Welcome!

Thank you for participating in UConn Engineering’s Third Annual Industry Open House.

We are excited to showcase a selection of our innovation-driven faculty research and to meet with you one-on-one to discover, together, pathways toward collaboration that will energize and enhance your business.

The exhibit hall features more than 45 posters summarizing a fraction of the exciting research and commercialization activities underway at UConn. Learn how this research can help you innovate, lower production and material costs, increase efficiency, explore new technologies, license UConn developed IP and improve your operation.

UConn Engineering currently collaborates with more than 100 companies on different areas of research innovation, SBIR ventures, and sponsored capstone Senior Design projects that allow our students to gain invaluable hands-on design and development experience. There are many avenues that we can explore together with your company.

One-on-One Meetings
For those who reserve one-on-one “speed dates” with our innovators, please consult the Faculty Find Legend and ballroom floor plan contained in this program to locate your meeting table(s).

If you didn’t book a reservation for a one-on-one meeting, there may still be times available. Don’t hesitate to ask a faculty member whether they can accommodate an unscheduled “speed date” during today’s Open House.

Before leaving today, we would appreciate your feedback on the event: simply complete the enclosed Comments slip and hand it to one of our staff posted at the ballroom entryway.

We hope to see you again!

Cordially,

Kazem Kazerounian
Dean and Professor
THANK YOU TO OUR CO-SPONORS!

U.S. Commercial Service
United States of America
Department of Commerce

Connecticut
still revolutionary
Department of Economic and Community Development

connecticut innovations
What’s next starts here.

INSTITUTE OF MATERIALS SCIENCE

UNIVERSITY OF CONNECTICUT
OFFICE OF THE VICE PRESIDENT FOR RESEARCH
TECHNOLOGY COMMERCIALIZATION PARTNERS
## Engineering Faculty Legend
Industry Open House
November 5th, 2015

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<td>Anson Ma</td>
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<td>Kristina Wagstrom</td>
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<td>Greg Lewis (CSBDC)</td>
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<td>Richard Christenson</td>
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<td>Arash Esmaili Zaghi</td>
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ALEXANDER G. AGRIOS  
CIVIL & ENVIRONMENTAL ENGINEERING

Phone: (860) 486-1350  
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Website: http://agrios.engr.uconn.edu

Keywords:  
Nanomaterials; Composites; Catalysis; Photovoltaics; Dye-sensitized and Perovskite solar cells; Environmental photocatalysis

Summary:  
Molecularly Tethered Nanocatalysts: Platinum nanoparticles (< 2 nm) are chemically attached to a semiconductor surface via a bifunctional molecule capable of binding to both the semiconductor and the metal while providing electronic coupling between the two.

Transparent Conducting Aerogels: A transparent conducting oxide material (antimony-doped tin oxide) fabricated in the aerogel morphology, which is a high-surface area, high-porosity, highly networked structure. The aerogels can be conformally coated with other materials by atomic layer deposition providing both a more rigid structure and one with intended interface properties.

Applications for these technologies include photovoltaics, solar fuels, sensing, and displays.
REDA A. AMMAR
COMPUTER SCIENCE & ENGINEERING
DIR. OF ENGINEERING GLOBAL PROGRAMS

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Website: http://www.engr.uconn.edu/~reda/

Keywords:
Performance Engineering, Real-Time Systems, Distributed Systems, Under Water Processing Networks

Summary:
Hierarchical performance modeling. Techniques to evaluate sequential and distributed systems have been investigated. Results were integrated in Hierarchical Performance Modeling System (HPMS) to provide a general-purpose methodology to support the development of the performance-oriented software applications including distributed objects and real-time systems. It provides quantitative performance assessment of an entire system comprising of hardware, software and communication. It assists the system developers to incorporate performance metrics very early in the design process. Techniques are used to evaluate and optimize developing real-time systems and efficient parallel and distributed algorithms via restructuring, partitioning, allocation and scheduling.

Big data are found in numerous underwater applications. Such information is often generated continuously at fast rate. Current techniques are impractical. Underwater wireless processing networks (UWPNs) have emerged as an essential technology for various undersea applications. UWPN reduces the size of the data being transmitted and perform more computation underwater in order to extract and transmit valuable information.
EMMANOUIL ANAGNOSTOU
CIVIL & ENVIRONMENTAL ENGINEERING

Phone: (860) 486-2298  
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Website: http://ucwater.engr.uconn.edu/

Keywords:  
Global precipitation measurement from remote sensing; Hydro-meteorological modeling for the prediction of floods; Underwater passive aquatic listening for marine application; Numerical weather prediction and data assimilation; Damage modeling for electric distribution networks

Summary:  
Intelligent Ambient Noise Sensors for Monitoring the Oceanic Environment: The sustainable protection and management of the oceans requires a comprehensive understanding of the processes and conditions that affect the state of the marine environment. To support this need, we are developing remote sensing techniques for smart detection and categorization of the ambient sounds into multiple sources, such as, environmental (rainfall and wind speed), anthropogenic (ships, drillings), biological (e.g. marine mammals) and geological (seismic activities, volcanic eruptions, landslides), and the quantification of the abovementioned classified sources.

