDP). The project is in collaboration with the University of California at Berkeley, U.S. DOE's Pacific Northwest National Lab, the U.S. Army Corps of Engineers, and the U.S. Naval Research Lab and will fund research into networked infrastructures under compound extremes. Due to the increased interconnectivity of our world, there is a danger that pressure placed by extreme events on one facet of infrastructure could cause a cascade of failures across others. Ganguly and his team plan to develop a framework for mapping failure and recovery pathways of critical infrastructure. The government and military will be able to use the framework to predict the effect of various compound extremes on important infrastructure, and direct resources for strengthening them appropriately.



Associate Professor **Luca Caracoglia**, civil and environmental engineering, was awarded a \$440K National Science Foundation grant for “Exploiting the Wind Energy Resource

through Aeroelastic Vibration and Torsional Flutter.”



Professor **Ozlem Ergun**, mechanical and industrial engineering, and Assistant Professor **Michael Kane**, civil and environmental engineering, are co-PIs of a **\$1.2 million National Science Foundation grant**, along with Northeastern’s School of Law (lead), and College of Social Sciences and Humanities, as well as Boston College for creating an “Understanding the Algorithmic Workplace: A Multi-Method Study for Comprehensive Optimization of Platforms.” The project will develop new evidence and understanding about the behavior and interactions of workers, business organizations, and government institutions that are involved in the “algorithmic workplace” or “gig economy”.



[View all department news.](#)

COVID-19 Research Highlights



College of Engineering Distinguished Professor **Ming Wang**, civil and environmental engineering, is reconfiguring the biosensor of a testing device he

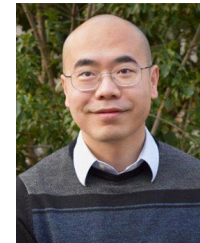
developed to monitor glucose levels using **rapid saliva samples to test for SARS-Cov-2** molecules in the saliva of people who carry the coronavirus and give an accurate diagnosis within three minutes of testing. The device is intended to work even in the early stages of infection, before the onset of COVID-19 symptoms. It is also designed to detect antibodies in an effort to help determine whether someone who has recovered from the disease might be protected from it in the future.



Assistant Professor **Ameet Pinto**, civil and environmental engineering (CEE),

Associate Professor **Aron Stubbins**, College of Science, jointly appointed in CEE, and Assistant Professor **Kelsey Pieper**, CEE, were awarded a \$200K **National Science Foundation RAPID grant** for “Extreme Water Use Patterns and Their Impact on the Microbial and Chemical Ecology of Drinking Water.” An unintentional impact of COVID-19 interventions is a drastic change in where and how much drinking water is used. The primary goal of this RAPID project is to understand the effect of drastic changes in water use patterns across residential and commercial locations on

the quality of drinking water. Drinking water quality will be monitored at multiple residential and commercial locations in the City of Boston, during and after the pandemic. Results from this study will have a direct impact on post-COVID-19 recovery. Results inform efforts to protect public health and water infrastructure in future scenarios where water use patterns change drastically over short time periods.



Assistant Professor **Qi “Ryan” Wang**, civil and environmental engineering, in collaboration with the University of Florida, was awarded an \$89K **National Science**

Foundation RAPID grant for “High-Frequency Data Collection for Human Mobility Prediction During COVID-19.” The specific focus will be to understand changes in mobility patterns and the complex and dynamic decision-making process shaping these changes during the unfolding events associated with this major public health crisis. Wang was also awarded a \$200K **National Science Foundation RAPID grant** for determining the “Infection Transmission of COVID-19 in Urban Neighborhoods.” Recent reports reveal that in many American cities the coronavirus is having disproportionate impacts on neighborhoods that are historically disadvantaged. This project will identify disparities in infection rates by examining how residents of different neighborhoods have varied in their ability and tendency to practice social distancing during the pandemic. While most research on how infection proceeds through communities focuses on international transmission, we expand this understanding to how it progresses through the finer geospatial scale of communities in a metropolitan area.



Ameet Pinto, assistant professor of civil and environmental engineering, received the **Water Research Foundation’s Paul L. Busch award** with a \$100K grant for his innovative research to make testing drinking water affordable and quick to the masses. All water has microorganisms in it so when filtering water, the question isn’t whether bacteria is present, but rather how much and what kind. His lab is developing a low-cost microscope and easy-to-follow procedures that will help regulate how water quality is monitored. One of those procedures involves sequencing the DNA of microbes in a water source. A portable DNA sequencer can be used on-site to test what kind of bacteria is in the water with immediate results. The microscope costs only about \$250 to make and can be assembled using generic parts that can be purchased online.



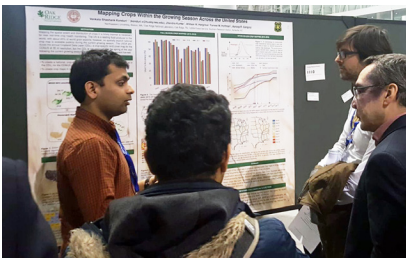
Associate Professors **Loretta Fernandez** and Assistant Professor **Amy Mueller**, civil and environmental engineering, jointly appointed in the College of Science, have developed a method for **testing particle filtration efficiency of cloth masks**—both handmade and commercial—to provide information urgently needed by health care professionals and individuals caring for ill loved ones in their homes. Preliminary results and testing suggest the options that may provide health protection in cases where N95 and commercial surgical masks are unavailable. It is well known that both the mask material and seal are critical for good protection, and this work allows masks to be assessed on both qualities: whether the material is adequate and whether the fit is adequate.



Interdisciplinary Engineering PhD candidate **Craig Poulin** and Assistant Professor **Michael Kane**, civil and environmental engineering, were awarded “Best Community R&D Paper” at Resilience Week 2019 for their paper “Identifying Heterogeneous Infrastructure Interdependencies through Multiverse Simulation.”

Student Honors and Awards

Selected Highlights



Interdisciplinary PhD student **Shashank Konduri**, civil and environmental engineering, received the First Place Poster Presentation Award for his poster on “In-season Crop Mapping for the Continental United States” at the American Meteorological Society’s 100th Annual Meeting.



Madeline DuBois, E’20, environmental engineering, was awarded a 2020 Fulbright scholarship at the University of Copenhagen, Denmark to study agriculture with a specialization in production and the environment.



PhD student **Zhao Chen**, civil and environmental engineering, was awarded a 2020 Thornton Tomasetti Student Innovation Fellowship for his exceptional submittal for innovative research to investigate “Efficient Seismic Meta-modeling of Highly Nonlinear Structures with Scarce Data.”



Northeastern's Engineers Without Borders chapter was selected for the 2019 Premier Chapter Award from EWB-USA.



The **Northeastern Graduate Structural Engineering Association (NGSEA)** was selected by the Structural Engineering Institute (SEI) Local Activities Division as the Graduate Student Chapter of the Year. They were chosen for their “excellent mix of technical and social activities” that engage students and “help them transition into the workforce.”



Michael Tormey, E’20, civil engineering, was awarded the prestigious Marshall Scholarship, which will allow him to study transportation engineering for two years in the United Kingdom. He was also one of just 10 students nationwide named to the 2020 list of New Faces of Civil Engineering Collegiate Edition by the American Society of Civil Engineers.

PhD Student Spotlight



Alice Peiying Wang, PhD'19

Advised by Loretta Fernandez, Associate Professor, Civil and Environmental Engineering, jointly appointed in Marine and Environmental Sciences in the College of Science

While pursuing her PhD in Civil Engineering at Northeastern University, Alice Peiying Wang worked closely with researchers at the U.S. Army Corp of Engineers' Environmental Research and Development Center (USACE ERDC). She learned how various potential remedies for PCB contaminated sediments perform in terms of protecting aquatic species from taking up toxic compounds from their environment, and how those remedies respond to ongoing contamination. Through her research she became an expert in the application of passive sampling methods for analyzing transport of contaminants between environmental media. She and Associate Professor Loretta Fernandez collaborated on various publications of this work including "Bioaccumulation in Functionally Different Species: Ongoing Input of PCBs with Sediment Deposition to Activated Carbon Remediated Bed Sediments," which was recognized for the 2019 Top 10 Exceptional Papers Award by Environmental Toxicology and Chemistry (ET&C) journal, published by the Society of Environmental Toxicology and Chemistry (SETAC). She presented her work at various professional conferences hosted by organizations including SETAC, American Chemical Society (ACS) and International Passive Sampling Workshop (IPSW). She received Northeastern University conference funding awards from the Graduate Student Government (GSG), Graduate Women in Science and Engineering (GWISE) and the PhD Network. She was one of the founding members of the CEE Graduate Student Council, which helps create a community among the graduate student body through social and professional networking events. She joined Geosyntec Consultants after graduation and now applies her expertise in passive sampling and contaminant transport modeling at project sites across the United States and beyond.

Akram Alshawabkeh



University Distinguished Professor and Snell Professor of Engineering, Civil and Environmental Engineering; Senior Associate Dean for Research and Graduate Education; Director, PROTECT Superfund Research Center

PhD, Louisiana State University, 1994
coe.northeastern.edu/people/alshawabkeh-akram

Scholarship focus: geoenvironmental engineering, soil and groundwater remediation; electrokinetic and electrochemical processes; contaminant fate and transport; environmental restoration

Honors and awards: Fellow, American Society of Civil Engineers; ASCE Thomas A. Middlebrooks Award; National Science Foundation CAREER Award; Søren Buus Outstanding Research Award, College of Engineering

SELECTED PUBLICATIONS

- A.L. Cathey, D.J. Watkins, Z.Y. Rosario, C. Velez, A. Alshawabkeh, J.F. Cordero, J.D. Meeker
 Associations of Phthalates and Phthalate Replacements with CRH and Other Hormones Among Pregnant Women in Puerto Rico, *Journal of the Endocrine Society*, 3(6), 2019, Pages 1127–1149
- A. Aker, K.K. Ferguson, Z.Y. Rosario, A.M. Calafat, X. Ye, A. Alshawabkeh, J.F. Cordero, J.D. Meeker
 A Repeated Measures Study of Phenol, Paraben, and Triclocarban Urinary Biomarkers and Circulating Maternal Hormones During Gestation in the Puerto Rico PROTECT Cohort, *Environmental Health*, 18(1), 2019, 28
- W. Zhou, X. Meng, J. Gao, A.N. Alshawabkeh
 Hydrogen Peroxide Generation from O₂ Electroreduction for Environmental Remediation: A State-of-the-Art Review, *Chemosphere*, 225, 2019, 588–607

SELECTED RESEARCH PROJECTS

- Electrochemically-Induced in Situ Degradation of Legacy Munitions and Insensitive High Explosives in Manufacturing Wastewater
 Co-Principal Investigator, Department of Defense Strategic Environmental Research and Development Program
- Environmental Influences on Child Health Outcomes in Puerto Rico (ECHO-PRO)
 Principal Investigator and Director, National Institutes of Health
- Puerto Rico Testsite for Exploring Contamination Threats (PROTECT)
 Principal Investigator, National Institutes of Health

Joseph Ayers



Professor, Marine and Environmental Sciences; affiliated faculty, Bioengineering, Civil and Environmental Engineering, Electrical and Computer Engineering

PhD, University of California, Santa Cruz, 1975
coe.northeastern.edu/people/ayers-joseph

Scholarship focus: development of underwater robots for civil infrastructure and explosive sensing; neurophysiology and behavior; biomimetics; synthetic biology

SELECTED PUBLICATIONS

- R.T. Myers, J. Ayers
 A Nitric Oxide Sensor Fabricated Through E-Jet Printing Towards Use in Bioelectronics Interfaces, *Journal of Applied Electrochemistry*, 48, 2018, 1-11
- L.L. McGrath, S.V. Vollmer, S.T. Kaluziak, J. Ayers
 De Novo Transcriptome Assembly for the Lobster *Homarus Americanus* and Characterization of Differential Gene Expression Across Nervous System Tissues, *BMC Genomics*, 17, 2016, 3-12
- J. Ayers
 Underwater Vehicles Based on Biological Intelligence, *ASME Journal of Dynamic Systems, Measurement and Control*, 138, 2016, 1-5
- L. Zhu, A.I. Selverston, J. Ayers
 The Role of Ih in Differentiating the Dynamics of the Gastric Mill and Pyloric Neurons in the Stomatogastric Ganglion of the Lobster, *Homarus Americanus*, *Journal of Neurophysiology*, 115(5), 2016, 2434-2445
- J. Lu, J. Yang, Y.-B. Kim, J. Ayers, K.K. Kim
 Implementation of Excitatory CMOS Neuron Oscillator for Robot Motion Control Unit, *Journal of Semiconductor Technology and Science*, 14(4), 2014, 383-390
- J. Ayers, D. Blustein, A. Westphal
 A Conserved Biomimetic Control Architecture for Walking, Swimming and Flying Robots, *Lecture Notes in Artificial Intelligence*, 2012, 1-12

SELECTED RESEARCH PROJECTS

- Utilizing Synthetic Biology to Create Programmable Micro Bio-Robots
 Co-Principal Investigator, Office of Naval Research

R. Edward Beighley



Professor and Associate Chair for Undergraduate Studies, Civil and Environmental Engineering; affiliated faculty, Marine and Environmental Sciences, Global Resilience Institute; Associate Director of the Coastal Sustainability Institute

PhD, University of Maryland, 2001
coe.northeastern.edu/people/beighley-edward

Scholarship focus: hydrologic and hydraulic modeling; remote sensing of the hydrologic cycle; hydrologic impacts of climate and/or land use change; flood hazard and risk assessment

