Here

IS HOW WE DRIVE INNOVATION

University at Buffalo
School of Engineering and Applied Sciences

Driving Innovation

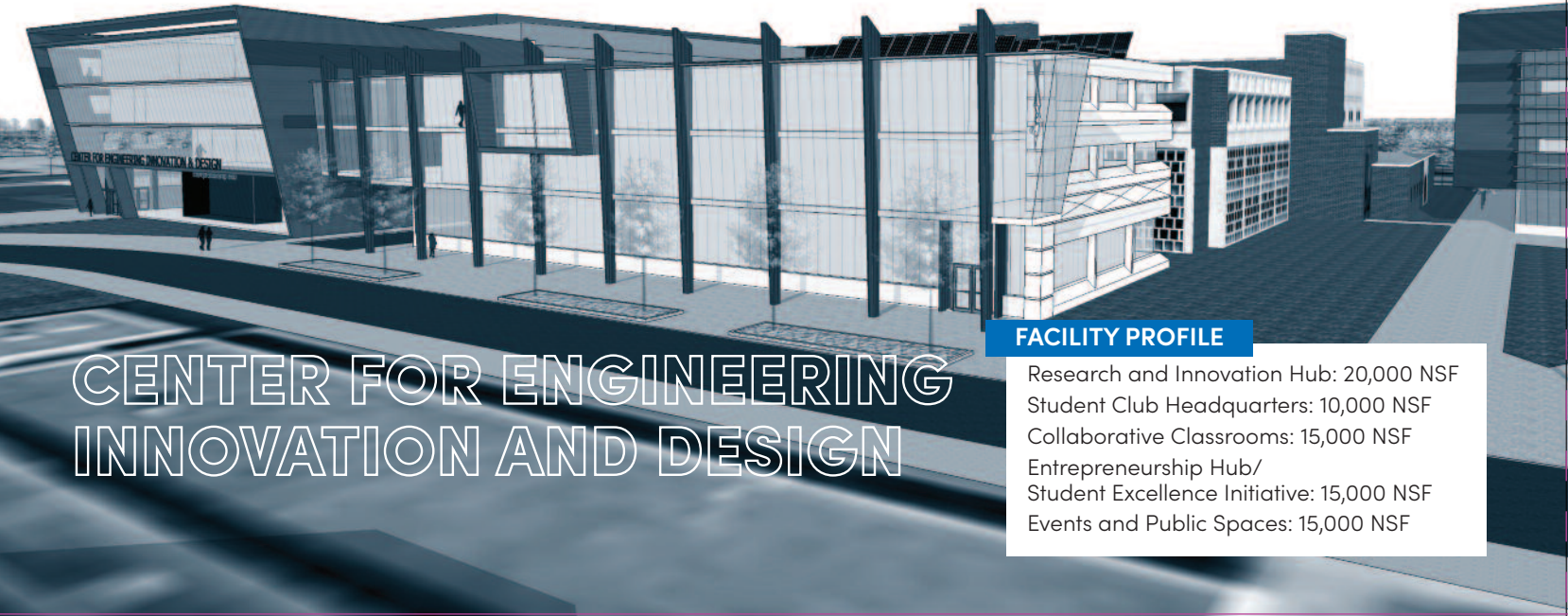
So much has changed at UB's School of Engineering and Applied Sciences over the past 5 years that it is hard to keep up with the pace! Just in the last year, we added **26 new faculty**, graduated over **1,700 students** with BS, MS and PhD degrees, and increased our research portfolio to **$74 million** in expenditures.

There is **great passion and a sense of urgency among the faculty, staff and students** who are driven to seek solutions to some of the greatest problems that we face as a community, and to deepen our understanding of fundamental sciences.

It is with considerable excitement that this year we launched a new **Department of Engineering Education** under the leadership of Carl Lund, SUNY Distinguished Teaching Professor and former chair of our Department of Chemical and Biological Engineering. The department will become distinctive by producing leading research on implementing, validating and advocating pathways for translation and scaling of the best tested engineering education research findings into broad practice across all of the engineering disciplines.

Following the launch of the Boldly Buffalo Campaign for UB last April, we are excited to be in full fundraising mode in support of a **new building that will provide a stimulating, collaborative learning environment for all of our undergraduate students under one roof**. Our alums know well that we have never previously had dedicated space for undergraduates to build and collaborate within the SEAS footprint, and I am very excited about the plans to provide such space for the next generation of SEAS students. I hope you will help us to make this a reality!