Weather-Based Damage Prediction on Electric Distribution Network: New England is a densely forested region of the US, frequently affected by severe winds and precipitation that often leads to power outages. Our team is developing a weather-based power outage prediction system tailored for the Northeast Utilities service territories. The prediction framework utilizes forecasted values of meteorological parameters from a state-of-the-art numerical weather prediction model combined with infrastructure data and vegetation parameters to provide operational estimates of the number and spatial distribution of power outages over the region for an approaching weather event.
**MARINA ASTITHA**  
**CIVIL & ENVIRONMENTAL ENGINEERING**

Atmospheric Modeling and Air Quality Group  
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Website: [http://airmg.uconn.edu](http://airmg.uconn.edu)

**Keywords:** Regional and global atmospheric modeling; Extreme weather events; Aerosol-cloud-radiation climatic feedback; Air pollution modeling in the regulatory setting

**Summary:**  
Dr. Astitha’s recent research efforts have focused on atmospheric dynamics, air pollution and climate using atmospheric modeling systems of varying complexity. The research is focused on the following areas:  
1) **Predictability of extreme weather events:** state-of-the-science numerical modeling systems are routinely used to predict atmospheric circulation and weather patterns globally. Yet, improvements in the accuracy of the prediction (spatiotemporal patterns, intensity, and magnitude) are still deemed necessary.  
2) **Aerosol-cloud-radiation interactions in regional and global scale:** direct and indirect effects of aerosols (desert dust, sea salt, sulfates, nitrates etc) have proven significant for the accurate prediction of atmospheric conditions and climate change. Certain combinations of air quality and atmospheric conditions are likely to trigger flood events or, in contrary, suppress rainfall in areas sensitive to water availability.  
3) **Air pollution modeling in the regulatory setting:** in the US, models are being used for designing emission control strategies to comply with the relevant air quality standards. It is vital to improve our understanding of the model strengths and limitations and develop better approaches for using air quality models in the regulatory setting.
Mukul Bansal
Computer Science & Engineering

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Website: http://www.cse.uconn.edu/~mukul

Keywords:
Algorithms, Computational Biology and Bioinformatics, Molecular Evolution and Phylogenetics, Genomics.

Summary:
Dr. Bansal develops new computational methods, efficient algorithms, and powerful software tools to help answer fundamental biological questions. He is especially interested in problems related to understanding the evolution of genes, genomes, and species. Some specific research projects include: (1) Inferring the evolution of microbial genomes and gene families to understand how microbes evolve and adapt, and (2) reconstructing highly accurate gene trees and whole-genome species trees for improving the accuracy of downstream comparative and functional genomic analyses.

Potential commercial applications include understanding and improving the genetics of important food crops and other commercially important organisms, and finding new drug targets for disease-causing microbes.
JOHN BAU
CENTER FOR CAREER DEVELOPMENT

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Website:
http://www.career.uconn.edu
http://www.linkedin.com/in/johnbau

Keywords:
Career Fairs, Job/Co-op/Internship Postings, Experiential Learning Collaborations, Company Information Sessions, On-Campus Interviewing, Campus Brand-Building Opportunities, On-Campus Recruiting, Networking

Summary:
Mr. Bau serves as the embedded Career Consultant for the School Engineering from the UConn Center for Career Development. With nearly 20 years of experience in STEM staffing and higher education, John seeks to build bridges between industry partners and UConn students in ways that can benefit both. John coaches students in communication-oriented skills to complement their technical classroom experiences to help prepare them for the workplace. Networking is a specific interest, and he is an avid proponent for professional use of social media, such as LinkedIn, in the job search. He can assist employers in developing campus branding and recruiting strategies to help them reach the right students at the right time to meet their staffing goals – in both engineering and non-technical roles.
**Ali Bazzi**

**Electrical & Computer Engineering**

**Phone:** (860) 486-5377  
**E-mail:** [bazzi@engr.uconn.edu](mailto:bazzi@engr.uconn.edu)  
**Website:** [http://apedl.engr.uconn.edu](http://apedl.engr.uconn.edu)

**Keywords:**  

**Summary:**  
Prof. Bazzi’s research and expertise cover a wide base of power and energy applications with focus on power electronics applications. These include electric motor drives, renewable energy systems (especially solar photovoltaics), and micro-grids. In these applications, his interest is in the design and control of power electronics by considering larger system integration whether it is for transportation (automotive, marine, or aerospace), industrial, or residential. Most of Dr. Bazzi’s research addresses enhancement of energy efficiency and reliability in such applications with cost and practical implementation constraints.
**JINBO BI**  
**COMPUTER SCIENCE & ENGINEERING**

**Phone:** (860)486-1458  
**E-mail:** jinbo@engr.uconn.edu  
**Website:** www.labhealthinfo.uconn.edu

**Keywords:**  
Machine learning, data mining, pattern recognition, bioinformatics, medical informatics, optimization

**Summary:**  
Dr. Bi’s expertise is in machine learning and statistical data mining. She has expertise in the development and deployment of the statistical techniques to health informatics and bioinformatics problems. Her recent research focuses on (1) the creation of novel machine learning methodologies for the imprecisely-supervised learning problem where human experts are unable to annotate data accurately; (2) the derivation of novel bioinformatics and parallel/distributed algorithms that can refine disease classification for enhanced genomic analysis of the disease; (3) the development of clinical decision support tools for physicians to improve diagnostics, such as middle ear infection; (4) the study of brain electrophysiological data to understand cognitive functions such as working memory.
**GEORGE M. BOLLAS**  
**CHEMICAL & BIOMOLECULAR ENGINEERING**

**Phone:** (860) 486-4602  
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**Website:** [http://pdsol. engr.uconn.edu/](http://pdsol. engr.uconn.edu/)

**Keywords:**  
Energy processes, simulation, optimization, control, fault detection, Chemical-Looping, Biomass Pyrolysis, Fischer-Tropsch Synthesis, Fluid Catalytic Cracking

**Summary:**  
Dr. Bollas is an Assistant Professor with the Department of Chemical and Biomolecular Engineering of the University of Connecticut and the Director of the UTC Institute for Advanced Systems Engineering. He is a process design expert and winner of the prestigious NSF CAREER and ACS-PRF Doctoral New Investigator awards. He is the head of the Process Design Simulation and Optimization Laboratory (PDSOL), which performs research on system intensification and processes that address the growing energy crisis and the environmental impact of energy production. His research portfolio includes model-based and experimental analyses of processes for chemical-looping combustion with an emphasis on the optimal experimental design and process scale-up of existing pilot plants to power plant capacities; experimental and theoretical studies of biomass pyrolysis, gasification, and catalyst deactivation during biomass catalytic processing; Fischer-Tropsch Synthesis; and model-based fault detection and isolation methods for built-in test of aircraft cabin air and temperature control systems. Dr. Bollas manages a research portfolio >$2M, advising 9 graduate students and 7 undergraduate researchers. He has published 25 scientific papers, 2 book chapters, over 90 conference proceedings and is the inventor of 2 US patents.
JOHN CHANDY
ELECTRICAL & COMPUTER ENGINEERING