Honors and awards: Fostering Engineering Innovation in Education Award, College of Engineering, Northeastern University, 2019; College of Engineering Faculty Fellow

SELECTED PUBLICATIONS

F.E. O'Loughlin, J. Neal, G.J.P. Schumann, E. Beighley, P.D. Bates

A LISFLOOD-FP Hydraulic Model of the Middle Reach of the Congo, *Journal of Hydrology*, 24, 2020, 2253–2267

D. Feng, R.E. Beighley

Identifying Uncertainties in Simulated Streamflow from Hydrologic Model Components for Climate Change Impact Assessments, *Hydrology and Earth System Sciences*, 24, 2020, 2253–2267

F. Hossain, M. Bonnema, M. Srinivasan, E. Beighley, et al.
The Early Adopter Program for the Surface Water Ocean Topography Satellite Mission: Lessons Learned in Building User Engagement during the Pre-launch Era, *Bulletin of the American Meteorological Society*, 101(3), 2020, E259–E264

SELECTED RESEARCH PROJECTS

Global River Baseflows Derived from GRACE/GRACE-FO
Principal Investigator, National Aeronautics and Space Administration, GARCE-FO Science Team

Collaborative Research: Re-evaluating Precipitation Extremes and Flood Hazard in the Wake of Hurricane Harvey

Co-Principal Investigator, National Science Foundation
Integrating Lateral Contributions and Longitudinal Controls Along River Reaches to Improve SWOT Discharge Estimates

Principal Investigator, National Aeronautics and Space Administration, SWOT Science Team

Dionisio Bernal



Professor, Civil and Environmental Engineering

PhD, University of Tennessee, 1979
coe.northeastern.edu/people/bernal-dionisio

Scholarship focus: system identification; fault detection and fault localization; earthquake engineering; soil structure interaction; structural stability

Honors and awards: Moisseiff Award, American Society of Civil Engineers; Søren Buus Outstanding Research Award

SELECTED PUBLICATIONS

D. Bernal

Eigenvalue Sensitivity of Sampled Systems Operating in Closed-Loop, *Mechanical Systems and Signal Processing*, 105, 2018, 481–487

D. Bernal, M.R. Ulriksen

Output Feedback in the Design of Eigenstructures for Enhanced Sensitivity, *Mechanical Systems and Signal Processing*, 112, 2018, 22–30

M.D. Ulriksen, D. Bernal, L. Damkilde

Shaped Input Distributions for Structural Damage Localization, *Mechanical Systems and Signal Processing*, 110, 2018, 499–508

D. Bernal

State Observers in the Design of Eigenstructures for Enhanced Sensitivity, *Mechanical Systems and Signal Processing*, 110, 2018, 122–129

D. Bernal

Analytical Minimization of Synchronicity Errors in Stochastic Identification, *Mechanical Systems and Signal Processing*, 98, 2017, 415–424

Y. Zhang, D. Bernal

Damage Localization From Projection of Free Vibration Signals, *Journal of Sound and Vibration*, 394, 2017, 146–154

SELECTED RESEARCH PROJECTS

Monitoring the Health of Structural Systems from the Geometry of Sensor Traces

Principal Investigator, National Science Foundation

Luca Caracoglia



Associate Professor, Civil and Environmental Engineering; affiliated faculty, Mechanical and Industrial Engineering

PhD, University of Trieste, 2001
coe.northeastern.edu/people/caracoglia-luca

Scholarship focus: structural dynamics; wind engineering; wind energy; wind-induced vibration; cable dynamics; climate change

Honors and awards: ASCE Fellow; Full Professor, Two National Scientific Habilitations, Ministry of Instruction, University and Research, Italy; Scientific Disciplines ICAR 08/B2 and ICAR 08/B3; National Science Foundation CAREER Award

SELECTED PUBLICATIONS

V. Le, L. Caracoglia

A Neural Network Surrogate Model for the Performance Assessment of a Vertical Structure Subjected to Non-stationary, Tornadoic Wind Loads, *Computers and Structures*, 231, 2020, 106208

F. Rizzo, L. Caracoglia

Artificial Neural Network Model to Predict the Flutter Velocity of Suspension Bridges, *Computers and Structures*, 233, 2020, 106236

V. Le, L. Caracoglia

Experimental Investigation on Non-Stationary Wind Loading Effects Generated with a Multi-Blade Flow Device, *Journal of Fluids and Structures*, 96, 2020, 103049

V. Le, L. Caracoglia

Life-cycle Cost Analysis of a Monopole Structure Subjected to Tornadoic Wind Loads, *ASCE Journal of Structural Engineering*, 146(2), 2020, 04019194

I. Venanzi, L. Ierimonti, L. Caracoglia

Life-Cycle-Cost Optimization for the Wind Load Design of Tall Buildings Equipped with TMDs, *Wind and Structures*, an International Journal, Techno-Press, 30(4), 2020, 379-392

SELECTED RESEARCH PROJECTS

Collaborative Research: Active Control of Nonlinear Flow-Induced Instability of Wind Turbine Blades under Stochastic Perturbations

Principal Investigator, National Science Foundation

Exploiting the Wind Energy Resource through Aeroelastic Vibration and Torsional Flutter

Principal Investigator, National Science Foundation

Performance-Based Wind Engineering: Stochastic Approximation for the Wind-Induced Dynamics of the Next-Generation Tall Buildings and Tower Structures

Principal Investigator, National Science Foundation

Qin Jim Chen



Professor, Civil and Environmental Engineering; jointly appointed, Marine and Environmental Sciences

PhD, Old Dominion University, 1997
coe.northeastern.edu/people/chen-qin-jim

Scholarship focus: coastal engineering and science, particularly in coastal hydrodynamics; fluid-structure interactions; natural and nature-based solutions; coastal hazard assessment and mitigation; and numerical modeling for coastal resiliency and sustainability

Honors and awards: James M. Todd Technological Accomplishment Medal, LES-BTR; Best Paper Award, Louisiana Association of Professional Biologists; LSU Rainmakers Award for innovative research; National Science Foundation CAREER Award

SELECTED PUBLICATIONS

L. Zhu, Q. Chen, H. Wang, W. Capurso, L. Niemczynski, K. Hu, G. Snedden

Field Observations of Wind Waves in Upper Delaware Bay with Living Shorelines, *Estuaries and Coasts*, 43, 2020, 739-755

C. Johnson, Q. Chen, C. Ozdemir

Lidar Time-Series Analysis of a Rapidly Transgressing Low-Lying Mainland Barrier (Caminada Headlands, Louisiana, USA), *Geomorphology*, 352, 2020, 106979

L. Zhu, Q. Chen

Phase-Averaged Drag Force of Nonlinear Waves Over Submerged and Through Emergent Vegetation, *Journal of Geophysical Research-Oceans*, 124, 2019

K. Liu, Q. Chen, K. Hu, K. Xu, R. Twilley

Modeling Hurricane-Induced Wetland-Bay and Bay-Shelf Sediment Fluxes, *Coastal Engineering*, 135, 2018, 77-90

K. Hu, Q. Chen, H. Wang, E.K. Hartig, P.M. Orton

Numerical Modeling of Salt Marsh Morphological Change Induced by Hurricane Sandy, *Coastal Engineering* 132, 2018, 63-81

SELECTED RESEARCH PROJECTS

A Coastal Resilience Collaboratory: Cyber-Enabled Discoveries for Sustainable Deltaic Coasts

Principal Investigator, National Science Foundation

Collecting Ecological Data and Models of Living Shoreline Restoration Projects (MD, NJ, NY, VA)

Principal Investigator, U.S. Geological Survey

Convergence: RAISE Nearshore Water-Land Interface During Extreme Storms

Co- Principal Investigator, National Science Foundation

Matthew Eckelman



Associate Professor, Civil and Environmental Engineering; affiliated faculty, Chemical Engineering, Marine and Environmental Sciences, Public Policy and Urban Affairs

PhD, Yale University, 2009
coe.northeastern.edu/people/eckelman-matthew

Scholarship focus: environmental engineering and sustainability; life cycle assessment; energy efficiency and emissions modeling; environmental assessment of bio and nanomaterials; material and energy use in urban buildings and infrastructure

Honors and awards: National Science Foundation CAREER Award; International Laudise Prize in Industrial Ecology; National Academy of Engineering Exemplar in Engineering Ethics Education; Clemens Herschel Award for Civil Engineering Research, Boston Society of Civil Engineering Section (BSCES)

SELECTED PUBLICATIONS

A.G. Parvatker, M.J. Eckelman

Simulation-Based Estimates of Life Cycle Inventory Gate-To-Gate Process Energy use for 151 Organic Chemical Syntheses, *ACS Sustainable Chemistry & Engineering* 8(23), 2020, 8519-8536

L.N. Troup, M.J. Eckelman, D.F. Fannon

Simulating Future Energy Consumption in Office Buildings using an Ensemble of Morphed Climate Data, *Applied Energy*, 255, 2019, 113821

N. Watts, M.J. Eckelman, J. Chambers

The 2019 Report of the Lancet Countdown on Health and Climate Change: Ensuring that the Health of a Child Born Today is not Defined by a Changing Climate, *The Lancet*, 394(10211), 2019, 1836-1878

S.M. Rahman, M.J. Eckelman, A. Onnis-Hayden, A.Z. Gu

Comparative Life Cycle Assessment of Advanced Wastewater Treatment Processes for Removal of Chemicals of Emerging Concern, *Environmental Science and Technology*, 52, 2018, 11346-11358

SELECTED RESEARCH PROJECTS

Air Climate and Energy Center–SEARCH: Solutions for Energy Air Climate and Health

Senior Personnel, Environmental Protection Agency

CAREER: Building Chemical Synthesis Networks for Life Cycle Hazard Modeling

Principal Investigator, National Science Foundation

David Fannon



Associate Professor, School of Architecture; jointly appointed, Civil and Environmental Engineering

MS, University of California, Berkeley, 2015
coe.northeastern.edu/people/fannon-david

Scholarship focus: sustainable and high performance building design; resilient buildings; human comfort within the built environment

Honors and awards: Latrobe Prize, American Institute of Architects College of Fellows

SELECTED PUBLICATIONS

L. Troup, D. Fannon, M. Eckelman

Spatio-Temporal Changes Among Site-to-Source Conversion Factors for Building Energy Modeling, *Energy and Buildings*, 213, 2020

S. Mirzaee, D. Fannon, M. Ruth

A Comparison of Preference Elicitation Methods for Multi-Criteria Design Decisions About Resilient and Sustainable Buildings, *Environment Systems & Decisions*, 39(4), 2019, 439-453

L. Troup, R. Phillips, M. Eckelman, D. Fannon

Effect of Window-to-Wall Ratio on Measured Energy Consumption in US Office Buildings, *Energy and Buildings*, 203, 2019

D. Fannon, M. Laboy, P. Wiederspahn

Dimensions of Use, *ENQUIRY: The ARCC Journal*, 15(1), 2018, 25-45

SELECTED RESEARCH PROJECTS

A Scalable Hardware-and-Human-in-the-Loop Grid-Interactive Efficient Building Equipment Performance Dataset

Co-Principal Investigator, Department of Energy EERE: Buildings Energy Efficiency Frontiers & Innovation Technologies (BENEFIT)

Future-Use Architecture: Design for Persistent Change

Principal Investigator, Latrobe Prize, American Institute of Architects

Building Resilience: A Tool for Adaptability Planning and Decision-Making

Co-Principal Investigator, Northeastern University

Loretta Fernandez



Associate Professor, Civil and Environmental Engineering; jointly appointed, Marine and Environmental Sciences

PhD, Massachusetts Institute of Technology, 2010
coe.northeastern.edu/people/fernandez-loretta

Scholarship focus: environmental organic chemistry; passive sampling methods for organic contaminants in water and sediments; transport and transformation of contaminants in indoor and natural environments

Honors and awards: Civil and Environmental Engineering Excellence in Teaching Award

SELECTED PUBLICATIONS

A.S. Joyce, L.A. Fernandez, R.M. Burgess
 In Situ Investigation of Performance Reference Compound-Based Estimates of PCB Equilibrated Passive Sampler Concentrations and C free in the Marine Water Column, *Environmental Toxicology and Chemistry*, 39(6), 2020, 1165-1173

A.V. Mueller, M.J. Eden, J.M. Oakes, C. Bellini, L.A. Fernandez
 Quantitative Method for Comparative Assessment of Particle Removal Efficiency of Fabric Masks as Alternatives to Standard Surgical Masks for PPE, *Matter*, 3, 2020, 1-13

P.T. Gidley, A.J. Kennedy, G.R. Lotufo, A.H. Wooley, N.L. Melby, U. Ghosh, R.M. Burgess, P. Mayer, L.A. Fernandez, S.N. Schmidt, A.P. Wang, T.S. Bridges, C.E. Ruiz
 Bioaccumulation in Functionally Different Species: Ongoing Input of PCBs with Sediment Deposition to Activated Carbon Remediated Beds, *Environmental Toxicology and Chemistry*, 38(10), 2019, 2326-2336

SELECTED RESEARCH PROJECTS

Electrochemically-Induced in Situ Degradation of Legacy Munitions and Insensitive High Explosives in Manufacturing Wastewater

Co-Investigator, Strategic Environmental Research and Development Program

Establishing an Approach to PFAS Forensics and a PFAS Source Materials Forensic Library

Co-Investigator, Strategic Environmental Research and Development Program

Herbicide Monitoring Related to Hell's Half Acre Invasive
 Principal Investigator, Charles River Conservancy