Rajan Batta, PhD
Interim Dean, School of Engineering and Applied Sciences



CENTER FOR ENGINEERING INNOVATION AND DESIGN

FACILITY PROFILE

Research and Innovation Hub: 20,000 NSF
Student Club Headquarters: 10,000 NSF
Collaborative Classrooms: 15,000 NSF
Entrepreneurship Hub/
Student Excellence Initiative: 15,000 NSF
Events and Public Spaces: 15,000 NSF

New Initiatives

Artificial Intelligence Institute

UB's Artificial Intelligence Institute, led by **David Doermann**, is bringing together university, industry, government and community partners to advance core AI technologies, apply them in ways that optimize human-machine partnerships and provide the complementary tools and skills to understand their societal impact.

The Institute builds upon a rich history of AI research at UB that dates back decades, to when computer scientists developed a handwriting-recognition system that has saved the U.S. Postal Service hundreds of millions of dollars. More recently, UB has made strategic investments in both people and programs to enhance its AI capabilities. Over the past three years, 20 faculty experts in artificial intelligence have joined UB and more than $10 million in external funds specifically for AI-related projects have been awarded.

Blockchain ThinkLab

The UB Blockchain Think-Lab is a comprehensive environment for education, business exploration, and research experimentation related to solving challenges using blockchain and similar technologies.

This unique center offers students a hands-on environment for learning, industry executives a place to create options that advance their businesses, and faculty support for research and teaching.

The ThinkLab's director, **Bina Ramamurthy**, was the first to offer a four-course sequence on Blockchain on the Coursera platform leading to certification.

Institute for Computational and Data Sciences

The Institute for Computational and Data Sciences (ICDS) integrates UB's strong inter-disciplinary graduate program in Computational Data Sciences and Engineering with its nationally recognized computing/data infrastructure provider, the Center for Computing Research.

Led by **Abani Patra**, ICDS is creating novel educational and training offerings ranging from research-oriented PhDs to skills-oriented continuing education to meet the data/computing workforce needs of the region and the nation.

ICDS is also developing a template for SUNY-wide use for integrated interdisciplinary programs in student-centric and just-in-time learning.

ICDS is a joint effort between SEAS, the College of Arts and Sciences, and the Schools of Management, Pharmacy and Pharmaceutical Sciences, and Public Health and Health Professions.

$74 MILLION
RESEARCH EXPENDITURES

264
FULL-TIME FACULTY

9
ACADEMIC DEPARTMENTS

12
NEW FELLOWS
in the past three years

11
NEW NATIONAL SCIENCE FOUNDATION CAREER AWARDS
in the past three years

12
SUNY AWARDS
in the past three years

1,763
DEGREES AWARDED
967 Bachelor's
712 Master's
84 Doctorates
Academic year 2017-2018

1900
5200
STUDENT BODY
5200 Undergraduates
1900 Graduate students
Academic year 2018-2019

65 COUNTRIES | **30 STATES**

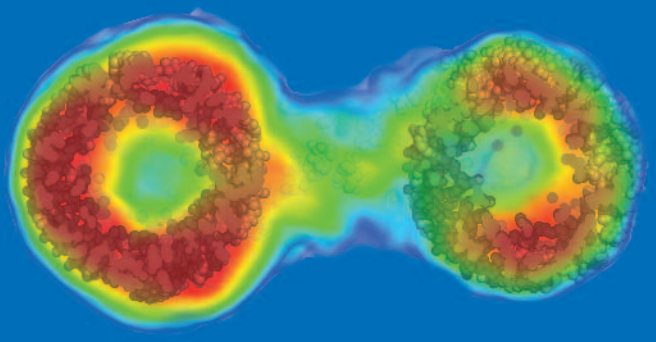
136
DELTAS
Academic year 2016-2017

36,000+
ALUMNI

Advancing the engineering profession

The newly-formed interdisciplinary **Department of Engineering Education** aims to create and disseminate new knowledge pertinent to engineering education and transform the way in which students are educated. It seeks to study and implement new strategies for scaling and translation of engineering education research findings into widespread classroom practice.

A new PhD program and a graduate certificate program targeted at current PhD candidates in all engineering and computing disciplines are under development. Many of the faculty serve as the primary instructors for school-wide undergraduate engineering and applied sciences courses. Learn more at **engineering.buffalo.edu/dee**.



BioXFEL awarded $22.5 million to capture biology at the atomic level using X-ray lasers

UB's Department of Materials Design and Innovation is home to BioXFEL, a National Science Foundation Science and Technology Center. **BioXFEL, which is short for Biology with X-ray Free Electron Lasers**, was recently awarded $22.5 million to continue its groundbreaking work in capturing biology at an atomic level using X-ray lasers.

BioXFEL represents a new paradigm for materials science research, in that for the first time, data sciences, physics, materials and chemistry of soft matter are converging to **enable us to view the shape of a molecule as well as how it changes in real-time**.