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Keywords:
Storage systems, Reconfigurable computing, Parallel and distributed applications, hardware security, embedded systems security

Summary:
Dr. Chandy’s research has been focused on distributed storage systems, high performance computing, and systems security. His work on distributed storage systems includes parallel file systems, active storage systems, reliable disk architectures, peer-to-peer storage, and energy-aware storage systems. In high-performance computing, he has developed parallelized algorithms for VLSI CAD, distributed application frameworks, and reconfigurable computing applications and frameworks. Finally, in the area of systems security, his work focuses on embedded systems security, hardware assessment, and cloud storage security.
Ki Chon
Biomedical Engineering

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Website: http://www.bme.uconn.edu/facultystaff/core-faculty

Keywords:
Biosignal processing, biomedical instrumentation, mobile health diagnostics, wearable sensors and devices, biomaterials, and identification and modeling of physiological systems.

Summary:
Dr. Chon’s research has been focused on biosignal processing, biomedical instrumentation, wearable sensors and devices including use of smart phones for vital signs and monitoring cardiac arrhythmias, development of hydrophobic vital sign sensors, and identification and modeling of physiological systems. His main research falls into the following areas: (1) Fabrication of novel hydrophobic, reusable electrocardiogram electrodes for underwater vital sign monitoring; (2) Application of our novel ECG electrodes for continuous monitoring and detection of malignant heart arrhythmias including atrial fibrillation and heart failure; (3) Development of smartphone application software for vital sign monitoring and detection of atrial fibrillation; (4) Development of novel motion and noise detection and reconstruction algorithms for wearable devices to minimize data corruption.
Richard E. Christenson  
Civil & Environmental Engineering  

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Website:  
http://www.engr.uconn.edu/~richard/christenson

Keywords:  
Structural vibrations, shake table testing, vibration monitoring

Summary:  
Rich Christenson’s research interests are in structural engineering, particularly in the areas of structural dynamics and experimental research. His current research is in the areas of smart damping technologies for buildings and bridges, bridge monitoring, and real-time hybrid testing methodologies. Laboratory testing facilities of interest include a single axis and six degree-of-freedom (6DOF) shake table with associated sensor and data acquisition technologies and capabilities to conduct vibration testing of physical components in a hardware-in-the-loop type configuration. Field testing capabilities include a portable wireless monitoring system including up to 20 channels of acceleration and strain measurements to measure structural response, deterioration and existing conditions useful in the physical evaluation of structural performance.
MARIA CHRYSOCHOOU
ENVIRONMENTAL ENGINEERING PROGRAM

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Website: http://www.cee.engr.uconn.edu/

Keywords: Environmental engineering, water resources, pollution control, waste management, brownfield redevelopment, site remediation

Summary:
The Environmental Engineering (ENVE) program at the UConn’s School of Engineering offers Bachelor’s, Master’s and Ph.D. degrees in Environmental Engineering.

Environmental Engineers design solutions for diverse problems related to protection of the environment and human health: wastewater treatment, air pollution control, management of household and industrial waste, rational water resources management, renewable energy, climate change and reduction of carbon footprint. Senior undergraduate students spend a year on a real-world design problem, working under industrial and government sponsors. Graduate students may also conduct applied research towards providing innovative solutions for real-world problems. Fee-for-service analytical services may also be provided by individual ENVE faculty.

In summary, the ENVE program offers:
• Undergraduate and graduate degrees
• Senior Design projects for real world problems
• Graduate Research opportunities
• Selected analytical services (faculty-specific)
ASHWIN DANI
ELECTRICAL & COMPUTER ENGINEERING

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Website: http://www.ee.uconn.edu/faculty-staff-students/faculty/fac_dani

Keywords:

Summary:
Dr. Dani’s research has been focused on solving various estimation and control challenges in robotics & automation and other engineering domains including industrial and biomedical applications. His main research falls into the following areas: (1) Human-Robot collaboration & safety issues in manufacturing environments; (2) GPS-denied navigation of unmanned aerial systems, improved autonomy; (3) Supervisory Control of building systems; (4) Sensor data fusion of electronic and soft (human-provided) information; (5) Estimation and control for neuro-prosthesis (exoskeleton-type structures as walking aids).
PARASARA SRIDHAR DUGGIRALA
COMPUTER SCIENCE & ENGINEERING

Phone: (860) 486-2687
E-mail: psd@engr.uconn.edu
Website: http://engr.uconn.edu/~psd/

Keywords:

Summary:
Prof. Duggirala works in the interdisciplinary area of verification of Cyber-Physical Systems. He brings together techniques from Formal Methods, Control Theory, Numerical Analysis, and Distributed systems for developing techniques that ensure safe functioning of safety critical systems. He is interested in integrating these techniques into the design cycles of aircraft landing protocols, autonomous vehicles, and medical devices.
AFSHIN GHIAEI
CONTINUING & DISTANCE ENGINEERING EDUCATION

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Keywords:
Continuing education, online courses, distance education, customized programs, master of engineering, certificates, systems engineering, power engineering

Summary:
The Continuing & Distance Engineering Education (CDEE) program at the UConn’s School of Engineering gives working engineers the ability to improve their skills in cutting-edge subject areas or to develop in-depth knowhow in areas tailored to their needs or the needs of their employers.