Stephen Flynn



Professor, Political Science; Founding Director, Global Resilience Institute; affiliated faculty, Civil and Environmental Engineering

PhD, Tufts University, 1991
coe.northeastern.edu/people/flynn-stephen

Scholarship focus: critical infrastructure resilience; public policy

Honors and awards: Outstanding Innovation Award, Northeastern University; Honorary Doctorate, Monmouth University

SELECTED PUBLICATIONS

S. Flynn
 The Challenge of Securing the Global Supply Chain, C. Lawson (Ed) *Beyond 9/11: Building a Homeland Security Enterprise for the 21st Century*, MIT Press, 2020

S. Flynn, A. Ganguly, U. Bhatia
 Critical Infrastructures Resilience: Policy and Engineering Principles, Routledge, 2018

S. Flynn
 Wildfires: A Changing Landscape, Northeastern University & National Fire Protection Association, 2017

S. Flynn
 A New International Framework for Bolstering Global Supply System Security and Resilience, Northeastern University, 2017

S. Flynn
 The Role of Community Resilience in Advancing Security, State, Society, and National Security: Challenges and Opportunities in the 21st Century, S. Jayakumar (Ed) Singapore: World Scientific Publishing, 2016

SELECTED RESEARCH PROJECTS

Building a Disaster Resilient Economy in New Orleans
 Principal Investigator, U.S. Economic Development Administration

COVID-19 Resilient Economic Recovery for the New England Region
 Principal Investigator, FEMA

CRISP Type 2: Interdependent Network-based Quantification of Infrastructure Resilience (INQUIRE)
 Co-Principal Investigator, National Science Foundation

Networked Infrastructure under Compounded Extremes (NICE)
 Co-Principal Investigator, SERDP

Vulnerability of Critical Infrastructure to Non-nuclear Electromagnetic Pulse (EMP) / Electromagnetic Interference (EMI) Attacks
 Principal Investigator, Smith Richardson Foundation

Peter Furth



Professor, Civil and Environmental Engineering

PhD, Massachusetts Institute of Technology, 1981
coe.northeastern.edu/people/furth-peter

Scholarship focus: traffic signal control; bicycle transportation; transit operations modeling; transit data collection and sampling

Honors and awards: Lifetime Achievement Award, Association of Pedestrian & Bicycle Professionals; Best Paper Award, Transportation Research Board / Traffic Control Devices Committee

SELECTED PUBLICATIONS

P.G. Furth, Y.D. Wang, M.A. Santos, M.A.
 Multi-Stage Pedestrian Crossings and Two-Stage Bicycle Turns: Delay Estimation and Signal Timing Techniques for Limiting Pedestrian and Bicycle Delay, *Journal of Transportation Technologies*, 9(04), 2019, 489

P.G. Furth, P. Moser, T.V.V.K. Putta
 Measuring Low-Stress Connectivity in Terms of Bike-Accessible Jobs and Potential Bike-to-Work Trips: A Case Study Evaluating Alternative Bike Route Alignments in Northern Delaware, *Journal of Transport and Land Use*, 11(1), 2018, 815-831

P.G. Furth, A.T. Halawani, J. Li, W. Hu, B. Cesme
 Using Traffic Signal Control to Limit Speeding Opportunities on Bidirectional Urban Arterials, *Transportation Research record*, 2672(18), 2018, 107-116

M.B. Lowry, P. Furth, T. Hadden-Loh
 Prioritizing New Bicycle Facilities to Improve Low-Stress Network Connectivity, *Transportation Research*, 86, 2016, 124-140

SELECTED RESEARCH PROJECTS

Low-Stress Bicycle Network Planning: New Methods for Network Analysis and Improvement, with Application in Greater Boston

Principal Investigator, Helen and William Mazer Foundation

Traffic Signal Design and Operations Strategies for Non Motorized Users

Principal Investigator, National Cooperative Highway Research Program

Auroop Ganguly



Professor, Civil and Environmental Engineering; affiliated faculty, Khoury College of Computer Science; Marine and Environmental Sciences; Political Science; Public Policy and Urban Affairs; Global Resilience Institute

PhD, Massachusetts Institute of Technology, 2002
coe.northeastern.edu/people/ganguly-auroop

Scholarship focus: climate adaptation & resilient engineering; water & built environment; urban sustainability; machine learning & AI; nonlinear dynamics and network science

Honors and awards: Fellow, American Society of Civil Engineers; Senior Member, Institute of Electrical and Electronics Engineers; Runner-Up Best Paper Award, ACM KDD 2017; Best Student Paper Award, SIAM Data Mining 2011; United Nations Review Panel; Independent Advisory Committee for Applied Climate Assessment national-scale report (lead author of Artificial Intelligence section); United Nations Association for the United Kingdom (lead author of data-driven solutions section)

SELECTED PUBLICATIONS

U. Bhatia, L. Sela, A.R. Ganguly
 Hybrid Method of Recovery: Combining Topology and Optimization for Transportation Systems, *ASCE Journal of Infrastructure Systems*, 26(3), 2020

Y. Liu, J. Chen, A. Ganguly, J. Dy
 Nonparametric Mixture of Sparse Regressions on Spatio-Temporal Data--An Application to Climate Prediction, *Proc. ACM SIGKDD, KDD*, 2019, 2556-2564

U. Bhatia, A.R. Ganguly
 Precipitation Extremes and Depth-Duration-Frequency Under Internal Climate Variability, *Scientific Reports*, Nature Publishing Group, 9, 2019, 9112

SELECTED RESEARCH PROJECTS

CRISP Type 2: Interdependent Network-based Quantification of Infrastructure Resilience (INQUIRE)
 Co-Principal Investigator, National Science Foundation

CyberSEES: Type 2: SEA-MASCOT: Spatio-temporal Extremes and Associations : Marine Adaptation and Survivorship under Changes in extreme Ocean Temperatures

Co-Principal Investigator, National Science Foundation

NICE: Networked Infrastructures under Compound Extremes

Principal Investigator, Department of Defense Strategic Environmental Research & Development Program

Edgar Goluch



Associate Professor, Chemical Engineering; affiliated faculty, Bioengineering, Biology, Civil and Environmental Engineering

PhD, University of Illinois, 2007
coe.northeastern.edu/people/goluch-edgar

Scholarship focus: detection of biomolecules at the nanoscale in micro and nanofluidic channels; biophysics; micro and systems biology; environmental sensing; analytical instrumentation

SELECTED PUBLICATIONS

- M.K. Kimani, J. Mwagi, E.D. Goluch
 Bacterial Sample Concentration and Culture Monitoring using a PEG-Based Osmotic System with Inline Impedance and Voltammetry Measurements, *Journal of Analysis and Testing*, 3(2), 2019, 166-174
- M.K. Kimani, R. Loo, E.D. Goluch
 Biosample Concentration Using Microscale Forward Osmosis with Electrochemical Monitoring, *Analytical Chemistry*, 91, 2019, 7487-7494
- P.J. Buch, Y. Chai, E.D. Goluch
 Treating Polymicrobial Infections in Chronic Diabetic Wounds, *Clinical Microbiology Reviews*, 32(2), 2019, e00091-18
- J. Sun, N. Tandogan, A.Z. Gu, S. Müftü, E.D. Goluch, K.T. Wan
 Quantification of Colloidal Filtration of Polystyrene Micro-Particles on Glass Substrate Using a Microfluidic Device, *Colloids and Surfaces B: Biointerfaces* 165, 2018, 381-387
- C.R. Santiveri, H.J. Sismaet, M. Kimani, E.D. Goluch
 Electrochemical Detection of *Pseudomonas Aeruginosa* in Polymicrobial Environments, *ChemistrySelect*, 3(11), 2018 2926-2930
- H.J. Sismaet, E.D. Goluch
 Electrochemical Probes of Microbial Community Behavior, *Annual Review of Analytical Chemistry*, 2018
- P.N. Abadian, P.J. Buch, E.D. Goluch, J. Li, Z. Zhang
 Real-Time Monitoring of Urinary Encrustation Using a Quartz Crystal Microbalance, *Analytical Chemistry*, 90(3), 2018, 1531-1535

SELECTED RESEARCH PROJECTS

Point-of-Care Test for Identifying Gram Negative Urinary Tract Infections in Companion Animals
 Principal Investigator, National Science Foundation

Tarik Gouhier



Associate Professor, Marine and Environmental Sciences; affiliated faculty, Civil and Environmental Engineering

PhD, McGill University, 2010
coe.northeastern.edu/people/gouhier-tarik

Scholarship focus: theoretical ecology

SELECTED PUBLICATIONS

- M. Yeager, A.R. Hughes, T.C. Gouhier
 Predicting the Stability of Multitrophic Communities in a Variable World, *Ecology*, 101, 2020, e02992
- P. Pillai, T.C. Gouhier
 Not Even Wrong: The Spurious Measurement of Biodiversity's Effects on Ecosystem Functioning, *Ecology*, 100, 2019, e02645
- D.L. Townsend, T.C. Gouhier
 Spatial and Interspecific Differences in Recruitment Decouple Synchrony and Stability in Trophic Metacommunities, *Theoretical Ecology*, 12, 2019, 319-327
- G. Di Cecco, T.C. Gouhier
 Increased Spatial and Temporal Autocorrelation of Temperature Under Climate Change, *Scientific Reports*, 8, 2018, 14850
- T Rogers, T.C. Gouhier, D.L. Kimbro
 Temperature-Dependency of Intraguild Predation Between Native and Invasive Crabs, *Ecology*, 99, 2018, 885-895
- D. Wang, T.C. Gouhier, B.A. Menge, A.R. Ganguly
 Intensification and Spatial Homogenization of Coastal Upwelling Under Climate Change, *Nature*, 518, 2015, 390-394

SELECTED RESEARCH PROJECTS

Mechanisms of Resistance And Resilience to System Wide Loss of a Keystone Predator in an Iconic Intertidal Community
 Principal Investigator, National Science Foundation

Spatiotemporal Extremes And Associations: Marine Adaptation and Survivorship Under Changes in Extreme Ocean Temperatures
 Co-Principal Investigator, National Science Foundation

The Effects of Fine-Scale Temperature and Desiccation Variability on the Distribution of Marine Species
 Co-Principal Investigator, National Science Foundation

Jonathan Grabowski



Professor, Marine and Environmental Sciences; affiliated faculty, Civil and Environmental Engineering

PhD, University of North Carolina at Chapel Hill, 2002
coe.northeastern.edu/people/grabowski-jonathan

Scholarship focus: environmental science and policy; fisheries; ecological economics

Honors and awards: Antarctic Service Award, National Science Foundation; Stifel Faculty Fellow, Shoals Marine Laboratory, Cornell University

SELECTED PUBLICATIONS

J.H. Grabowski, T.C. Gouhier, J.E. Byers, L.F. Dodd, A.R. Hughes, M.F. Piehler, D.L. Kimbro
 Regional Environmental Variation and Local Species Interactions Influence Biogeographic Structure on Oyster Reefs, *Ecology*, 101, 2020, e02921

S.B. Scyphers, S. Picou, J.H. Grabowski
 Chronic Social Disruption Following a Systemic Fishery Failure, *Proceedings of the National Academy of Sciences*, 116, 2019, 22912–22914

M.D. McMahan, J.H. Grabowski
 Nonconsumptive Effects of a Range Expanding Predator on Juvenile Lobster (*Homarus Americanus*) Population Dynamics, *Ecosphere*, 10, 2019, e02867

J.H. Grabowski, C.W. Conroy, R. Gittman, J.T. Kelley, S. Sherman, G.D. Sherwood, G. Wippelhauser
 Habitat Associations of Juvenile Cod in Nearshore Waters, *Reviews in Fisheries Science and Aquaculture*, 26, 2018, 1–14

R. Murphy, S. Scyphers, J.H. Grabowski
 Perceptions Outweigh Knowledge in Predicting Support for Management Strategies in the Recreational Striped Bass (*Morone Saxatilis*) Fishery, *Marine Policy*, 97, 2018, 44–50

SELECTED RESEARCH PROJECTS

Addressing Constraints to Shellfish Aquaculture Through Quantifying Public Perceptions and Attitudes Along the Atlantic Coast of The U.S.