The research can potentially transform a broad range of scientific fields focused on structural biology and drug development, and extend it to potential innovations in environmental technologies and development of new materials. Learn more at **bioxfel.org**.

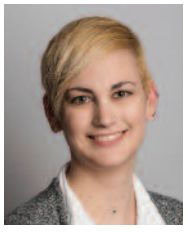
26 New Faculty

DEPARTMENT OF ENGINEERING EDUCATION

Technical Communication
"I research technical communication in the public sphere, developing strategies for making technical decisions more inclusive and equitable."
Kristen Moore, Associate Professor
PhD, Purdue University

Engineering Mechanics
"My research involves theoretical developments that focus on an analysis of the fundamental governing equations of continua at the microscale. From this perspective, I enjoy teaching students about the fundamentals of engineering mechanics."
Arezoo Hajesfandiari, Assistant Teaching Professor
PhD, University at Buffalo

Technical Communication
"I bring my background in the humanities to the STEM communication classroom, and work with students to develop a toolkit for rhetorical analysis and effective writing."
Lauren Kuryloski, Assistant Teaching Professor
PhD, Northeastern University



Visual Rhetoric
"My goal is to find innovative and practical methods to facilitate the learning and understanding of written, visual and verbal communication skills."
Stephanie Phillips, Assistant Professor of Practice
PhD, University of South Florida

Engineering Pedagogy
"My research interest focuses on improving students' conceptual understanding through hands-on activities, self-awareness of learning approaches and instruction in troubleshooting problem solving."
Presentacion Rivera Reyes, Teaching Assistant Professor
PhD, Utah State University

DEPARTMENT OF ELECTRICAL ENGINEERING

Nanomaterials

"My work provides theoretical guidance for experimental efforts to expedite development of electronic and opto-electronic applications with new functionalities, including bio molecular sensors, photo detectors, nanoscale light emitters and quantum technologies."

Vasili Perebeinos, Professor
PhD, Stony Brook University

Wireless Networking

"My research tackles fundamental challenges in the design of next-generation, intelligent and secure wireless networks, such as optimal control of complex wirelessly connected systems, and automated vulnerability discovery and counter-measure design."

Zhangyu Guan, Assistant Professor
PhD, Shandong University

Machine Learning

"My research focuses on developing novel algorithms and comprehensive theory to address data processing problems in data science, Internet of Things and wireless communications."

Shaofeng Zou, Assistant Professor
PhD, Syracuse University

Power Electronics

"My research interests are the development and control of power electronics for the safe operation of DC networks. Particular interests encompass techniques to detect and localize faults, optimally manage energy sources, and enhance power quality."

Luis Carlos Herrera, Assistant Professor
PhD, The Ohio State University

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Artificial Intelligence

"I am interested in building machines that augment our intelligence and allow humans and machines to be true partners by building systems that can learn our strengths and weaknesses and help us compensate for them, like our human partners do."

David Doermann, Empire Innovation Professor
PhD, University of Maryland, College Park

Human Computer Interaction

"I am working to promote smart health and well-being using cutting-edge computing technologies, as well as to discover new computing paradigms leveraging bio-inspired approaches."

Zhanpeng Jin, Associate Professor
PhD, University of Pittsburgh

Statistical Modeling

"I take a computational social science perspective, leveraging large datasets and developing advanced statistical modeling approaches to improve our understanding of how people form social and political biases, how they can be measured, and how they shape various social processes."

Kenneth Joseph, Assistant Professor
PhD, Carnegie Mellon University

Computer Vision

"The goal of my research is to make computers see and understand the real world, through cameras, so that machines can understand the environment and robots can act intelligently like human beings."

Junsong Yuan, Associate Professor
PhD, Northwestern University

Security and Program Analysis

"I create effective tools that solve important security and sustainability issues for web applications that affect a large number of users."

Weihang Wang, Assistant Professor
PhD, Purdue University

Computer Vision and Multimedia

"I am interested in finding small and actionable insights from big video data."

Jingjing Meng, Teaching Assistant Professor
PhD, Nanyang Technological University

DEPARTMENT OF BIOMEDICAL ENGINEERING

Imaging

"My research interests involve development and clinical translation of advanced magnetic resonance imaging and spectroscopy techniques and instrumentation for acquiring structural and physiological information non-invasively."

Xiaoliang Zhang, Empire Innovation Professor
PhD, University of Minnesota

DEPARTMENT OF INDUSTRIAL AND SYSTEMS ENGINEERING

Resilient & Sustainable Sociotechnical Systems

"My research focuses on quantitative modeling of complex systems and climate change adaptation, leveraging advanced algorithm-based data-driven techniques with the goal of developing risk-informed decision models."