The CDEE program also delivers coursework required by graduate students toward completion of their degrees; courses of interest to students who wish to expand their knowledge of specific subjects, either for credit or not for credit; and courses for practitioners and students who are interested in advancing their knowledge of specific subjects in a non-degree path.

In summary, the CDEE program offers:
• Master of Engineering (MENG)
• Systems Engineering Certificates in Controlled, Embedded and System Design
• Power Engineering Certificate
• Graduate Courses (Non-degree)
• Corporate Education (Customized Training & Development)
SHALABH GUPTA
ELECTRICAL & COMPUTER ENGINEERING

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E-mail: shalabh.gupta@engr.uconn.edu
Website:
http://www.linkswp.engr.uconn.edu

Keywords:

Summary:
Dr. Gupta’s research is focused on the science of autonomy with emphasis on two key areas: Data Analytics and Networked-Intelligent systems. Application examples include complex human-engineered systems such as a network of unmanned vehicles, distributed sensor networks, power grids, aircraft control systems, hybrid vehicles, etc. Some key research areas include autonomous machine perception, information fusion, distributed learning, adaptive decision & control in presence of uncertainties, cooperative tasking and adaptive navigation of unmanned vehicles, intelligent sensor networks for Intelligence, Surveillance & Reconnaissance (ISR) operations, and fault diagnosis & prognosis in networked-control systems. In essence, the research is centered on the essential characteristic of cyber-physical systems that links the domain of underlying system dynamics with the domain of information & control.
Rainer Hebert
Materials Science & Engineering

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Keywords:
Metallurgy; rapid solidification; phase transformations; additive manufacturing; steels; titanium alloys.

Summary:
Rapid solidification processing (RSP) has over the last three decades greatly extended the range of commercial alloys. The deviations from equilibrium during RSP can induce novel phases or microstructures and hence contribute to alloys with improved properties. During additive manufacturing of metallic components cooling rates reach $10^4 \text{ K/s}$ locally and are therefore similar to cooling rates in traditional RSP. The fundamental knowledge of RSP is applied to additive manufacturing in order to modify compositions of existing commercial alloys or to develop new alloys, for example metallic glass alloys.
FAQUIR JAIN
ELECTRICAL & COMPUTER ENGINEERING

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Keywords:
Implantable bio-sensor platforms; Quantum dot based multi-bit FETs, solar cells and lasers; Quantum Simulations.

Summary:
Miniaturized wireless biosensors, that can be subcutaneously inserted using a syringe, are being developed to continuously monitor glucose and other analyte levels to manage diabetes.

Quantum dot superlattice (QDSL) structures for electronics (novel 2-bit FETs, SRAM and nonvolatile RAMs and flash) and high efficiency solar cells.
FIONA LEEK
INDUSTRIAL AFFILIATES PROGRAM
INSTITUTE OF MATERIALS SCIENCE

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Keywords:
Industry outreach, failure analysis, raw material comparison, identification of unknowns/contaminants, analysis of product/process difficulties & customer returns

Summary:
Since 1974, the IMS Industrial Affiliates Program (IAP) has provided industry with convenient access to the Institute of Materials Science’s resources for short-term research, development and production projects. Assistance typically involves materials characterization and/or faculty consultation. Small feasibility studies started in the Program are easily transitioned into longer-term, faculty-led research projects. The Program provides assistance on a request-by-request basis; however, some companies opt for Program membership so as to foster a more intimate, long-term working relationship. Through membership, IMS and IAP grow to become an integral part of the company’s technical team and a problem-solving partner.

Dr. Leek received a M.S. in Textile Science & Engineering from the College of Textiles at NCSU and a Ph.D. from the Polymer Program here at UConn. She subsequently worked as an Application Scientist for T. A. Instruments and a Senior Research Scientist in Corporate Analytical for Millipore. Ten years ago, she returned to UConn to become the Associate Director of the IMS Industrial Affiliates Program.
GREGORY LEWIS
SMALL BUSINESS ADVISOR

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Keywords:

Summary:
Gregory Lewis is a Detroit native and graduate of Harvard University who, immediately upon graduation, journeyed across America. Since then he’s accumulated extensive experience in sales, commercial real estate, operating his own computer-related companies, and owning and managing university and non-profit training programs in Hawaii, Massachusetts, Texas and Connecticut.

Gregory believes that entrepreneurs and innovators who turn to a trusted advisor—and discover the right information—put themselves in a position to be sustainable and successful. Greg provides the guidance, resources, and checks and balances needed to transform ideas into financially secure reality. Gregory is based at the Connecticut Small Business Development Center at the UConn School of Business.
W. K. Anson Ma  
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Institute of Materials Science

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Keywords:  
Inkjet and 3D printing; rheology; nanotechnology; flexible electronics; polymer composites

Summary:  
Ma’s research group, Complex Fluids Laboratory, focuses on connecting fundamental knowledge of complex fluid flows (rheology) to technologically important processes such as inkjet and 3D printing, foam and emulsion stabilization, and drug delivery. The group has received over US$ 1.7 million in funding from companies and federal agencies since 2011. Of particular interest is the development of next-generation inkjet and 3D printing technologies for polymers and biomaterials. Ma’s research has been featured in the newspaper (“the Chronicle”) and on TV News (WFSB and WTNH). He has filed 2 patents, published 2 book chapters and 18 journal articles related to material processing. He is currently leading major initiatives in soft material additive manufacturing and flexible electronics at UConn.
RADENKA MARIC
CHEMICAL & BIOMOLECULAR
ENGINEERING
MATERIALS SCIENCE & ENGINEERING

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Keywords: Thin film, biomaterials, coating technologies, nanomaterials engineering, fuel cell, batteries, and bio-sensors.