Principal Investigator, NOAA National Sea Grant

Aligning Coastal Restoration with Ecological and Societal Needs

Principal Investigator, National Center for Ecological Analysis and Synthesis

The Northern Range Expansion of Black Sea Bass: Understanding Population Dynamics and Socioeconomic Impacts of a Rapid Distribution Shift

Principal Investigator, NOAA S-K Program

Jerome Hajjar



CDM Smith Professor and Chair, Civil and Environmental Engineering; affiliated faculty, Marine and Environmental Sciences

PhD, Cornell University, 1988
coe.northeastern.edu/people/hajjar-jerome

Scholarship focus: steel and composite steel/concrete structures; earthquake engineering; structural stability; large-scale experimental testing of structures; regional simulation

Honors and awards: Fellow, American Society of Civil Engineers; Fellow, Structural Engineering Institute; Norman Medal, American Society of Civil Engineers; Shortridge Hardesty Award, American Society of Civil Engineers; Moisseiff Award, American Society of Civil Engineers; T.R. Higgins Lectureship Award, American Institute of Steel Construction; Special Achievement Award, American Institute of Steel Construction; Walter L. Huber Civil Engineering Research Prize, American Society of Civil Engineers; Breakthrough Award, Popular Mechanics; Clemens Herschel Award, Boston Society of Civil Engineers

SELECTED PUBLICATIONS

R. Zhang, J.F. Hajjar, H. Sun
 A Machine Learning Approach for Sequence Clustering with Applications to Ground Motion Selection, *Journal of Engineering Mechanics*, ASCE, 146, 2020, 04020040

L. Wang, M.D. Webster, J.F. Hajjar
 Design for Deconstruction Using Sustainable Composite Beams with Precast Concrete Planks and Clamping Connectors, *Journal of Structural Engineering*, ASCE, 146, 2020, 04020158-1

V.V. Saykin, T.H. Nguyen, J.F. Hajjar, D. Deniz, J. Song
 The Effect of Triaxiality on Finite Element Deletion Strategies for Simulating Fracture in Steel Structures, *Engineering Structures*, 210, 2020, 110364

J.-J. Wang, C. Liu, J.S. Fan, J.F. Hajjar, X. Nie
 Triaxial Concrete Constitutive Model for Simulation of Composite Plate Shear Wall-Concrete Encased: THUC3, *Journal of Structural Engineering*, ASCE, 145, 2020, 04019088-1

D. Deniz, J. Song, J.F. Hajjar
 Energy-Based Sidesway Collapse Fragilities for Ductile Structural Frames Under Earthquake Loadings, *Engineering Structures*, 174, 2018, 282–294

S.T. Hallowell, A.T. Myers, S.R. Arwade, W. Pang, P. Rawal, E. Hines, J.F. Hajjar, et al.
 Hurricane Risk Assessment of Offshore Wind Turbines, *Renewable Energy*, 125, 2018, 234–249

SELECTED RESEARCH PROJECTS

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

Co-Principal Investigator, National Science Foundation

Physics-Reinforced Deep Learning for Structural Metamodeling

Co-Principal Investigator, National Science Foundation

Steel Diaphragm Innovation Initiative

Co-Principal Investigator, American Institute of Steel Construction and Industry

Brian Helmuth



Professor, Marine and Environmental Sciences; jointly appointed, School of Public Policy and Urban Affairs; affiliated faculty, Civil and Environmental Engineering

PhD, University of Washington, 1997
coe.northeastern.edu/people/helmuth-brian

Scholarship focus: ecological forecasting and resilience of coastal environments

Honors and awards: Google Science Communications Fellow

SELECTED PUBLICATIONS

W. Wang, J. Wang, F.M.P. Choi, P. Ding, X. Li, G. Han, M. Ding, M. Guo, X. Huang, W. Duan, Z. Cheng, Z. Chen, S.J. Hawkins, Y. Jiang, B. Helmuth, Y. Dong

Global Warming and Artificial Shorelines Reshape Seashore Biogeography, *Global Ecology and Biogeography*, 29, 2020, 220-231

A. Cryan, B. Helmuth, S. Scyphers

Ecological Design for Urban Coastal Resilience, In *Handbook on the Resilience of Socio-Technical Systems*, Edward Elgar Publishing, 2018

A.E. Bates, B. Helmuth, M.T. Burrows, M.I. Duncan, J. Garrabou, T. Guy-Haim, F. Lima, A.M. Queiros, R. Seabra, R. Marsh, J. Belmaker, N. Bensoussan, Y. Dong, A.D. Mazaris, D. Smale, M. Wahl, G. Rilov

Biologists Ignore Ocean Weather at their Peril, *Nature*, 560, 2018, 299-301

X. Zhou, X. Ji, B. Wang, Y. Cheng, Z. Ma, F. Choi, B. Helmuth, W. Xu

Pido: Predictive Delay Optimization for Intertidal Wireless Sensor Networks, *Sensors*, 18, 2018, 1464

SELECTED RESEARCH PROJECTS

Bioprospecting for Industrial Enzymes and Drug Lead Compounds in an Ancient Submarine Forest

Co-Principal Investigator, NOAA Ocean Exploration

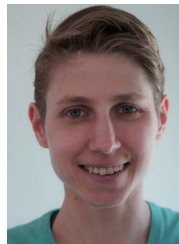
Citizen Science, Civics and Resilient Communities: Increasing Resilience through Citizen-Created Data, Local Knowledge and Community Values

Co-Principal Investigator, NOAA Environmental Literacy

Tide Gate Modulation of Wetland Function: Measurements, Models, and Decision Support for Best Practices

Co-Principal Investigator, National Science Foundation

Julia Hopkins



Assistant Professor, Civil and Environmental Engineering

PhD, Massachusetts Institute of Technology, 2017
coe.northeastern.edu/people/hopkins-julia

Scholarship focus: coastal morphodynamics, including effects of extreme weather events on sediment transport in the surf zone; wave-current interactions in the nearshore; developing and implementing field-verified numerical models to study coastal processes, informing coastal management with process-based research

Honors and awards: MIT Climate Changed Design Competition – First Place

SELECTED PUBLICATIONS

J. Hopkins, M.A. de Schipper, M. Wengrove, F. De Wit, B. Castelle

Observations and Numerical Model Results of Morphodynamic Feedback Owing to Wave-Current Interaction, *Coastal Sediments 2019*, 553-564

J. Hopkins, S. Elgar, B. Raubenheimer
 Storm Impact on Morphological Evolution of a Sandy Inlet, *Journal of Geophysical Research*, 123, 2018, 5751-5762

J. Hopkins, S. Elgar, B. Raubenheimer
 Flow Separation Effects on Shoreline Evolution, *Coastal Engineering*, 125, 2016, 23-27

J. Hopkins, S. Elgar, B. Raubenheimer
 Observations and Model Simulations of Wavecurrent Interaction on the Inner Shelf, *Journal of Geophysical Research: Oceans*, 120, 2015, 1-11

V.J. Coles, M.T. Brooks, J. Hopkins, M.R. Stukel, P.L. Yager, R.R. Hood

The Pathways and Properties of the Amazon River Plume in the Tropical North Atlantic Ocean, *Journal of Geophysical Research: Oceans*, 118, 2013, 6894-6913

SELECTED RESEARCH PROJECTS

SBIR Phase I: The Emerald Tutu

Co-Principal Investigator, National Science Foundation

A. Randall Hughes



Associate Dean of Equity in the College of Science; Associate Professor, Marine and Environmental Sciences; affiliated faculty, Civil and Environmental Engineering

PhD, University of California-Davis, 2006
coe.northeastern.edu/people/hughes-randall

Scholarship focus: marine community ecology and biodiversity

SELECTED PUBLICATIONS

A.R. Hughes, T.C. Hanley, J.E. Byers, J.H. Grabowski, T. McCrudden, M.F. Piehler, D.L. Kimbro
 Genetic Diversity and Phenotypic Variation within Hatchery-Produced Oyster Cohorts Predict Size and Success in the Field, *Ecological Applications*, 2019, e01940

A.R. Hughes, T.C. Hanley, A.F.P. Moore, C. Ramsay-Newton, R.A. Zerebecki, E.E. Sotka
 Predicting the Sensitivity of Marine Populations to Rising Temperatures, *Frontiers in Ecology and the Environment* 17, 2019, 17-24

A.R. Hughes, J.H. Grabowski, H.M. Leslie, S. Scyphers, S.L. Williams
 Inclusion of Biodiversity in Habitat Restoration Policy to Facilitate Ecosystem Recovery, *Conservation Letters*, 11(3), 2018, e12419

A.R. Hughes, J. Cebrian, K. Heck, J. Goff, T.C. Hanley, W. Scheffel, R.A. Zerebecki
 Effects of Oil Exposure, Plant Species Composition, and Plant Genotypic Diversity on Salt Marsh and Mangrove Assemblages, *Ecosphere*, 9, 2018, e02207

SELECTED RESEARCH PROJECTS

CAREER: Linking Genetic Diversity, Population Density, and Disease Prevalence in Marine Foundation Species: Integrating Research, Education, and Stakeholder Knowledge to Enhance Resilience of Seagrass and Oyster Ecosystems

Principal Investigator, National Science Foundation
 Biological Oceanography

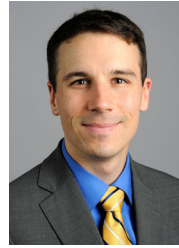
Ecological and Social Drivers of Mangrove Expansion and Restoration in the Future Gulf of Mexico

Principal Investigator, National Academy of Sciences
 Healthy Ecosystems

Collaborative Research: Trait Differentiation and Local Adaptation to Depth within Meadows of the Foundation Seagrass *Zostera Marina*

Principal Investigator, National Science Foundation
 Biological Oceanography

Michael Kane



Assistant Professor, Civil and Environmental Engineering

PhD, University of Michigan, 2014
coe.northeastern.edu/people/kane-michael

Scholarship focus: occupant-centric building controls; community resilience; model predictive control; hybrid systems

SELECTED PUBLICATIONS

M. Schweiker, E. Ampatzi, M.S. Andargie, R.K. Andersen, E. Azar, V.M. Barthelmes, C. Berger, A. Jamrozik, M. Kane, et al.

Review of Multi-Domain Approaches to Indoor Environmental Perception and Behaviour, *Building and Environment*, 176, 2020, 106804

M.B. Kane, J.P. Lynch, J. Scruggs
 Run-Time Efficiency of Bilinear Model Predictive Control Using Variational Methods, With Applications to Hydronic Cooling, *IEEE/ASME Transactions on Mechatronics*, 24(2), 2019, 718-728

M.B. Kane, L.P. Jerome, J. Scruggs
 Development of a Scalable Distributed Model Predictive Control System for Hydronic Networks with Bilinear and Hybrid Dynamics, *Journal of Computing in Civil Engineering*, 32(5), 2018, 04018038

M.B. Kane
 Modeling Human-in-the-Loop Behavior and Interactions with HVAC Systems, *American Control Conference (ACC)*, IEEE, 2018, 6

M.B. Kane, C. Peckens
 Digital Control Systems, Chapter in *Marks' Standard Handbook for Mechanical Engineers*, McGraw-Hill Professional, 2017, 1257-1265

M.W. Häckell, R. Rolfes, M.B. Kane, J.P. Lynch
 Three-Tier Modular Structural Health Monitoring Framework Using Environmental and Operational Condition Clustering for Data Normalization: Validation on an Operational Wind Turbine System, *Proceedings of the IEEE*, 108(8), 2016, 1-15

SELECTED RESEARCH PROJECTS

A Scalable Hardware-and-Human-in-the-Loop Grid-interactive Efficient Building Equipment Performance Dataset

Principal Investigator, US Dept. of Energy Building Technologies Office

Community Resilience in Extreme Temperatures, Principal Investigator; Northeastern University

Haris N. Koutsopoulos



Professor, Civil and Environmental Engineering

PhD, Massachusetts Institute of Technology, 1986
coe.northeastern.edu/people/koutsopoulos-haris

Scholarship focus: urban transportation networks and informatics; mobility on demand; intelligent transportation systems; public transportation operations

Honors and awards: August-Wilhelm Scheer Visiting Professor, TUM, Technical University of Munich; Traffic Simulation Lifetime Achievement Award, Transportation Research Board

SELECTED PUBLICATIONS

B. Mo, Z. Ma, H.N. Koutsopoulos, J. Zhao
 Capacity-constrained Network Performance Model for Urban Rail Systems, *Transportation Research Record*, Journal of the Transportation Research Board, 2674, 2020, 59-69

A. Tympakianaki, H.N. Koutsopoulos, E. Jenelius,
 Anatomy of Tunnel Congestion: Causes and Implications for Tunnel Traffic Management, *Tunnelling and Underground Space Technology*, 83, 2019, 498-508

A. Halvorsen, H.N. Koutsopoulos, Z. Ma, J. Zhao
 Design and Evaluation of Transit Demand Management Programs Using Smart Card Data, *Transportation*, 2019

Z. Ma, H.N. Koutsopoulos, Y. Chen, N.H.M. Wilson
 Estimation of Denied Boarding in Urban Rail Systems: Alternative Formulations and Comparative Analysis, *Forthcoming, Transportation Research Record (TRR)*, Journal Transportation Research Board, 2673, 2019, 771-778

Z. Ma, H.N. Koutsopoulos
 Optimal Design of Promotion Based Transit Demand Management Strategies, *Transportation Research Part C: Emerging Technologies*, 109, 2019, 155-173

SELECTED RESEARCH PROJECTS

Massachusetts Bay Transportation Authority
 Principal Investigator, Boston Research Partnership
 Transport for London Research Partnership
 Principal Investigator, Transport for London

Michelle Laboy



Assistant Professor, School of Architecture;
 affiliated faculty, Civil and Environmental Engineering

MArch, MUP, University of Michigan,
 Ann Arbor, 2005
coe.northeastern.edu/people/laboy-michelle

Scholarship focus: building and site systems integration; structures and landscape performance; building and urban resilience; green infrastructure; socio-ecological factors in design; transdisciplinary teaching and learning

Honors and awards: Latrobe Prize, American Institute of Architects College of Fellows

SELECTED PUBLICATIONS

M. Laboy
 1-Inch Urbanism: An Architectural Agenda for Decentralized Storm Water Buffering, *Future Praxis: Applied Research as a Bridge Between Theory and Practice: Journal of Proceedings of the 2019 ARCC International Conference*

M. Laboy, A. Onnis-Hayden
 Bridging the Gap Between Architecture and Engineering: a Transdisciplinary Model for a Resilient Built Environment, *Proceedings of BTES 2019: Integration and Innovation*, 2019 Conference of the Building Technology Educators Society

