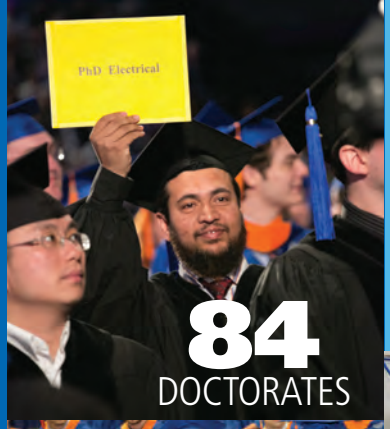
DEAN'S REPORT 2014

School of Engineering and Applied Sciences

University at Buffalo *The State University of New York*

Degrees awarded up **44%** in 10 years
(AY 2004-2014)



84
DOCTORATES

503
MASTER'S

777
BACHELOR'S

Record number of students enrolled in AY 2014-2015

3,167
Undergraduates

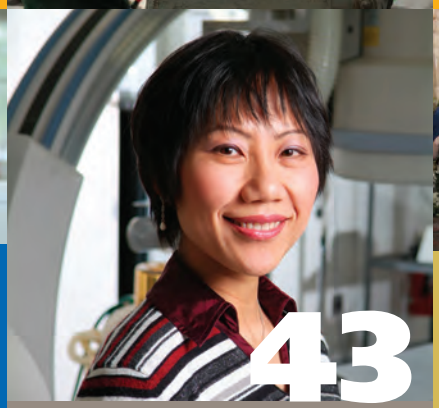
1,927
Graduate Students

$60 million
annual research expenditure

68
research and teaching labs

29
National Science Foundation CAREER awards among current faculty

165
Faculty



43
Fellows

235
students awarded **63** scholarships totaling over **$500,000**
(AY 2013-2014)

178
students in First Senior Design Expo

23
clubs and honor societies for undergraduates

Over **$1 million**
contributed annually by Delta Society members

$5.1
million donated to SEAS in FY 2014

US News & World Report Ranking
Undergraduate:
65
Graduate:
60

29,500
alumni in **50** states and **65** countries

"We are always striving to improve the quality of education our students receive and the impacts of our research."

Staying Nimble

Like any great organization, the School of Engineering and Applied Sciences is continually evolving and stretching to meet new challenges.

In the past two years, we have hired **37 new faculty, restructured our administration** to provide better support to our faculty and our students, and established **Shared Instrumentation Facilities** to make better use of our capital investments in research equipment. We have created a new model for companies to engage with students and faculty in SEAS, prioritizing our support for **experiential learning opportunities** for students AND our support for **economic development** activities. We've also made it a priority to stay more strongly engaged with our students as they leave our fold and enter the ranks of our **29,500 alumni** working across the globe.

We are working hard to re-invent our **built infrastructure** so that it will support **student collaborative learning**. This is an expensive undertaking, but the rewards are immediately clear when we see groups of students working together in teams all around the engineering complex to solve real-world problems. A major part of this initiative has been to add new landscaping to **Grace Plaza**, the focal point of our complex, as well as new outdoor seating amid colorful gardens.

These actions make us stronger, but not complacent; the more we achieve, the more we see that needs to be done to rise to the challenge of training the next generation of great engineers while delivering world-changing advances in science and technology. In a world that changes ever more rapidly, being nimble matters more than ever!

Liesl Folks, PhD, MBA
Dean, School of Engineering and Applied Sciences

The Best Public Universities have the Strongest Private Support

Your philanthropic support is critical to our success, allowing us to achieve greatness in education and research. Over the past three years, our enrollment has reached record numbers and our need for makerspaces has never been greater. To address this need, we are renovating our existing space to better serve our ever-growing student population, and we need your help to make this a reality. Your participation, at any level, is greatly appreciated.

We thank all our donors, especially members of the Delta Society – those who give $1,000 or more annually – whose investments make the "difference" for our school. Donate and view our member list today at **www.giving.buffalo.edu/delta-society**.

Thank You Corporate Partners

Our corporate partnership program strengthens the school's relationships with local and national companies, both for their benefit and the benefit of our students and their employment futures. The program provides local and national companies with exposure to multiple school events throughout the academic year.

Companies can choose to partner with us at the Gold or Silver level with a single yearly contribution. Signage at and access to school events are provided at both levels to increase company visibility to engineering students, faculty and staff. Gold level partners have the additional opportunity to sponsor a senior design project.