Sayanti Mukherjee, Assistant Professor
PhD, Purdue University

Product Life-Cycle Management

"My research is in product lifecycle management and sustainable manufacturing. I am committed to creating a welcoming classroom for all my students and crafting easy-to-understand examples to enhance learning."

Johnson Fadeyi, Teaching Assistant Professor
PhD, Wayne State University

DEPARTMENT OF CHEMICAL AND BIOLOGICAL ENGINEERING

Computational Systems Biology

"I combine chemical and systems engineering principles with bioinformatics and machine learning to analyze large-scale, molecular data to gain a better understanding of complex biological processes and improve biotechnology for protein or small molecule therapeutics."

Rudiyanto Gunawan, Associate Professor
PhD, University of Illinois at Urbana-Champaign

DEPARTMENT OF CIVIL, STRUCTURAL AND ENVIRONMENTAL ENGINEERING

Sustainable Water and Wastewater Management

"I focus on sustainable ways to treat water and wastewater using natural microbial organisms like microalgae to recover nutrients from waste streams and to generate resources such as fertilizer and bioenergy."

Ian Bradley, Assistant Professor
PhD, University of Illinois at Urbana-Champaign

Data Analytics

"My research focuses on health monitoring and autonomous inspection through model-based and machine learning to improve infrastructure systems and buildings in regular service and under extreme events."

Xiao Liang, Research Assistant Professor
PhD, University of California, Berkeley

DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

Nanomaterials

"I examine earth-abundant nanomaterials for green energy applications, and molecular electronics for emerging energy-efficient nanodevices."

Shenqiang Ren, Professor
PhD, University of Maryland, College Park

Turbulence and Triboelectricity

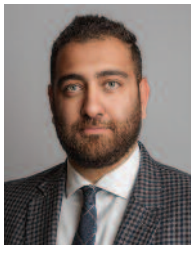
"I study energy transfer in turbulence at supersonic and hypersonic speeds for safer and quieter flights, as well as the origin of electron transfer in triboelectrification, which is a promising alternative energy source for personal electronics."

James Chen, Assistant Professor
PhD, The George Washington University

Autonomous Systems

"I research how autonomous systems, such as aerial drones and unmanned underwater vehicles, can more effectively interact with their air or water surroundings."

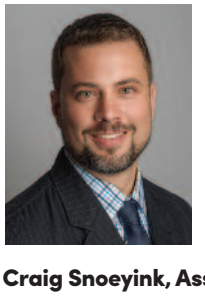
Frank Lagor, Assistant Professor
PhD, University of Maryland, College Park



Green Design

"My research focuses on the interaction of human behavior and systematic design. I aim to design systems that are more efficient, sustainable and robust."

Ardeshir Raihanian, Teaching Assistant Professor
PhD, University at Buffalo



Microfluids

"I specialize in developing advanced nanoscale optical measurement and microfluidic techniques to observe previously invisible nanoscale phenomenon."

Craig Snoeyink, Assistant Professor
PhD, Purdue University

ENGINEERING PARTNERS

GOLD PARTNERS

ATTO

ASCENT AEROSPACE
GEMCOR

MOOG

nationalgrid
HERE WITH YOU. HERE FOR YOU.

NORTHROP GRUMMAN

PRAXAIR
Making our planet more productive

SAFRAN
AEROSPACE · DEFENCE · SECURITY

U&S SERVICES
Your buildings. Our solutions.

UNIFRAX

valuecentric

SILVER PARTNERS

ASTRONICS
50 YEARS
OF INNOVATION
& COLLABORATION

CURBELL
MEDICAL

Viatran
PRESSURE & LEVEL SENSORS

LOCKHEED MARTIN

NIAGARA
SPECIALTY METALS

Boldly Buffalo:
The Campaign for UB
buffalo.edu/campaign

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"UB changed my life. From the committed faculty who taught with passion and commitment to the lifelong friends made here, this place was truly transformational."
-Stephen Still, civil engineering class of '76

DRIVING THE TRANSPORTATION REVOLUTION

The UB community is benefitting from a generous gift from civil engineering alumnus Stephen Still to its transportation research program. The $4 million gift creates an endowment to support the Institute for Sustainable Transportation and Logistics, a center that unites the Schools of Engineering and Applied Sciences and Management to address the growing new field of transportation, logistics and supply-chain management.

In honor of Still's generosity, the institute has been renamed as the Stephen Still Institute for Sustainable Transportation and Logistics, and Panos Anastasopoulos was named Stephen E. Still Chair of Transportation Engineering and director of the Institute. Anastasopoulos will guide and continue to expand the Institute's innovative research and interdisciplinary master's degree and graduate certificate.

Stephen Still (left) and Panos Anastasopoulos (right)