M. Eckelman, M. Laboy
 LCAart: Communicating Industrial Ecology at a Human Scale, *Journal of Industrial Ecology*, 2020

M. Laboy
 Physical Environments for Active Schools: Future Directions for Transdisciplinary Research, *Translational Journal of the American College of Sports Medicine*, 4(17), 2019, 155-64

M. Laboy
 Temporal Reciprocities of Building and Site: Structural Patterns for Resilient Future-Use Structures, *Structures and Architecture: Bridging the Gap and Crossing Borders*, 2019, 1031-40

SELECTED RESEARCH PROJECTS

Boston LightWells
 Principal Investigator, Boston Groundwater Trust and AutoDesk BUILD Grant
 Community Resilience in Extreme Temperatures: Solutions for Citizens, Governments and Utilities Through Big Data and Community Engagement
 Co-Principal Investigator, Northeastern University
 Future-Use Architecture: Design for Persistent Change
 Co-Principal Investigator, American Institute of Architects College of Fellows

Philip Larese-Casanova



Associate Professor, Civil and Environmental Engineering; affiliated faculty, Marine and Environmental Sciences

PhD, University of Iowa, 2006
coe.northeastern.edu/people/larese-casanova-philip

Scholarship focus: environmental chemistry and mineralogy; transformation and remediation of water pollutants; nanomaterial sorbents for water treatment

Honors and awards: National Science Foundation CAREER Award; Civil and Environmental Engineering Excellence in Teaching Award

SELECTED PUBLICATIONS

L. Xia, A.E.P. Schellenger, A. Onnis-Hayden, D.P. Jaisi, P. Larese-Casanova

Isolation of Selenate from Selenite, Carbonate, Phosphate, and Arsenate Solutions for $\delta^{18}\text{O}$ -Selenate Determination, *Isotopes in Environmental and Health Studies*, 2020, 297-313

N. Cai, P. Larese-Casanova

Facile Synthesis and Reuse of Magnetic Black Carbon Magnetite (Bc-Mag) for Fast Carbamazepine Removal From Water, *Nanomaterials*, 10, 2020, 213

P. Paydary, P. Larese-Casanova

Water Chemistry Influences on Quantum Dot Dissolution in Water, *Journal of Environmental Science*, 90, 2020, 216-233

S.M. Navarro Gallón, E. Alpaslan, M. Wang,

P. Larese-Casanova, et al.

Characterization and Study of the Antibacterial Mechanisms of Silver Nanoparticles Prepared with Microalgal Exopolysaccharides, *Materials Science and Engineering C*, 99, 2019, 685-695

Y. Qin, Y. He, Q. She, P. Larese-Casanova, P. Li, Y. Chai

Heterogeneity in Respiratory Electron Transfer and Adaptive Iron Utilization in a Bacterial Biofilm, *Nature Communications*, 10, 2019, 3702

SELECTED RESEARCH PROJECTS

CAREER: Quantum Dot Degradation in Aquatic Environments

Principal Investigator, National Science Foundation
 Insights to Selenium Cycling and Remediation Revealed by Stable Oxygen Isotopes

Principal Investigator, National Science Foundation
 Recrystallization of Stable Iron Oxides in Reducing Environments

Principal Investigator, National Science Foundation

Yiannis A. Levendis



COE Distinguished Professor, Mechanical and Industrial Engineering; affiliated faculty, Civil and Environmental Engineering

PhD, California Institute of Technology, 1987
coe.northeastern.edu/people/levendis-yiannis

Scholarship focus: gasification and combustion of solid fuels; generation and containment of combustion-generated pollution; synthesis and characterization of combustion-generated materials; fire suppression – fire extinction; engine design and operation

Honors and awards: Fellow, Combustion Institute; Fellow, American Society of Mechanical Engineers; Fellow, Society of Automotive Engineers; Fellow, Royal Society of Chemistry; Fellow National Academy of Inventors; Søren Buus Outstanding Research Award, College of Engineering; George Westinghouse Gold Medal, American Society of Mechanical Engineers; Percy Nicholls Award, jointly awarded by the American Society of Mechanical Engineers and the Society of Manufacturing Engineers, 2015; Elected to the Steering committee of the Greek Energy Forum, 2016; Elected Fellow of the Combustion Institute, 2018; Elected Fellow of the Royal Academy of Chemistry 2019; Elected Fellow of the National Academy of Inventors, 2019

SELECTED PUBLICATIONS

A. Panahi, N. Vorobiev, M. Schiemann, M. Tarakcioglu, M. Delichatsios, Y.A. Levendis

Combustion Details of Raw and Torrefied Biomass Fuel Particles with Individually-Observed Size, Shape and Mass, *Combustion and Flame*, 207, 2019, 327-341

Z. Wang, S.C. Yelishala, G. Yu, H. Metghalchi, Y.A. Levendis

Effects of Carbon Dioxide on Laminar Burning Speed and Flame Instability of Methane/Air and Propane/Air Mixtures: A Literature Review, *Energy and Fuels*, 33, 2019, 9403-9418

A. Panahi, Z. Wei, G. Song, Y.A. Levendis

Influence of Stainless-Steel Catalyst Substrate Type and Pretreatment on Growing Carbon Nanotubes from Waste Postconsumer Plastics, *Industrial & Engineering Chemistry Research*, 58, 2019, 3009-3023

SELECTED RESEARCH PROJECTS

Containment of Greenhouse Gases Through use of Refrigerants that are based on Petroleum-derived Products and Recycled Carbon Dioxide

Principal Investigator, Funded by The American Chemical Society

Synthesis of Carbon Nanotubes from Waste Polymeric Materials using Various Catalysts

Principal Investigator, Canon Virginia Inc

Amy Mueller



Assistant Professor, Civil and Environmental Engineering; jointly appointed, Marine and Environmental Sciences; affiliated faculty, Electrical and Computer Engineering

PhD, Massachusetts Institute of Technology, 2012
coe.northeastern.edu/people/mueller-amy

Scholarship focus: biogeochemistry of natural and engineered systems; in-situ sensors and instrumentation for high-resolution process characterization; remediation and sustainability in natural and built coastal environments; sensor-driven closed-loop controls for resource optimization in engineered systems; signal processing and machine learning, embedded systems, and sensor networks

Honors and awards: National Science Foundation Ocean Sciences Postdoctoral Research Fellowship

SELECTED PUBLICATIONS

A. Snaffer, U. Chauhan, K. Cogert, M.K.H. Winkler, A. Mueller

Data Fusion for Environmental Process Control: Maximizing Useful Information Recovery for Process Control under Data Limited Constraints, *IEEE Sensors Letters: Special Issue Multimodal Data Fusion*, 3(1), 2019

C.-A. Chou, J. Xiaoning, A. Mueller, S. Ostadabbas
 Multimodal Data Fusion-Moving from Domain-Specific Algorithms to Trans-Domain Understanding for Accelerated Solution Development, *IEEE Sensors Letters, Special Issue on Multimodal Data Fusion*, 3(1), 2019, 7100104

A.V. Mueller, H.F. Hemond

Statistical Generation of Training Sets for Measuring NO₃⁻, NH₄⁺, and Major Ions in Natural Waters by an Ion Selective Electrode Array, *Environmental Science: Processes and Impacts*, 18(5), 2016, 590-599

SELECTED RESEARCH PROJECTS

Implementation of a synthetic Anammox Bio-Granular Technology in the Main Wastewater Treatment Line
 Co-Principal Investigator, Defense Advanced Research Projects Agency Biological Technologies

PRISM: Better Ocean Data for Better Ocean Management
 Principal Investigator, Massachusetts Technology Transfer Center - Acorn Innovation Fund

Real-Time Responsive Nutrient Loading Management in Urban Catchments Through Sewer-Embedded Sensing and Controls

Principal Investigator, United States Geological Survey Water Resources Research Institute Program

Sinan Müftü



Associate Dean for Faculty Affairs; Professor, Mechanical and Industrial Engineering; affiliated faculty, Civil and Environmental Engineering

PhD, University of Rochester, 1994
coe.northeastern.edu/people/muftu-sinan

Scholarship focus: cold-spray additive manufacturing; high velocity impact of micron scale particles; mechanics and tribology of axially moving materials; numerical simulation of tissue healing and bone remodeling

Honors and awards: Fellow, American Society of Mechanical Engineers; Søren Buus Outstanding Research Award, College of Engineering; Martin W. Essigman Outstanding Teaching Award, College of Engineering

SELECTED PUBLICATIONS

S. Irandoust, S. Müftü

The Interplay Between Bone Healing and Remodeling Around Dental Implants, *Scientific Reports*, 10, 2020, 4335

J. Sun, R. Ran, S. Müftü, A.Z. Gu, K.-T. Wan

The Mechanistic Aspects of Microbial Transport in Porous Media, *Colloids And Surfaces A*, 603, 2020, 125169

E. Lin, I. Nault, O.C. Ozdemir, V.K. Champagne, Jr., A. Nardi, S. Müftü

Thermo-Mechanical Deformation History and the Residual Stress Distribution in Cold Spray, *Journal of Thermal Spray Technology*, 2020

E. Lin, Q. Chen, O.C. Ozdemir, V.K. Champagne, S. Müftü
 Effects of Interface Bonding on the Residual Stresses in Cold-Sprayed Al-6061: A Numerical Investigation, *Journal of Thermal Spray Technology*, 28, 2019, 472-483

SELECTED RESEARCH PROJECTS

Additive Manufacturing and Advanced Materials Processing

Technical Point of Contact, Army Research Laboratory

Advancing Additive Repair Technologies and Cold Spray for Sustainment of Maritime Assets

Technical Point of Contact, NAVSEA

Collaborative Research: High-Strain-Rate Dynamics of Copolymer Microparticles for Advanced Additive Manufacturing

Principal Investigator, National Science Foundation

Collaborative Research: Mechanics of Fusion of Dissimilar Lipid Bilayers and Multi-Lamellar Vesicles

Co-Principal Investigator, National Science Foundation

Engineered Materials and Materials Design of Engineered Materials (EMMDEM)

Technical Point of Contact, Army Research Laboratory

Samuel Muñoz



Assistant Professor, Marine and Environmental Sciences; jointly appointed, Civil and Environmental Engineering

PhD, University of Wisconsin-Madison, 2015
coe.northeastern.edu/people/munoz-samuel

Scholarship focus: sedimentary records of environmental change; paleoclimate and climate change; rivers and fluvial processes; hydroclimatic extremes

SELECTED PUBLICATIONS

- S.E. Muñoz, T.J. Porter, A. Bakkelund, J. Nusbaumer, S.G. Dee, B. Hamilton, L. Giosan, J.E. Tierney
 Lipid Biomarker Record Documents Hydroclimatic Variability of the Mississippi River Basin During the Common Era, *Geophysical Research Letters*, 47(12), 2020, e2020GL087237
- J.R. Walsh, J.R. Corman, S.E. Muñoz
 Coupled Long-Term Limnological Data and Sedimentary Data Reveal Novel Control on Water Quality in a Eutrophic Lake, *Limnology & Oceanography*, 64(S1), 2019, S34-S48
- S.E. Muñoz, L. Giosan, J. Blusztajn, C. Rankin, G.E. Stinchcomb
 Radiogenic Fingerprinting Reveals Anthropogenic and Buffering Controls on Sediment Dynamics of the Mississippi River System, *Geology*, 47(3), 2019, 271-274
- S.E. Muñoz, L. Giosan, M.D. Therrell, J.W. Remo, Z. Shen, R.M. Sullivan, J.P. Donnelly
 Climatic Control of Mississippi River Flood Hazard Amplified by River Engineering, *Nature*, 556(7699), 2018, 95-98
- S.E. Muñoz, S.G. Dee
 El Niño Increases the Risk of Lower Mississippi River Flooding, *Scientific Reports*, 7, 2017, 1772

SELECTED RESEARCH PROJECTS

- Collaborative Research: Re-evaluating Precipitation Extremes and Flood Hazard in the Wake of Hurricane Harvey
 Principal Investigator, National Science Foundation Hydrologic Sciences
- Collaborative Research: Extreme Floods on the Lower Mississippi River in the Context of Late Holocene Climatic Variability
 Principal Investigator, National Science Foundation Paleo-Perspectives on Climate Change
- Coastal Flooding Prediction and Mitigation: Integrating High-Fidelity Computer Models with Field Observations
 Principal Investigator, Global Resilience Institute of Northeastern University

Andrew Myers



Associate Professor and Associate Chair for Graduate Studies, Civil and Environmental Engineering

PhD, Stanford University, 2009
coe.northeastern.edu/people/myers-andrew

Scholarship focus: fixed and floating offshore wind structures; multi-scale experimental testing of structures; computational simulation; probabilistic modeling

Honors and awards: National Science Foundation CAREER Award; Civil and Environmental Engineering Excellence in Teaching Award

SELECTED PUBLICATIONS

- C. Qiao, A.T. Myers, S.R. Arwade
 Characteristics of Hurricane-Induced Wind, Wave, and Storm Surge Maxima along the U.S. Atlantic Coast, *Renewable Energy*, 150, 2020, 712-721
- F. Mirzaie, A.T. Myers, A. Jay, A. Mahmoud, E. Smith, B.W. Schafer
 Analysis of Geometric Imperfections of Spirally Welded Slender Tubes, *Thin-Walled Structures*, 146, 2019, 106447
- C. Qiao, A.T. Myers, S.R. Arwade
 Validation and Uncertainty Quantification of Metocean Models for Assessing Hurricane Risk, *Wind Energy*, 23, 2019, 220- 234
- S. Hallowell, A.T. Myers, S.R. Arwade, W. Pang, P. Rawal, E. Hines, J.F. Hajjar, C. Qiao, V. Valamanesh, K. Wei, W. Carswell, C. Fontana
 Hurricane Risk Assessment of Offshore Wind Turbines, *Renewable Energy*, Elsevier, 2018
- F. Mirzaie, A.T. Myers, A. Jay, A. Mahmoud, S. Torabian, E. Smith, B.W. Schafer
 Imperfection Measurements to Predict Buckling Behavior of Slender Steel Tubes, *Thin-Walled Structures*, Elsevier, 2017