Summary:
Dr. Maric’s research has been focused on fundamental understanding of the effect of structure, defects, and microstructure on transport and electrical properties of surfaces and interfaces. In particular, she is interested in developing novel materials for fuel cell, batteries and biosensors, durability study, performance and life prognosis, aging, material state changes, and long term behavior. She developed the Reactive Spray Deposition Technology (RSDT) technology, a thin-film deposition process that overcomes many of the shortcomings of traditional vapor deposition techniques while yielding equal or better quality coatings at a lower cost. The RSDT not only provides high quality active films/coatings (e.g., catalysts/electrodes), it also reduces the manpower, energy consumption and number of processing steps required to assemble the films. More specifically, RSDT combines materials synthesis and deposition into a single step with several control features, replacing at least 5 unit operations in a conventional electrode manufacturing scheme.
LAURENT D. MICHEL
COMPUTER SCIENCE & ENGINEERING

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Keywords:

Summary:
The research projects of Dr. Michel lie at the intersection of Programming Language and Combinatorial Optimization. His efforts are directed to the construction of software tools that considerably simplify the development of complex application (most belong to the NP class) for discrete and continuous optimization problems. This research attempts to automate the strenuous, error-prone activities associated with the development cycle. Examples of such tools include Numerica: a Modeling Language for Global Optimization; OPL: the Optimization Programming Language; and COMET: a platform for Constraint-Based Local Search as well as Constraint Programming. Objective-CP is the most recent platform co-created by the PI. It is meant to support the next decade of efforts in optimization technology. The platform supports Constraint Programming, Scheduling and Mathematical Programming. It is designed to be small and highly compositional to host and facilitate the collaboration of multiple solving technologies. It was showcased in an invited talk at the 19th International Conference on Principles and Practice of Constraint Programming. The platform is open sourced under a BSD-style license that enable other researchers and industries to leverage the tools, benefit from the platform and possibly contribute.
RICHA D A. MILLER
UCONN ENVIRONMENTAL POLICY

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        www.envpolicy.uconn.edu (Environmental Compliance)

Keywords:
environmental policy, clean energy, microgrids, energy efficiency, green building,
retro-commissioning, carbon mitigation, resiliency, Low impact development
(LID), green stormwater infrastructure, ZEVs, water conservation, waste
reduction, recycling

Summary:
Rich was hired as UConn’s first environmental officer in 2002. He established and
oversees the University’s Sustainability Office and Environmental Compliance
Office. The University has been a consistent leader in campus sustainability and is
one of only two schools to have been ranked by the Sierra Club among the Top
Ten greenest colleges and universities in the U.S. for each of the past four years.

Rich has worked with SoE faculty on numerous environmental research projects
that have a “living laboratory” or on-campus demonstration and outreach
component. Some of these include clean energy issues, like UConn’s Renewable
Energy Strategic Plan, or energy efficiency and carbon mitigation projects, like
building retro-commissioning and re-lamping, or climate resiliency projects such
as the UConn clean energy microgrid and numerous green stormwater
infrastructure/LID installation and monitoring efforts. He has also worked to
engage faculty and students on UConn sustainability initiatives ranging from
alternative-fuel vehicles to ZEVs, food and agricultural waste reduction, green
building and water conservation.
VITO MORENO
MECHANICAL ENGINEERING

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Keywords:  
Aerospace, Structures, Applied Mechanics, Kinematics, Fatigue and Fracture

Summary:  
Dr. Moreno is the Director of the Mechanical Engineering Senior Design Program. He interfaces with various Connecticut companies and government agencies to provide meaningful sponsored capstone projects for the ME Senior Class. Typically 40 to 50 Projects are sponsored each year by over 30 different companies and agencies.

Dr. Moreno also teaches both undergraduate and graduate classes within the Mechanical Engineering curriculum.
Mu-Ping Nieh
CHEMICAL AND BIOMOLECULAR ENGINEERING
BIOMEDICAL ENGINEERING

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Keywords:
Nanostructural characterization, surfaces/interfaces, dispersion, nano- and micro- emulsion, in vitro cellular test, targeting drug/diagnostic delivery nanocarriers and instrument-free sensing materials.

Summary:
Dr. Nieh’s research mainly focuses on, but not limited to, the self-assemblies of soft materials including polymers, phospholipids, surfactants and proteins. Applications of our research range from designing nanoparticles, structural stability in micro- or nano- emulsion, targeting-delivery carriers, sensing materials, 3-D nano-scaffold, proton exchange membranes, polymeric micelles and alignable biomembranes. Many of these spontaneously forming nanomaterials have well-defined structures and can be manufactured robustly in a large quantity - suitable for the industrial setting. Dr. Nieh is also an expert in nanostructural characterization using scattering (X-ray, neutron and light) and microscopic (electron and optical) techniques. The probing length scale in his research ranges from micron to Å.
Keywords:
Computational design exploration of engineered systems, including structural shape and topology optimization, multidisciplinary optimization, design optimization for manufacturability, and design of structures made of heterogeneous or hierarchical materials.

Summary:
Dr. Norato’s current research interests lie in incorporating manufacturing, cost and geometric constraints in the design exploration of structures and materials via topology optimization, with the aim of exploring efficient structures that are tailored to a specific manufacturing process, and with applications across domains, from machine components, to composite and architected materials, to bone scaffolds. In particular, he is interested in the incorporation of geometry models into topology optimization that accommodate the imposition of geometric requirements that render closer-to-manufacturing optimal topologies. Prior to joining UConn in 2014, he worked for nine years for Caterpillar, where he was responsible for the Product Optimization Group, in charge of research, development, deployment and application of optimization technologies.
SUNG YEUL PARK
ELECTRICAL & COMPUTER ENGINEERING

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Keywords:
Power electronics, smart energy and power conversion, microgrid, smart building power network, renewable integration, power conditioning system, grid-connected-inverter, battery energy conversion and management systems, building power systems and power quality

Summary:
Dr. Park’s recent research efforts have focused on smart energy and power conversion systems in the distributed power network and renewable energy grid integration applications. Dr. Park seeks the way of full utilization of power electronic technologies so that:

1. The power quality of distributed power network will be enhanced
2. The benefit from renewable energy and its power conditioning systems will be maximized
3. The energy storage will last longer and efficiently use

The power conditioning system is the core part of renewable integration, electric vehicle power conversion, and battery energy storage systems.