To become a partner or for more information, contact Todd Brooks at *toddbroo@buffalo.edu*.

Gold Partners

ATTO

PRAXAIR
Making our planet more productive

LPCiminelli

GEMCOR

NORTHROP GRUMMAN

nationalgrid
HERE WITH YOU. HERE FOR YOU.

U&S SERVICES
Your buildings. Our solutions.

Silver Partners

GE

NIAGARA SPECIALTY METALS

SEABURY APG AIRLINE PLANNING

Turner

valuecentric

New Leadership Roles

Rajan Batta

Associate Dean for Faculty Affairs

In the newly created role of associate dean for faculty affairs, Dr. Batta provides schoolwide support for faculty recruitment, diversity, mentoring, promotion, tenure, and honors and awards. He is a SUNY distinguished professor of industrial and systems engineering, and was the former associate dean for graduate education and research.

Gary Dargush

Associate Dean for Graduate Education and Research

Following a six year term as chair of mechanical and aerospace engineering, Dr. Gary Dargush was named associate dean for graduate education and research. In his new role, Dr. Dargush oversees SEAS's graduate programs and helps support and grow the school's research portfolio.

Alexander Cartwright

Provost and Executive Vice Chancellor of the State University of New York

As the new SUNY provost and executive vice president, Dr. Cartwright is responsible for the SUNY system's vast academic enterprise in close collaboration with its 64 college and university campuses. He is a professor of electrical engineering and previously served as UB's vice president for research and economic development.

Jeffrey Errington

Associate Dean for Undergraduate Education

Dr. Jeffrey Errington is charged with providing oversight of the school's undergraduate programs. Dr. Errington, professor of chemical and biological engineering, assumed the role of associate dean for undergraduate education following the retirement of Dr. John Van Benschoten, professor of civil, structural and environmental engineering.

Christine Human

Associate Dean for Accreditation and Student Affairs

Dr. Christine Human leads the school's ABET and Middle States Commission on Higher Education accreditation activities and processes in her newly established position as associate dean for accreditation and student affairs. She also manages student affairs for undergraduates, including scholarships, commencement, open house events and tours. Dr. Human is a professor in the department of civil, structural and environmental engineering.

Venu Govindaraju

Interim Vice President for Research and Economic Development

As interim vice president for research and economic development, Dr. Govindaraju seeks to strengthen UB's connections between research, education, knowledge transfer and economic development. He is an internationally recognized expert in machine learning and pattern recognition and a SUNY Distinguished Professor of Computer Science and Engineering.

Kemper Lewis

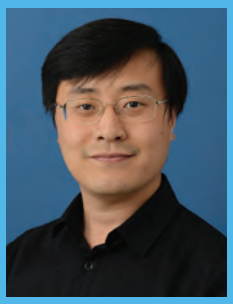
Chair, Mechanical and Aerospace Engineering

Dr. Kemper Lewis was named chair of the department of mechanical and aerospace engineering, following several years as director of the New York State Center for Engineering Design and Industrial Innovation (NYSCEDII). Dr. Lewis, an expert in decision-based design, will also continue as site director of NSF's National Center for e-Design at UB.

Global leaders in industry and academia learned about UB's research and teaching endeavors as part of the inaugural Advanced Design and Manufacturing Impact Forum, co-located in Buffalo with the 2014 ASME and IDETC/CIE conferences.

New Faculty

INNOVATION FOR MAXIMUM IMPACT



Cyber-Physical Systems

"I am developing information-effective and resource-efficient cyber-physical systems. These systems can intelligently collect, transmit, integrate, and eventually transform the deluge of sensory data generated by the ubiquitous human and physical sensors into high quality information that can enable us to better understand the social and physical world."

- **Lu Su, Computer Science and Engineering**
  PhD, University of Illinois at Urbana-Champaign

New Materials

"Batteries with extended lifetime, high efficiency plastic solar cells, and 3D printed machine elements free of defects, are only a few examples of where nano/microstructure is a key to improved performance. In my research, I develop computational methods to study the evolution of phases and interfaces for these applications. By injecting data-driven and computational thinking into these fields, my research has the potential to accelerate new materials discoveries and to improve the way we design devices."

- **Olga Wodo, Mechanical and Aerospace Engineering**
  PhD, Czestochowa University of Technology

Safety in Automation

"My research focuses on the design and analysis of safety-critical systems that depend on human-automation interaction. Specifically, I develop novel methods and tools for using human behavior models, theories of erroneous behavior, and model checking (an automated means of performing exhaustive, mathematical proofs) to design systems with guaranteed safety performance."