SELECTED RESEARCH PROJECTS

- CAREER: Advancing Multi-Hazard Assessment and Risk-based Design for Offshore Wind Energy Technology
 Principal Investigator, National Science Foundation
- GOALI/Collaborative Research: Optimization of Infrastructure-Scale Thin-Walled Tube Towers Including Uncertainty
 Principal Investigator, National Science Foundation
- Innovative, Ultra-Low Cost, Locally Manufactured Floating Wind Turbine for Cheap Electricity
 Principal Investigator, Massachusetts Clean Energy Center

Annalisa Onnis-Hayden



Teaching Professor, Civil and Environmental Engineering

PhD, University of Cagliari, Italy, 2004
coe.northeastern.edu/people/onnis-hayden-annalisa

Scholarship focus: biological treatment processes; ecotoxicology and toxicity assessment; microbial population dynamics and ecology in engineered biological systems

Honors and awards: Ralph Fuhrman Medal for Outstanding Water Quality Academic-Practice Collaboration, Water Environment Federation; Clair N. Sawyer Award, New England Water Environment Association; Martin W. Essigman Outstanding Teaching Award, College of Engineering

SELECTED PUBLICATIONS

M. Laboy, A. Onnis-Hayden

Bridging the Gap between Architecture and Engineering: a Transdisciplinary Model for a Resilient Built Environment, Building Technology Educator's Society, 1, 2019, 38

A. Onnis-Hayden, N. Majed, Y. Li, S.M. Rahman, D. Drury, L. Risso, A.Z. Gu

Impact of Solid Residence Time (SRT) on Functionally Relevant Microbial Populations and Performance in Full-Scale Enhanced Biological Phosphorus Removal (EBPR) Systems, Water Environment Research, 2019

D. Wang, N.B. Tooker, V. Srinivasan, G. Li, L.A. Fernandez, P. Schauer, A. Onnis-Hayden, A.Z. Gu, et al.

Side-Stream Enhanced Biological Phosphorus Removal (S2EBPR) Process Improves System Performance-A Full-Scale Comparative Study, Water Research, 2019, 167, 115109

A. Onnis-Hayden, V. Srinivasan, N.B. Tooker, G. Li, D. Wang, J.L. Barnard, A.Z. Gu, et al.

Survey of Full Scale Side-Stream Enhanced Biological Phosphorus Removal (S2EBPR) Systems and Comparison with Conventional EBPRs in North America: Process Stability, Kinetics and Microbial Populations, Water Environment Research, 2019

S.M. Rahman, M.J. Eckelman, A. Onnis-Hayden, A.Z. Gu
 Comparative Life Cycle Assessment of Advanced Wastewater Treatment Processes for Removal of Chemicals of Emerging Concern, Environmental Science and Technology, 52(19), 2018, 11346-11358

SELECTED RESEARCH PROJECTS

Practices to Enhance Internal Fermentation of Side-Stream Secondary Sludge and Mixed Liquor Suspended Solids for Biological Phosphorus Removal

Co-Principal Investigator, Water Research Foundation

Mark Patterson



Professor, Marine and Environmental Sciences; jointly appointed, Civil and Environmental Engineering; Associate Dean for Research and Graduate Affairs, COS, and Chief Technology Officer, Global Resilience Institute

PhD, Harvard University, 1985
coe.northeastern.edu/people/patterson-mark

patterson-mark

Scholarship focus: development of autonomous underwater robots for civil infrastructure and marine sensing; decision support tools for gray/green infrastructure like tide gates; environmental fluid mechanics; biomechanics and mass transfer in living systems

Honors and awards: Explorers Club Flag Award – Fabien Cousteau's Mission 31; Lockheed Martin Award for Excellence in Ocean Science & Engineering

SELECTED PUBLICATIONS

S.D. Williams, M.R. Patterson

Resistance and Robustness of the Global Coral-Symbiont Network, Ecology, 101(5), 2020, e02990

N. Relles, M. Patterson, D. Jones

Change Detection in a Marine Protected Area (MPA) over Three Decades on Bonaire, Dutch Caribbean, Journal of the Marine Biological Association of the United Kingdom, 2018, 1-10

A.C. Trembanis, A.L. Forrest, B.M. Keller, M.R. Patterson

Mesophotic Coral Ecosystems: A Geoacoustically Derived Proxy for Habitat and Relative Diversity for the Leeward Shelf of Bonaire, Dutch Caribbean, Frontiers in Marine Science, 4(51), 2017

R.H. Certner, A.M. Dwyer, M.R. Patterson, S.V. Vollmer

Zooplankton as a Potential Vector for White Band Disease Transmission in the Endangered Coral, Acropora Cervicornis, Journal of Life and Environmental Sciences, 5, 2017, e3502

SELECTED RESEARCH PROJECTS

Microplastics in Marine Food Webs

Co-Principal Investigator, Schmidt Marine Technology Partners, Ocean Diagnostics LLC

Tide Gate Modulation of Wetland Function: Decision Support Through Engineering Best Practices

Principal Investigator, National Science Foundation Environmental Sustainability

Kelsey Pieper



Assistant Professor, Civil and Environmental Engineering

PhD, Virginia Tech, 2015
coe.northeastern.edu/people/pieper-kelsey

Scholarship focus: applied environmental chemistry; corrosion;

drinking water quality, treatment, and infrastructure; post-disaster drinking water recovery; public health engineering

SELECTED PUBLICATIONS

K.J. Pieper, W.J. Rhoads, L. Sauicer, A. Katner, J.R. Barrett, M. Edwards

Improving State-Level Emergency Well Disinfection Strategies in the United States, *Science of the Total Environment*, 720, 2020 137451

K. Mapili, K.J. Pieper, D. Dai, A. Pruden, M.A. Edwards, M. Tang, W.J. Rhoads

Legionella pneumophila Occurrence in Drinking Water Supplied By Private Wells, *Letters in Applied and Environmental Microbiology*, 70(4), 2020, 232-240

K.J. Pieper, A. Katner, R. Kriss, M. Tang, M.A. Edwards
 Understanding Lead in Water and Avoidance Strategies: A United States Perspective for Informed Decision-Making, *Journal of Water and Health*, 17(4), 2019, 540-555

K.J. Pieper, M. Tang, C.N. Jones, S. Weiss, A. Greene, H. Mohsin, J. Parks, M.A. Edwards
 Impact of Road Salt on Drinking Water Quality and Infrastructure Corrosion in Private Wells, *Environmental Science & Technology*, 52(24), 2018, 14078-14087

K.J. Pieper, M. Tang, M.A. Edwards
 Flint Water Crisis caused by Interrupted Corrosion Control: Investigating "Ground Zero" Home, *Environmental Science & Technology*, 51(4), 2017, 2007-2014

SELECTED RESEARCH PROJECTS

Identification of Factors Impacting Efficacy and Adoption of Low-Cost Point of Use Filters

Co-Principal Investigator, U.S. Department of Housing and Urban Development

RAPID: Extreme Water use Patterns and Their Impact on the Microbial and Chemical Ecology of Drinking Water

Co-Principal Investigator, National Science Foundation

Untapping the Crowd: Consumer Detection and Control of Lead in Drinking Water

Co-Principal Investigator, U.S. Environmental Protection Agency

Ameet Pinto



Assistant Professor, Civil and Environmental Engineering; affiliated faculty, Marine and Environmental Sciences

PhD, Virginia Tech, 2009
coe.northeastern.edu/people/pinto-ameet

Scholarship focus: microbial ecology and physiology; drinking water treatment and distribution; wastewater treatment; public health microbiology, molecular microbiology; 'omics analyses

Honors and awards: Bright IDEAS Award, Engineering and Physical Sciences Research Council; National Science Foundation CAREER Award; International Water Association/International Society of Microbial Ecology BioCluster Award (Rising Star); Paul L Busch Award for Innovation in Applied Water Quality Research, The Water Research Foundation; Virginia Tech CEE Outstanding Young Alumni

SELECTED PUBLICATIONS

Z. Dai, M.C. Sevillano, S.T. Calus, Q.M. Bautista de los Santos, A.M. Eren, U.I. Ijaz, P. van der Wielen, A.J. Pinto
 Disinfection Systematically Impacts the Drinking Water Microbiome, *Microbiome*, 8(42), 2020

S.C. Potgieter, Z. Dai, S.N. Venter, M. Sigudu, A.J. Pinto
 Microbial Nitrogen Metabolism in Chloraminated Drinking Water Reservoirs, *mSphere*, 5(2), 2020, e00274-20

M.J. Kiristis, M. Emelko, A.J. Pinto
 Applying Biotechnology for Drinking Water Biofiltration: Advancing Science and Practice, *Current Opinions in Biotechnology*, 57, 2019, 197-204

N.M. Hull, F. Ling, A.J. Pinto, M. Albertsen, et al.
 Drinking Water Microbiome Project: Is it Time?, *Trends in Microbiology*, 27(8), 2019, 670-677

I. Cotto, Z. Dai, L. Huo, C.L. Anderson, K.J. Vilardi, U.Z. Ijaz, A.J. Pinto, et al.

Long Solids Retention Times and Attached Growth Phase Favor Prevalence of Comammox Bacteria in Nitrogen Removal Systems, *Water Research*, 169, 2019, 115268

SELECTED RESEARCH PROJECTS

CAREER: Developing a Spatial-Temporal Predictive Framework for the Drinking Water Microbiome

Principal Investigator, National Science Foundation

GOALI: Developing an Eco-Genomic Framework for Biofilter Operation

Principal Investigator, National Science Foundation

RAPID: Extreme Water use Patterns and Their Impact on the Microbial and Chemical Ecology of Drinking Water

Principal Investigator, National Science Foundation

Mehrdad Sasani



Professor, Civil and Environmental Engineering

PhD, University of California at Berkeley, 2001
coe.northeastern.edu/people/sasani-mehrdad

Scholarship focus: progressive collapse of structures; earthquake engineering; structural integrity and reliability; building and community resilience

Honors and awards: Fellow, American Concrete Institute; Fellow, American Society of Civil Engineers; Fellow, Structural Engineering Institute; National Science Foundation CAREER Award; Boston Society of Civil Engineers Section President's Award; BSCES/ASCE Clemens Herschel outstanding paper award

SELECTED PUBLICATIONS

M. Joyner, M. Sasani

Building Performance for Earthquake Resilience, Engineering Structures, 210(110371), 2020, 1-14

M.H. Kurth, J.M. Keenan, M. Sasani, I. Igor Linkov
 Defining resilience for the building industry in the U.S., Building Research & Information, 47(4), 2019, 480-492

M. Joyner, M. Sasani

A Multihazard Risk-Based Resilience Analysis of East and West Coast Buildings Designed to Current Codes, Journal of Structural Engineering, ASCE, 144(9), 2018, 1-16

R. Ceskavich, M. Sasani

Methodology for Evaluating Community Resilience, Natural Hazards Review, ASCE, 19(1), 2018, 1-13

J.A. Murray, M. Sasani

Seismic Hybrid Simulation of a Nonductile RC Building with Severe Damage to Multiple Columns, Earthquake Engineering and Structural Dynamics, 46, 2017, 733-752

J.A. Murray, M. Sasani

Near-Collapse Response of Existing RC Building Under Severe Pulse Type Ground Motion Using Hybrid Simulation, Earthquake Engineering and Structural Dynamics, 45(7), 2016, 1109-1127

SELECTED RESEARCH PROJECTS

A Decision and Design Framework for Multi-Hazard Resilient and Sustainable Buildings (RSB)

Principal Investigator, National Science Foundation

Near Collapse Performance of Existing RC Concrete Frame Buildings (NEESR)

Principal Investigator, National Science Foundation

Thomas Sheahan



Sr. Vice Provost for Curriculum and Programs; Professor, Civil and Environmental Engineering; Training Core Leader, PROTECT Center

ScD, Massachusetts Institute of Technology, 1991
coe.northeastern.edu/people/sheahan-thomas

Scholarship focus: soft ground engineering; coastal adaptation education; and training for engineers and scientists

Honors and awards: Fellow, American Society of Civil Engineers, Tau Beta Pi National McDonald Mentoring Award

SELECTED PUBLICATIONS

P.K. Judge, J.A. Buxton, T.C. Sheahan, E.M. Hamin-Infield
 Teaching across Disciplines: A Case Study of a Project-Based Short Course to Teach Holistic Coastal Adaptation Design, Journal of Environmental Studies and Sciences, 2020

E. Hamin, Y. Abunnasr, M.R. Dilthey, P. Judge, M. Kenney, P. Kirshen, T.C. Sheahan, D.J. DeGroot, R.L. Ryan, B. McAdoo, L. Nurse, J. Buxton, E. Roper, E. Albright, M. Buchanan, A. Marielos Marin, R. Fricke
 Pathways to Coastal Resiliency: The Adaptation Gradients Framework, Sustainability, 2018

D. Meric, A.N. Alshawabkeh, J.P. Shine, T.C. Sheahan
 Bioavailability of Hydrophobic Organic Compounds in Thin-Layered Sediments, Chemosphere, 103, 2014, 281-289