In addition, he has interests in modeling and control of distributed generators and loads in the microgrid applications in terms of energy system integration. He also can provide power electronics system design, analysis, and a prototype.
SANGUTHEVAR RAJASEKARAN
UTC CHAIR PROFESSOR OF CSE AND
DIRECTOR OF BOOTH ENGINEERING CENTER
FOR ADVANCED TECHNOLOGY (BECAT)

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Keywords:
Big Data Analytics, High Performance Computing, Algorithms, Bioinformatics

Summary:
We live in an era of data explosion. As an example, NCBI houses petabytes of genomic data and biologists around the world are generating 15 petabytes of sequence per year. The size of metagenomic data from multiple samples could be petabytes. Given such a volume of data, biologists are unable to extract full value from them since advances in analytics tools have not caught up with the rate at which data get generated in science and engineering. In particular, existing tools often have unacceptable run times. One of the main reasons for this has been that core memories of computers are not large enough to hold all the data to be analyzed, and hence most of the data have to be stored in secondary storages (SSs) such as solid state drives (SSDs) and (rotating) disks. Data access times from SSs are several orders of magnitude more than from core memories. Tremendous speedups can be obtained by minimizing the number of data accesses from SSs. Also, although there has been much recent research in the development of multicore and GPU algorithms for big data problems, for many of the problems only sequential in-core algorithms are known. My research on big data analytics focuses on the development of novel out-of-core and parallel algorithms for varied applications. I have extensive experience in the development of out-of-core algorithms. Recently, my project on Big Data analytics has been funded by NSF ($1.2M). This is the first big data project to be funded by NSF in the state of Connecticut.

When the data size is large, any operation to be performed on the data will take a large amount of time. Even when the data size is small, some of the operations to be performed could be complex (for example they could be NP-hard). Thus to cope up with these two possibilities we have to develop novel high performance and parallel algorithms to solve them. Another area of my interest is in high performance and parallel computing. I have 25+ years of experience in the development of parallel algorithms for numerous fundamental and applied problems. Several best-known algorithms for problems such as sorting, packet routing, motif search, closest pair problem, association rules mining, and singular value decomposition have been co-authored by me. As an example for industrial collaboration, I have developed a novel text mining algorithm for Boehringer-Ingelheim (a pharmaceutical company). Their algorithm for the same problem was estimated to take more than 18 years. On the other hand, my algorithm takes only 15 minutes (on a laptop). Also, I have developed 9 patents for Arcot Systems, an online transactions company. My inventions are a part of their products that serve 100 million people.
Lawrence K. Silbart
Vice Provost for Strategic Initiatives

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Keywords:
Next Generation CT, UConn Tech Park,
Innovation Partnership Building, Industry-
University Partnerships

Summary:
Dr. Lawrence Silbart was appointed Vice Provost for Strategic Initiatives in 2013 after serving as a Department Head at UConn for seven years. Dr. Silbart received his BGS, MPH and Ph.D. in Toxicology and Industrial Hygiene from the University of Michigan. As Vice Provost for Strategic Initiatives, Dr. Silbart oversees the Next Generation Connecticut Initiative—a 10-year, $1.7 billion dollar initiative spanning FY’15-FY’24. He also leads the development of the Tech Park and its cornerstone building, the Innovation Partnership Building (IPB) which is currently under construction and will become operational in Q3, 2017. Dr. Silbart has participated in negotiations with many companies and helped forge several multi-million dollar partnerships.
Helena Silva  
**ELECTRICAL & COMPUTER ENGINEERING**

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**Keywords:**  
Micro/nanoelectronic devices, electronic materials, electrical characterization, device fabrication

**Summary:**  
Fundamental transport studies and device research towards more efficient electronic devices for computation, memory and energy conversion.
PRABHAKAR SINGH
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ENERGY ENGINEERING
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Keywords:
Oxide vaporization, corrosion, electrolyte, sulfur clean up, carbon capture, adsorbent, molten salt, MCFC, bio fuel desulfurization, ceramic powder, SOFC, SOEC

Summary: Professor Singh’s research interests include quantification of oxide vaporization in humidified environment, accelerated corrosion under dual atmosphere exposure conditions, electrode –electrolyte interface degradation under electrolysis conditions, enzymatic sulfur clean up from bio derived fuels and carbon capture utilizing a solid –liquid agglomerated adsorbent. His main research falls into the following areas: (1) Accelerated Cr evaporation from Fe and Ni base alloys in humidified air atmosphere; (2) Surface barrier coatings consisting of aluminizing and spinel surface layer; (3) Mechanistic understanding of electrode –electrolyte interface separation during steam electrolysis; (4) Accelerated carbon dioxide capture using molten salt; (5) Microstructural modifications in ceramic matrix structure of MCFC; (6) Enhanced corrosion and breakdown of surface scale during simultaneous exposure to oxidizing and reducing atmospheres; (7) Bio fuel desulfurization utilizing liquid enzymatic process; (8) Composite ceramic powder synthesis for SOFC and SOEC; (9) Oxide dissolution and precipitation in molten salt systems.
Steven L. Suib
Institute of Materials Science

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Keywords:

Summary:
One area of interest includes the generation and control of pores in solid materials. Such porosity is important in a number of applications such as Adsorption, Ceramics, Catalysis, Coatings, Environmental Issues, Materials, and Semiconductors. The control of sizes, shapes and distribution of pores is a critical focus of this research. Several synthetic methods are used such as CVD, CVI, sol-gel, hydrothermal alteration, sputtering, ALD, electrodeposition, plasma deposition, microwave irradiation, ultrasonic cavitation, thermal, photochemical, others and combinations of such methods. Another area of interest is the control of properties of materials. This includes strengths, thermal stabilities, chemical stabilities, oxidation states, compositions, electrical properties, electronic properties, optical properties, magnetic properties, surface properties, bulk phases, kinetic effects, thermal properties, memory effects, wear, and many others. Single crystals, powders, films, wires, helices, thin films, multilayer films, composites, hybrid materials, and various morphologies are all being prepared and studied. Molecular design of materials their compositions and structure property interactions are a key feature of this work. Design of experiment and scale up procedures relevant to industrial needs are being pursued.
Luyi Sun
Chemical & Biomolecular Engineering

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Keywords:
Multifunctional Nanostructured Hybrids, Nanomaterials, Polymer Composites and Nanocomposites, Polymer Processing, Green Science and Engineering, Energy Conversion and Storage, Layered Materials

Summary:
Dr. Sun’s research covers a wide range of materials, including polymeric materials, ceramics and glasses, and composites. His recent efforts have focused on the design and synthesis of nanostructured hybrids for various applications, such as packaging, energy, catalysis, etc. In most cases, the structural design and control, usually down to nano- and molecular-scale, is the key to the high performance of these materials. Dr. Sun has been developing a nanocoating technology based on layered inorganic nanosheets and polymer binders, which can achieve superior mechanical and barrier properties, and outstanding flame retardancy. Another project Dr. Sun has been focusing on is immobilization of meal nanoparticles and complexes on layered materials for heterogeneous catalysis application.
GLEN DOWLYN THAMES
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SMALL BUSINESS INNOVATION

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Keywords:
Small business, strategic partnerships, technology, commercialization, entrepreneur, technology assessment, business partnerships, federal grants, state grants, grant-writing, small business internships, manufacturing grants, small business mentoring

Summary:
Glen manages CI’s Small Business Innovation Group, which includes the management of CTNext. In this role, Glen oversees vital programs that support the state’s small technology businesses and encourage innovation, collaboration and commercialization.

Prior to her current role, Glen was special assistant to the CEO at CI, where she led a wide range of projects spanning board relations, new program development and operations. She has extensive experience managing high-priority projects and major initiatives including nearly 10 years of experience in high-level public administration roles, and served as the special assistant to the superintendent of Hartford Public Schools. Prior to that, she was director of constituent services for the City of Hartford, where she managed citizen relations and worked on a variety of community and economic development projects.

Through Glen’s experience working in the Capital City, she brings a unique passion and understanding of economic development opportunities and challenges, particularly as they relate to our urban centers in Connecticut.
**Julia A. Valla**

**Chemical & Biomolecular Engineering**

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**Keywords:**  
Hierarchical pore structure zeolites, Fuel processing, Biomass catalytic pyrolysis, Desulfurization, Hydroprocessing

**Summary:**  
Dr. Valla’s research has focused on the nanoscale engineering of catalysts (mainly zeolites) for the production of advanced biofuels and biochemicals. Our objectives are: a) Development of hierarchical pore structure zeolites (e.g. ZSM-5, USY) with reduced diffusion limitations for easy access of heavy molecules and less coke formation; b) Development of multifunctional zeolites by encapsulation of metals for improved selectivity towards targeted products.

Our industrial applications include: a) Catalytic fast pyrolysis of biomass and waste for advanced biofuels and bio chemicals; b) catalytic removal of poly aromatic hydrocarbons (tars) from synthesis gas derived from biomass gasification; c) Hydroprocessing and hydrosulfurization of hydrocarbon streams; d) Desulfurization of diesel/biodiesel fuels.
Marten van Dijk
Electrical & Computer Engineering

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Keywords: Secure Processor Architectures; Physical Unclonable Functions; Hardware Trojan Detection; Secure Supply Chain Management; Secure Key Management; Secure Computation and Storage; Secure Data Center Technology; Embedded Systems Security

Bio: Marten van Dijk is Associate Professor at the ECE Department, University of Connecticut, and has held prior positions at Philips Research, MIT, and RSA Labs. He was a co-recipient of the 2015 A. Richard Newton Technical Impact Award in Electronic Design Automation for pioneering contributions in the discovery and use of silicon PUFs, a CCS 2013 best student paper award for Path-ORAM, the 2012 NYU-Poly AT&T Best Applied Security Paper Award - 3rd place - for the authenticated file system IRIS, a best paper nomination (1 of 3) for fully homomorphic encryption over the integers at Eurocrypt 2010, and the ACSAC 2002 outstanding student paper award for controlled PUFs. In 2014 the co-authored paper “AEGIS: Architecture for Tamper-Evident and Tamper-Resistant Processing” was included in the 25 years of International Conference on Supercomputing.
Diane Van Scoter
Management & Engineering for Manufacturing (MEM)

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Keywords:
Industrial Engineering, Industry Involvement, Process Improvement, the Impact of Contextual Factors, and STEM Education

Summary:
Dr. Van Scoter earned a BS and MS in Ceramic Engineering from the University of Washington – Seattle, an MS in Operations Research from the Colorado School of Mines, and a PhD in Industrial Engineering from Oregon State University.

Dr. Van Scoter is the Co-Director of the Management and Engineering for Manufacturing (MEM) program, an MEM instructor, and an Associate Professor in the Materials Science and Engineering Department.