- **Matthew Bolton, Industrial and Systems Engineering**
  PhD, University of Virginia, Charlottesville

Better Design

"I am developing techniques and technologies to leverage large scale and high performance computing to model complex engineering systems and to make predictions about their behavior, allowing for more efficient and reliable design. Recently, my focus has been modeling manned reentry vehicles used by NASA."

- **Paul Bauman, Mechanical and Aerospace Engineering**
  PhD, University of Texas at Austin

Social Networks

"My research focuses on using 'big data' to study and improve our social systems. For example, I am solving stochastic differential equations involving trillions of vehicle locations to better predict traffic jams, so that policymakers and individuals can make better transportation-related decisions."

- **Wen Dong, Computer Science and Engineering**
  PhD, Massachusetts Institute of Technology

Miniaturized Portable Devices

"I work in interdisciplinary research that bridges the areas of photonics, optoelectronics, plasmonics, and phononics at a nanoscale. I am aiming to develop novel integrated multi-functional miniaturized devices to improve the bandwidth of data access networks in optical communications and to enable micro/nanoscale biodiagnostics when integrated with cell phones."

- **Liang Feng, Electrical Engineering**
  PhD, University of California, San Diego

Materials Design

"Providing alternative sources of energy is one way advanced materials benefit society and the environment. My research combines quantum chemical modeling with modern concepts such as virtual high-throughput and 'big data' techniques, materials informatics, and machine learning, to rationally design innovative materials, and accelerate the development process."

- **Johannes Hachmann, Chemical and Biological Engineering**
  PhD, Cornell University

Robotics

"Living things are able to work reliably in unstructured, changing environments and often do so with a baffling lack of direct information, planning, and communication. My research focuses on applying insights on how these natural systems function to engineer better, more robust, artificial systems; e.g. robots that can build like termites or self-assemble like molecules."

- **Nils Napp, Computer Science and Engineering**
  PhD, University of Washington

IMPROVING HEALTH AN

Bioinformatics

"The ongoing revolution in biotechnology delivers an unprecedented volume and variety of data about us and life around us. My research focus is on scalable algorithms and techniques to provide faster and more precise answers about DNA, its meaning for our health and our environment. To achieve this, I design novel computational approaches to make the most efficient use of some of the fastest supercomputers in the world."

- **Jaroslaw Zola, Computer Science and Engineering**
  PhD, Grenoble Institute of Technology

SUSTAINING AND IMPROVING OUR ENVIRONMENT

Infrastructure Resilience

"Maintenance and repair of infrastructure imposes economic and environmental burdens on our society. The underlying problem is the poor long-term performance of concrete, which is the most-widely used construction material. I am developing innovative new materials that offer better mechanical performance and are more durable than concrete, resulting in significant cost savings over the long run."

- Ravi Ranade, Civil, Structural and Environmental Engineering

Infrastructure Analysis

"Critical infrastructure systems are fundamental for the economic development and growth of any nation. My research focuses on designing mathematical programming models to identify vulnerabilities in these systems. These models can be used to understand negative effects caused by catastrophic events on infrastructure systems and components, leading to the development of strategies to improve resiliency and reliability."

- Jose Walteros, Industrial and Systems Engineering
PhD, University of Florida

Natural Hazards

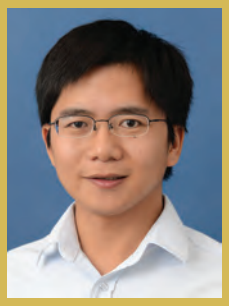
"I am developing performance-based, sustainable design solutions for civil engineering infrastructure, with emphasis on geotechnical objects. My current research is on developing computational tools to simulate the behavior of geostructures and for subsequent analyses of risks, including economic and social consequences, during extreme events such as earthquakes."

- Kallol Sett, Civil, Structural and Environmental Engineering
PhD, University of California, Davis

Sustainability

"My research focuses on developing innovative functional materials and catalysts for sustainable electrochemical energy and environmental uses. I use earth-abundant elements to replace expensive and supply-limited precious metals. This effort requires a fundamental understanding of relevant electrocatalysis mechanisms."

- Gang Wu, Chemical and Biological Engineering
PhD, Harbin Institute of Technology



Wind Engineering

"My research addresses the effects of service and extreme winds on the built environment, with an emphasis on bridges. I am building basic knowledge of wind effects using computational fluid dynamics, predicting the impact of wind hazards on constructed facilities, and developing wind-response mitigation strategies to improve safety and serviceability."