D. Cheney, L. Rajicb, E. Sly, D. Meric, T.C. Sheahan
 Uptake of PCBs Contained in Marine Sediments by the Green Macroalga Ulva Rigida, Marine Pollution Bulletin, 88(1-2), 2014, 207-214

R.D. Holtz, W.D. Kovacs, T.C. Sheahan
 An Introduction to Geotechnical Engineering, 2nd Edition, Upper Saddle River, NJ: Pearson Prentice-Hall, 2011

SELECTED RESEARCH PROJECTS

Puerto Rico Testsite for Exploring Contamination Threats (PROTECT)

Training Core Leader, National Institutes of Health

Research Opportunities for Undergraduates: Training in Environmental Health Sciences (ROUTES)

Principal Investigator, National Institutes of Health

Craig Shillaber



Assistant Teaching Professor, Civil and Environmental Engineering

PhD, Virginia Tech, 2016
coe.northeastern.edu/people/shillaber-craig

Scholarship focus: geotechnical subsurface characterization through

in-situ and laboratory methods; quantification of construction energy and carbon; sustainable geotechnics, engineering education

SELECTED PUBLICATIONS

S.T. Ghanat, J. Kaklamanos, T. Kunberger, C. Walton-Macaulay, S. Immanuel, D. A. Saftner, B.E. Barry, S. Griffiths, C.M. Shillaber, C. Swan

Bias and Precision in Instructor Grading of Concept Inventories in Geotechnical Engineering Courses, Proceedings of 2019 ASEE Annual Conference, American Society for Engineering Education, 2019

C.M. Shillaber, J.K. Mitchell, J.E. Dove, Z.A. Ostrum
Framework to Account for Uncertainty in Energy and Carbon Assessment of Ground Improvement Works, Journal of Geotechnical and Geoenvironmental Engineering, 143(5), 2017

C.M. Shillaber, J.E. Dove, J.K. Mitchell, et al.
Student Perceptions of Sustainability and Engineering Mechanics in Undergraduate Civil and Environmental Engineering Education at Virginia Tech, Proc. 2017 ASEE Annual Conference, American Society for Engineering Education, 2017

C.M. Shillaber, J.K. Mitchell, J.E. Dove
Energy and Carbon Assessment of Ground Improvement Works I: Definitions and Background, Journal of Geotechnical and Geoenvironmental Engineering, 142(3), 2016

C.M. Shillaber, J.K. Mitchell, J.E. Dove
Energy And Carbon Assessment of Ground Improvement Works II: Working Model And Example, Journal of Geotechnical and Geoenvironmental Engineering, 142(3), 2016

E.K. Phillips, C.M. Shillaber, et al.
Sustainability Comparison of a Geosynthetic-Reinforced Soil Abutment and a Traditionally-Founded abutment: A Case History, Proceedings of the Geotechnical and Structural Engineering Congress, ASCE, Reston, VA, 2016, 699-711

C.M. Shillaber, J.K. Mitchell, J.E. Dove
Sustainability Considerations in Deep Mixing Applications, with Examples from LPV 111 in New Orleans, LA., Proceedings, Deep Mixing, Deep Foundations Institute, 2015, 511-520

Michael B. Silevitch



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

PhD, Northeastern University, 1971
coe.northeastern.edu/people/silevitch-michael

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

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

Jennie C. Stephens



Director, School of Public Policy & Urban Affairs; Dean's Professor of Sustainability Science and Policy; affiliated faculty, Civil and Environmental Engineering; Director of Strategic Research Collaborations, Global Resilience Institute

PhD, California Institute of Technology, 2002
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stephens-jennie

Scholarship focus: renewable energy transformation, reducing fossil fuel reliance; energy resilience; energy democracy; integrating social justice with climate and energy innovations

Honors and awards: Arab-American Frontiers Fellowship, National Academy of Sciences; Leopold Leadership Fellowship, Stanford Woods Institute for the Environment

SELECTED PUBLICATIONS

J.C. Stephens

Diversifying Power: Why We Need Anti-Racist, Feminist Leadership on Climate & Energy, Island Press.
 Washington, DC, 2020

J.C. Stephens, K. Surprise

The Hidden Injustices of Advancing Solar Geoengineering Research, *Global Sustainability*, 3, 2020, 1-6

K.E.J. Jenkins, J.C. Stephens, T.G. Reames, D. Hernandez
 Towards Impactful Energy Justice Research: Transforming the Power of Academic Engagement, *Energy Research and Social Science*, 67, 2020

J.C. Stephens

Energy Democracy: Redistributing Power to the People Through Renewable Transformation, *Environment: Science and Policy for Sustainable Development*, 61(2), 2019, 4-13

E. Allen, H. Lyons, J.C. Stephens

Women's Leadership in Renewable Energy Transitions, *Energy Justice and Energy Democracy: Redistributing Power*, *Energy Research and Social Science*, 2019

M. Burke, J.C. Stephens

Political Power and Renewable Energy Futures: A Critical Review, *Energy Research & Social Science*, 35, 2018, 78-93

SELECTED RESEARCH PROJECTS

Power in Puerto Rico: Sociotechnical Imaginaries, Infrastructure Publics, and Electricity
 Principal Investigator, National Science Foundation

Aron Stubbins



Associate Professor, Marine and Environmental Sciences; jointly appointed, Civil and Environmental Engineering, Chemistry and Chemical Biology

PhD, Newcastle University, 2002
coe.northeastern.edu/people/stubbins-aron

Scholarship focus: environmental chemistry; geochemistry; the carbon cycle; freshwater, coastal and ocean biogeochemistry; feedbacks between natural biogeochemical cycles and climate change; permafrost; black carbon; aquatic microplastics

Honors and awards: Fellow of the Association for the Sciences of Limnology and Oceanography

SELECTED PUBLICATIONS

L. Zhu, S. Zhao, T.B. Bittar, A. Stubbins, D. Li

Photochemical Dissolution of Buoyant Microplastics to Dissolved Organic Carbon: Rates and Microbial Impacts, *Journal of Hazardous Materials*, 383, 2020, 121065

A. Stubbins, F. Guillemette, J.T. Van Stan II

Throughfall and Stemflow: The Crowning Headwaters of the Aquatic Carbon Cycle, *Precipitation Partitioning by Vegetation*, 2020, 121-132

S. Wagner, J. Brandes, R.G. Spencer, K. Ma,

S.Z. Rosengard, J.M.S. Moura, A. Stubbins
 Isotopic Composition of Oceanic Dissolved Black Carbon Reveals Non-Riverine Source, *Nature communications*, 10(1), 2019, 1-8

S. Wagner, J.H. Fair, S. Matt, J. Hosen, P. Raymond,

J. Saiers, J. Shanley, T. Dittmar, A. Stubbins
 Molecular Hysteresis: Hydrologically-Driven Changes in Riverine Dissolved Organic Matter Chemistry during a Storm Event, *Journal of Geophysical Research: Biogeosciences*, 124(4), 2019, 759-774

SELECTED RESEARCH PROJECTS

CBET: The Role of Sunlight in Determining the Fate and Microbial Impact of Microplastics in Surface Waters

Principal Investigator, National Science Foundation, Chemical, Bioengineering, Environmental and Transport Systems

Constraining the Source of Oceanic Dissolved Black Carbon Using Compound-Specific Stable Carbon Isotopes

Co-Principal Investigator, National Science Foundation

RAPID: Extreme Water use Patterns and their Impact on the Microbial and Chemical Ecology of Drinking Water

Co-Principal Investigator, National Science Foundation

Hao Sun



Assistant Professor, Civil and Environmental Engineering

PhD, Columbia University, 2014
coe.northeastern.edu/people/sun-hao

Scholarship focus: physics-informed AI for scarce data interpretation; smart and resilient infrastructure; innovative

sensing; big data analytics; machine/deep learning; uncertainty quantification and inverse computational mechanics with applications to civil infrastructure monitoring and resilience assessment

Honors and awards: Forbes 30 Under 30: Science; Top 10 Outstanding Chinese American Youth; Boeing Fellowship

SELECTED PUBLICATIONS

R. Zhang, J. Hajjar, H. Sun

Machine Learning-Based Approach for Sequence Clustering with Applications to Ground Motion Selection, *ASCE Journal of Engineering Mechanics*, 146(6), 2020, 04020040

R. Zhang, Y. Liu, H. Sun

Physics-Guided Convolutional Neural Network (PhyCNN) for Data-Driven Seismic Response Modeling, *Engineering Structures*, 215, 2020, 110704

Z. Chen, R. Zhang, J. Zheng, H. Sun

Sparse Bayesian Learning for Structural Damage Identification, *Mechanical Systems and Signal Processing*, 140, 2020, 106689

R. Zhang, Z. Chen, J. Zheng, O. Buyukozturk, H. Sun

Deep Long Short-Term Memory Networks for Nonlinear Structural Response Prediction, *Computers & Structures*, 220, 2019, 55-68

SELECTED RESEARCH PROJECTS

Physics-Reinforced Deep Learning for Structural Metamodeling

Principal Investigator, National Science Foundation

Image Processing and Machine Learning Algorithms to Measure Axial Stress in Rails

Co-Principal Investigator, Federal Railroad Administration

In-motion Track Stability Assessment Using a High-Resolution Camera

Co-Principal Investigator, Association of American Railroads

Ali Touran



Professor, Civil and Environmental Engineering

PhD, Stanford University, 1980
coe.northeastern.edu/people/touran-ali

Scholarship focus: risk assessment; construction cost/schedule

uncertainty; project delivery systems; simulation; construction productivity

Honors and awards: Fellow, American Society of Civil Engineers; President's Award, Boston Society of Civil Engineers

SELECTED PUBLICATIONS

N. Gao, A. Touran

Cost Overruns and Formal Risk Assessment Program in US Rail Transit Projects, *Journal of Construction Engineering and Management*, 146(5), 2020, 05020004

I. Castro-Nova, G.M. Gad, A. Touran, B. Cetin, D.D. Gransberg

Evaluating the Influence of Differing Geotechnical Risk Perceptions on Design-Build Highway Projects, *Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering*, 4(4), 2018

N. Montazeri, A. Touran

Multi-Objective Reliability-Based Optimization of Life-Cycle Maintenance for Bridges under Cost Uncertainty, *Proceedings of the Construction Research Congress, ASCE*, 2018

A. Touran, F. Panah

Use of the Alternative Technical Concepts in Transportation Projects, *ISEC, 9 Conference*, 2017

R. Masoumi, A. Touran

A Framework to Form Balanced Project Portfolios, *Proceedings of the Construction Research Congress, San Juan, Puerto Rico*, 2016

SELECTED RESEARCH PROJECTS

Integrated Project Delivery in Industrial Projects

Co-Principal Investigator, Construction Industry Institute

Systematic Approach for Estimating Construction Contract Time

Co-Principal Investigator, National Cooperative Highway Research Program

Geoffrey C. Trussell



Professor and Chair, Department of Marine and Environmental Sciences; Director Coastal Sustainability Institute & Marine Science Center; affiliated faculty, Civil and Environmental Engineering

PhD, College of William & Mary, 1998
coe.northeastern.edu/people/trussell-geoffrey

Scholarship focus: evolutionary and community ecology; coastal sustainability

Honors and awards: Ray Lankester Investigatorship; Sigma Delta Tau Outstanding Professor

SELECTED PUBLICATIONS

S.C. Donelan, G.C. Trussell

Sex-Specific Differences in the Response of Prey to Predation Risk, *Functional Ecology*, 34(6), 2020, 1235-1243

S.C. Donelan, G.C. Trussell

The Effects of Embryonic Experience with Predation Risk Vary Across a Wave Exposure Gradient, *Ecosphere*, 10(4), 2019, e02676

C.M. Matassa, P.J. Ewanchuk, G.C. Trussell

Cascading Effects of a Top Predator on Intraspecific Competition at Intermediate and Basal Trophic Levels, *Functional Ecology*, 2018, 1-12

S.C. Donelan, G.C. Trussell

Parental and Embryonic Experiences with Predation Risk Affect the Behavior and Performance of their Offspring, *Proceedings of Roy. Soc. B.*, 2018

S.C. Donelan, G.C. Trussell

Synergistic Effects of Parental and Embryonic Exposure to Predation Risk on Offspring Size at Emergence, *Ecology*, 99, 2018, 68-78

G.C. Trussell, C.M. Matassa, P.J. Ewanchuk

Moving Beyond Linear Food Chains: Trait-Mediated Indirect Interactions in a Rocky Intertidal Food Web, *Proceedings of the Royal Society*, 2017

SELECTED RESEARCH PROJECTS

Local Adaptation and the Evolution of Plasticity Under Predator Invasion and Warming Seas: Consequences for Individuals, Populations, and Communities

Principal Investigator, National Science Foundation

Research Coordination Network: Evolution in Changing Seas

Co-Principal Investigator, National Science Foundation

Sara Wadia-Fascetti



Vice Provost, PhD Network; Professor, Civil and Environmental Engineering

PhD, Stanford University, 1994
coe.northeastern.edu/people/wadia-fascetti-sara

Scholarship focus: condition assessment methodologies for infrastructure systems; life cycle and life span analysis; nondestructive testing and evaluation; structural and earthquake engineering uncertainty

Honors and awards: American Society of Engineering Education Sharon Keillor Award for Women in Engineering Education; Minorities in Engineering Award, American Society of Engineering Education; National Science Foundation CAREER Award; Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring, selected by President Bush and awarded at the White House