Dr. Van Scoter’s industry experience spans more than twenty years, ranging from Manufacturing at Boeing Commercial, space optics, survivability, and technology transfer for the DoD, management consulting for Deloitte, to production and quality for an international logistics company. Since arriving at the University of Connecticut in 2012, she has been a champion of the MEM program, updating the program to reflect 21st century industry needs and standards, better serving UConn students, the university, employers, and the engineering profession. Dr. Van Scoter has been introducing problem-based learning into the MEM curriculum using real engineering problems, collaboration with local industry, and promoting creativity using SolidWorks and 3-D fabrication.
Kristina Wagstrom
Chemical & Biomolecular Engineering

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Keywords:
Atmospheric chemistry, air pollution, exposure, computational modeling, aerosols, particles, sensor networks

Summary:
The Computational Atmospheric Chemistry and Exposure (CACE) Lab, led by Dr. Wagstrom, specializes in applying computational-base approaches to address problem related to air pollution and atmospheric chemistry. Current projects include (1) working to improve the science and functionality of community developed air pollution modeling platforms that are used by both scientists and policy makers to address air pollution concerns and (2) investigating the potential usability of low-cost air pollution sensors to create high density sensing networks for use in community exposure assessment and expedited leak detection at industrial facilities.
ARASH E. ZAGHI
CIVIL & ENVIRONMENTAL ENGINEERING RESEARCH & GRADUATE EDUCATION

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Keywords:
Bridge Design and Rehabilitation, Accelerated Bridge Construction (ABC), Multihazard Resilient Design, Novel Structural Systems, Design for Earthquake and Blast, Large-Scale Structure Experiments, Creativity in Engineering Education

Summary:
Dr. Zaghi’s research has been focused on structural and bridge engineering, design for multihazard robustness and resiliency, large-scale structure experiments, novel structural system and material, smart structures, and seismic and blast resistant design. His main research falls into the following areas: (1) Application of advanced composites and alloys in structures; (2) Novel structural systems and connections for accelerated construction of resilient and long-lasting bridge structures; (3) Blast, shock, and seismic testing and simulation of structural and nonstructural systems; (4) Innovative and cost-effective rehabilitation technologies for aging bridge structures; (5) Engineering education research with a focus on creativity.
Andrew Zehner
Office of Vice President for Research

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Keywords:
Strategic and business counsel for life sciences, health care, telecommunications and information technology; and negotiations on many research, development and commercialization transactions.

Summary:
Andrew Zehner serves as Assistant Vice President, Corporate and Business Relations, in the Office of Vice President for Research (OVPR). He also serves in the Office of the General Counsel as Counsel for business transactions. Andrew has twenty years of experience providing strategic and business counsel to a wide variety of industries, including life sciences, health care, telecommunications, and information technology. Andrew was most recently Senior Corporate Counsel in the Legal Division of Pfizer Inc., supporting all aspects of pharmaceutical R&D in the U.S. and United Kingdom. He led the negotiations on many research, development and commercialization transactions. Prior to that, he served as counsel for Paradigm4, People’s Choice TV and HSS, Inc., all fast-growing Connecticut technology companies.

Zehner received a B.A. degree in American civilization from Middlebury College, an M.A. degree in history from the University of Massachusetts, Amherst, and a Juris Doctor with Honors from the University of Maryland School of Law. He is admitted to practice law in Connecticut and Maryland.
DIANYUN ZHANG
MECHANICAL ENGINEERING

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Keywords:
Multiscale modeling of composite materials, high temperature performance of ceramic matrix composites, experimental characterization of materials with microstructure, micromechanics of heterogeneous materials, and damage and fracture mechanics

Summary:
Dr. Zhang has been a research associate in the Department of Aeronautics and Astronautics at the University of Washington, Seattle, with a dual appointment in the Department of Aerospace Engineering at the University of Michigan, Ann Arbor. Dr. Zhang received her dual bachelor degrees in Mechanical and Aerospace Engineering from the University of Michigan, and the bachelor degree in Mechanical Engineering from Shanghai Jiao Tong University, all in 2009. She obtained her M.S. (2013) and Ph.D. (2014) degrees in Aerospace Engineering from the University of Michigan. Her broad area of research interest is in experimental characterization and computational modeling of lightweight materials, including laminated composites, 3D textile composites, and oxide/oxide woven ceramic composites. Her research goal is to develop a high-fidelity computational methodology to predict deformation response of heterogeneous materials. The focus is on the multiscale modeling methods and progressive damage and failure analyses across different material length scales.
Liang Zhang
Electrical & Computer Engineering

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Keywords:
Manufacturing systems, production control and management, battery management systems, stochastic systems modeling and control.

Summary:
1) Production Systems Engineering: The goal of this research is to develop first-principle-based methods for modeling, analysis, continuous improvement, lean design, real-time control, and energy-efficient operations of manufacturing and service systems. Applications of the research has been carried out in numerous companies such as General Motors, Ford, Chrysler, Toyota, Generac, MillerCoors, Kraft Foods, Kroger, Lexmark, Subzero, Cree Lighting, and HellermannTyton.
2) System-theoretic Analysis of Battery systems: The goal of this research is to develop system-level mathematical and computer models for battery systems that can be used for performance prediction, active control, and optimal parameter selection without experimenting with physical systems.
WEI ZHANG
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Keywords:
Coastal infrastructure resilience, damage modeling, fatigue and corrosion, wind/wave induced vibrations, random vibrations, vehicle-bridge-wind-wave dynamics, and life-cycle structural performance and risk analysis.

Summary:
Dr. Zhang’s research interest includes coupled dynamic system, system-level structural performance assessment, coastal community resiliency, crack initiation and propagation, fatigue and damage modeling and energy harvesting. His main research falls into the following areas: (1) Modeling coastal infrastructure system in multi-scales under multiple nature hazards; (2) Small crack initiation due to fatigue and corrosion; (3) System level infrastructure performance assessment and optimization for design, assessment, and decision making. His long term research goal is to develop effective methodologies for life-cycle performance design, diagnosis, and rehabilitation of structural systems, which integrate extreme event and load modeling, risk and reliability analysis, life-cycle performance design, progressive damage inspection, monitoring, and rehabilitation to develop resilient and sustainable infrastructural systems.