- Teng Wu, Civil, Structural and Environmental Engineering
PhD, University of Notre Dame

D TREATING DISEASE

Improved Health Through Chemistry

"I am exploring organic nitrogen chemistry in engineered and natural environmental systems to reduce risks to human health. I believe that an improved understanding of these systems will lead to creative and sustainable solutions to environmental problems that have occurred as a result of the release of nitrogen-containing organic compounds from industrial and domestic sources."

- Ning Dai, Civil Structural and Environmental Engineering
PhD, Yale University

Biotechnology

"Seeing inside the body is of critical importance for diagnosing and treating diseases. My research focuses on an emerging technique called photoacoustic computed tomography that combines acoustic signals – basically, ultrasound – with optical signals from lasers to produce finer details and richer contrasts about the tissue than either method on its own."

- Jun Xia, Biomedical Engineering
PhD, University of Toronto

Air Quality

"I am developing sustainable and low-cost materials that will be used for air pollution control, improving indoor and outdoor air quality. My goal is to prevent the release of harmful air contaminants, which will improve human health and protect the environment."

- John D. Atkinson, Civil, Structural and Environmental Engineering
PhD, University of Illinois at Urbana-Champaign

New Collaborations

Women in Science and Engineering (WiSE)

As part of our commitment to support and encourage female students in STEM fields, the School of Engineering and Applied Sciences and the College of Arts and Sciences have teamed up to launch a new initiative called the Women in Science and Engineering (WiSE) program. This special initiative – formally started for the incoming class of 2014 – provides a variety of extra-curricular opportunities geared toward female students such as guest lectures, networking events, mentoring, study groups, and more.

Materials Design and Innovation (MDI)

To answer a growing need in the U.S. to train scientists and engineers to accelerate materials advances, UB launched the Department of Materials Design and Innovation (MDI) in July 2014. The new department, a collaboration between the School of Engineering and Applied Sciences and the College of Arts and Sciences, will build on UB's expertise to expedite the discovery and optimization of innovative materials for applications that span a broad spectrum of industry sectors. A search for the Erich Bloch Chair to lead the department is underway.

Dedication of Grace Plaza

A beautiful outdoor learning landscape for students, staff, faculty, and the university community was officially unveiled on October 9, 2014, when the School of Engineering and Applied Sciences celebrated the opening of Grace Plaza. University officials and other guests acknowledged Norm McCombs, BS '68 for his vision and involvement in making the space a reality.

In his address to the crowd, McCombs said that he "hopes that the plaza will be a place where the UB community can take time from their busy day-to-day lives to stop and reflect." Strategically placed in the center of UB's engineering complex, the plaza was named in honor of Norm's wife, Grace. McCombs received the National Medal of Technology and Innovation in 2013, the highest award given to an engineer or scientist in the U.S.

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"If the public had a better understanding of the complexities of geotechnical engineering, more women, who I believe like challenges, would choose this field."

Alumna Enjoys Challenging Career as a Geotechnical Engineer

Dr. Sissy Nikolaou, PhD, PE, is a leading expert in seismic design, particularly for the eastern United States. Her technical capabilities include structural and geotechnical engineering in multi-hazard environments with emphasis on performance-based engineering, soil-structure interaction, seismic hazard analysis, liquefaction evaluation and mitigation, and risk/resiliency assessment of critical facilities.

Dr. Nikolaou has worked on large bridge, infrastructure, and private development projects, such as the seismic retrofits of the Robert F. Kennedy and Queensboro bridges in New York City, the World Trade Center Towers, and large-scale projects in the Middle East, Germany, Mexico and Panama. In addition, she has led and/or participated in several engineering investigations following extreme events, where she documented the successes and failures of buildings, bridges, geostructures and other infrastructure subjected to earthquakes, hurricanes and floods.

She received both her MS and PhD in civil, structural and environmental engineering from UB. Upon receiving her doctorate in 1998, she joined Mueser Rutledge Consulting Engineers as a geotechnical engineer and became a senior associate in 2011.

Dr. Nikolaou was profiled in "Building on a Firm Foundation," SWE Magazine, Fall 2014 (www.nxtbook.com/nxtbooks/swe/fall14/), which was also highlighted on the National Academy of Engineering's Frontiers website (www.naefrontiers.org/Media/News/47096.aspx).