SELECTED PUBLICATIONS

D. Vine, S. Shahini Shamsabadi, Y. Zhao, R. Birken, M. Wang, S. Wadia-Fascetti

City-Wide Application of the Affordable and Rapid StreetScan Pavement Management System, *ASCE Journal of Infrastructure Systems*, 23(2), 2017

A. Ganguli, C.M. Rappaport, D. Abramo, S. Wadia-Fascetti
 Synthetic Aperture Imaging for Flaw Detection in a Concrete Medium, *Independent Nondestructive Testing and Evaluation*, 45(1), 2012, 79-90

K. Belli, S. Wadia-Fascetti, C. Rappaport
 Integrated Sensor and Media Modeling Environment Developed and Applied to Ground-Penetrating Radar Investigation of Bridge Decks, *Journal of Computing in Civil Engineering*, 25(1), 2011, 10-20

K. Belli, C. Rappaport, S. Wadia-Fascetti
 A Time Domain Equivalent Source Model of an Impulse GPR Antenna Based on Measured Radiation Field, *Research in Nondestructive Evaluation*, 22(4), 2011, 197-207

SELECTED RESEARCH PROJECTS

IGERT: Intelligent Diagnostics for Aging Civil Infrastructure
 Principal Investigator, National Science Foundation

Northeastern ADVANCE

Principal Investigator, National Science Foundation

VOTERS: Versatile Onboard Traffic Embedded Roaming Sensors

Co-Principal Investigator/Deputy Director, National Institute of Standards and Technology

Ming Wang



COE Distinguished Professor, Civil and Environmental Engineering

PhD, University of New Mexico, 1983
coe.northeastern.edu/people/wang-ming

Scholarship focus: network-wide pavement and bridge deck inspections; sensor technology for infrastructure; saliva-based sensor technology for disease diagnosis and monitoring; structural health monitoring for bridges; subsurface fault detection using air-coupled GPR systems

Honors and awards: Fellow, SPIE; Søren Buus Outstanding Research Award, College of Engineering; Outstanding Translational Research Award, College of Engineering

SELECTED PUBLICATIONS

- X. Ma, H. Liu, M.L. Wang
 Automatic Detection of Steel Rebar in Bridge Decks from Ground Penetrating Data, *Journal of Applied Geophysics*, 158, 2018, 93-102
- W. Zhang, S. Nazarine, M. Wang, S. Cranford
 Sensor Design via Scaled Collision Theory, *ASCE Journal of Engineering Mechanics*, 2018
- M. Wang, W. Zhang
 Saliva Glucose Monitoring System, US 9244035 B2, 2016, Licensed to NanoBio LLC, 2017
- W. Zhang, M.L. Wang, S. Khalili, S. Cranford
 Materiomics for Oral Disease Diagnostics and Personal Health Monitoring: Designer Biomaterials for the Next Generation Biomarkers, *OMICS: A Journal of Integrative Biology*, 20, 2016, 12-29
- N. Martino, K. Maser, R. Birken, M.L. Wang
 Quantifying Bridge Deck Corrosion Using Ground Penetration Radar, *Research in Nondestructive Evaluation*, 27(2), 2016, 112-124
- W. Zhang, M.L. Wang, S. Cranford
 Ranking of Molecular Biomarker Interaction with Targeted DNA Nucleobases via Full Atomistic Molecular Dynamics, *Scientific Report*, Nature Publishing Group, 6, 2016, 18659

SELECTED RESEARCH PROJECTS

Breath and Saliva Based Nano-Bio Sensing System for Disease Diagnosis and Monitoring
 Principal Investigator, Carecom

Qi Ryan Wang



Assistant Professor, Civil and Environmental Engineering

PhD, Virginia Tech, 2015
coe.northeastern.edu/people/wang-ryan

Scholarship focus: urban and social resilience; geo-social networking; coupled, human-natural systems; natural disaster response and evacuation; urban computing

SELECTED PUBLICATIONS

- J. Du, Q. Zhu, Y. Shi, Q. Wang, Y. Lin, D. Zhao
 Cognition-Digital Twins (Cog-DT) for Personalized Information Systems of Smart Cities – A Proof of Concept, *Journal of Engineering Management*, 2020
- A. Akhavan, N.E. Phillips, J. Du, J. Chen, B. Sadeghi, Q. Wang
 Accessibility Inequality in Houston, *IEEE Sensors Letters*, 3(1), 2019
- J. Du, Q. Wang, Q. Shi
 Description-Experience Gap under Imperfect Information – Information Continuum and Aggressive Cost Estimating in Capital Project, *Journal of Engineering, Construction and Architectural Management*, 2019
- J. Chen, W. Wang, N. Li, Q. Wang
 Linking Energy-Cyber-Physical System Through Human-Centric Occupancy Predication and Interpretation with Wi-Fi Probe-Based Ensemble Classifications, *Applied Energy*, 236, 2019, 55-69
- N.E. Phillips, M. Small, R. Sampson, Q. Wang
 The Social Integration of American Cities: Network Measures of Connectedness Based on Everyday Mobility across Neighborhoods, *Sociological Methods & Research*, 2019
- J. Chen, Q. Wang, Z. Lin, X. Guo
 Measuring the Cognitive Loads of Construction Safety Sign Designs During Selective and Sustained Attention, *Safety Science*, 105, 2018, 9-21

SELECTED RESEARCH PROJECTS

- High-Frequency Data Collection for Human Mobility Prediction during COVID-19
 Principal Investigator, National Science Foundation
- Infection Transmission of COVID-19 in Urban Neighborhoods
 Co-Principal Investigator, National Science Foundation
- Collaborative Research: Less is More: Personalized Spatial Information System Based on Real-Time Cognitive Load for First Responders in Emergency Indoor Wayfinding
 Principal Investigator, National Science Foundation
- Geosocial Networks in America's 50 Largest Cities
 Principal Investigator, Microsoft Azure for Research

Mishac Yegian



COE Distinguished Professor, Civil and Environmental Engineering

PhD, Massachusetts Institute of Technology, 1976
coe.northeastern.edu/people/yegian-mishac

Scholarship focus: geotechnical earthquake engineering; soil dynamics; geosynthetics; seismic response of landfills; base isolation; liquefaction; bridge engineering; use of shaking table in earthquake engineering

Honors and awards: Fellow, American Society of Civil Engineers; ASCE Thomas A. Middlebrooks Award

SELECTED PUBLICATIONS

- E. Eseller-Bayat, S. Gokyer, M.K. Yegian
 Earthquake Engineering Experimental Facility for Research and Public Outreach, Seismic Evaluation and Rehabilitation of Structures, 26, 2014, 379-387
- E. Eseller-Bayat, S. Gokyer, M.K. Yegian, O. Deniz, A. Alshawabkeh
 Bender Elements and Bending Disks for Measurement of Shear and Compression Wave Velocities in Large Fully and Partially Saturated Sand Specimens, ASTM Geotechnical Testing Journal, 36(2), 2013, 1-8
- E. Eseller-Bayat, S. Gokyer, M.K. Yegian, E. Ortakci, A. Alshawabkeh
 Design and Application of Simple Shear Liquefaction Box, ASTM Geotechnical Testing Journal, 36(3), 2013, 1-9

SELECTED RESEARCH PROJECTS

Field Application of Induced Partial Saturation (IPS) for Liquefaction Mitigation
 Principal Investigator, National Science Foundation

Yang Zhang



Professor and Distinguished Fellow and Associate Chair for Research, Civil and Environmental Engineering

PhD, University of Iowa, 1994
coe.northeastern.edu/people/zhang-yang

Scholarship focus: Atmospheric and environmental research at the interface of earth system sciences that crosses traditional disciplinary boundaries including energy, air, water, forest, ocean, soil, food, and health

Honors and awards: The RTI University Scholar Award

SELECTED PUBLICATIONS

- Y. Zhang, P.-L. Yang, Y. Gao, R.L. Leung, M. Bell
 Health and Economic Impacts of Air Pollution Induced by Climate Extremes Over the Continental U.S., Environmental International, 143, 2020, 105921
- C.-P. Hong, Q. Zhang, Y. Zhang, S.J. Davis, X. Zhang, D. Tong, D. Guan, Z. Liu, K.-B. He
 Weakened Aerosol Radiative Effects May Mitigate the Climate Penalty on Chinese Air Quality, Nature Climate Change, 10, 2020, 845-850
- C.-P. Hong, Q. Zhang, Y. Zhang, S. J. Davis, S. J. Davis, D. Tong, Y.-X. Zheng, Z. Liu, D.-B. Guan, K.-B. He, H. J. Schellnhuber
 Impacts of Climate Change on Future Air Quality and Human Health in China, Proceedings of the National Academy of Sciences of the United States of America, 2019, 1-8

SELECTED RESEARCH PROJECTS

U.S. EPA Air, Climate and Energy (ACE) Centers: Solutions for Energy, Air, Climate, and Health (SEARCH): Project 3: Improving Projections of the Spatial and Temporal Changes of Multi-Pollutants to Enhance Assessment of Public Health in a Changing World
 Principal Investigator, SEARCH, U.S. EPA

Towards Optimal Configurations of NAQFC Chemistry and Aerosol Representations
 Principal Investigator, National Oceanic and Atmospheric Administration

Framework: Software: Collaborative Research: CyberWater an Open and Sustainable Framework for Diverse Data and Model Integration with Provenance and Access to HPC
 Co-Principal Investigator, National Science Foundation

Viet Le

PhD 2020, Civil Engineering; Advisor,
Luca Caracoglia

A Performance-based Wind Engineering Framework For Vertical Structures Subjected To Nonstationary Wind Loads

Regarded as a rational analytical approach that enables more risk-informed decision making, performance-based engineering (PBE) has been widely endorsed by the wind engineering community for the design and analysis of vibration-sensitive structures such as tall buildings. Accomplished through modular stages that delineate a structure's capacity to satisfy performance objectives, the uncertainties, error propagation, and random properties of the structural system, the environmental hazard, and the estimation of losses incurred from damages can be systematically examined with great detail. This multi-faceted, holistic approach combines this information to better equip engineers, owners, and stakeholders with the knowledge to reduce wind-induced damage risks. In the current day, performance-based wind engineering (PBWE) has been substantially refined, especially for synoptic phenomena such as hurricanes and extratropical depressions. However, it is still largely deficient in one regard: the consideration of short-duration, non-synoptic, rapidly evolving thunderstorm downbursts and tornadoes. These windstorms have been mostly neglected in the development of the performance-based methodology because of the incomplete knowledge surrounding the hazard probability definition and the fluid-structure forces that they impart on structures.

See full dissertation at
coe.northeastern.edu/20/VietLe

V V K Theja Putta

PhD 2019, Civil Engineering; Advisor, Peter Furth

Evaluating Bicycle Networks : Visualizing And Measuring Low-stress Connectivity And Accessibility

Bicycling as a means of transportation has several health, economic, and environmental benefits. And yet, mass cycling has not really taken off in the U.S. Lack of safe, connected bicycle networks in most U.S. cities is one of the biggest reasons for this. Cities have been trying to change this and build well-connected bicycle networks and need tools and methods to evaluate their bicycle networks. These methods should be specific to bicycling since bicycle networks with only the low-stress links are often disconnected and circuitous while auto-centric networks usually offer complete connectivity between origins and destinations. This research builds on the level of traffic stress (LTS) study and introduces improved ways of measuring the effectiveness of bike networks in connecting origins and destinations. Also proposed are ways to visualize accessibility and connectivity on a map. These methods are useful for planners to compare network improvement scenarios, map accessibility and identify barriers in a network. The proposed methods are demonstrated using case studies from Delaware, Greater Boston, and Arlington County, VA. A case study in Delaware is used to demonstrate the effectiveness of potential bike-to-work trips as a measure in comparing proposed bicycle route alternatives between Newark and Wilmington.

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

Luke Troup

PhD 2019, Interdisciplinary Engineering; Advisors,
Matthew Eckelman and David Fannon

Resilient & Future Aware Building Performance Simulation

By shaping our physical surroundings and forming out cultures, buildings are integral to our lives. To serve their many functions - foremost protecting and sheltering occupants - buildings are complex systems and are elements in the multi-domain network of the built environment. That environment vastly contributes to the global climate crisis but must simultaneously provide protection from its consequences. The expected doubling of building land area by 2060 emphasizes buildings' role in the sustainability and resilience of our environment. Building performance simulation allows the architecture, engineering, and construction industry to analyze building behavior preemptively. However, current industry practice isolates modeling analysis from real buildings, relies on historic data, and excludes future uncertainty. To address these challenges, this dissertation investigates methods of simulating building performance in future scenarios to promote a resilient built environment. Future-aware building simulation requires models accurately describe physical parameters and effectively predict actual building behavior. Extensive prior simulations results indicate that window characteristics, particularly the window-to-wall ratio, strongly influence the energy necessary to maintain comfortable interior conditions. Regression analysis of measured data from actual US buildings reveals window-to-wall ratio to be a statistically significant predictor only in cooling energy, however, the correlation is not as robust in real buildings as in previous model-based studies. Discrepancies between simulated and actual performance are compounded over long building lifetimes. Current practice simulates annual energy use using "typical" exterior conditions assembled from historical meteorological measurements that may be over 40 years old: barely representative of present conditions, nevertheless uncertain future context.

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

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COVER IMAGE

Assistant Professor Ameet Pinto, civil and environmental engineering, was recognized with the prestigious 2019 Paul L. Bush Award from the Water Research Foundation for his research on understanding how microbial communities are influenced by treatment processes and how they in turn impact process performance and what can be done to manage these communities more reliably and more efficiently.

