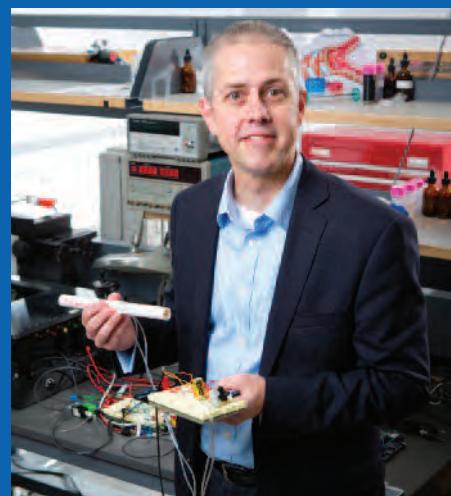
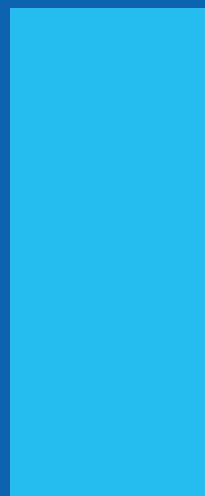
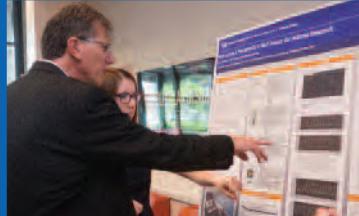
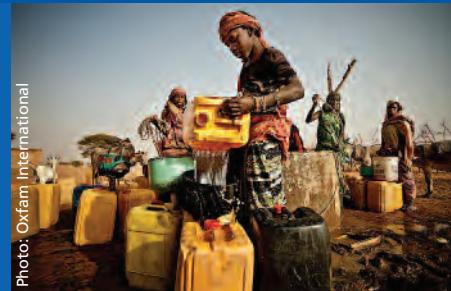
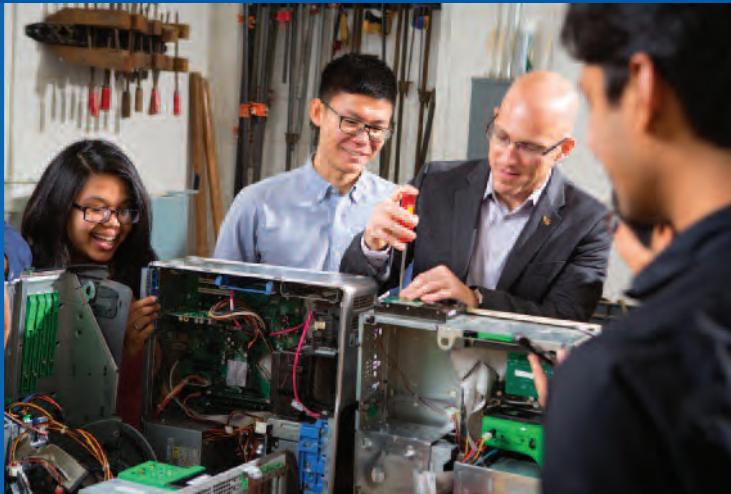


ADDRESSING SOCIETY'S TOUGHEST CHALLENGES

DEAN'S REPORT 2015-2016



University at Buffalo
School of Engineering
and Applied Sciences

ADDRESSING SOCIETY'S TOUGHEST CHALLENGES

Today, more than ever, we find ourselves **facing tough challenges in society and in the environment** that require diverse teams and interdisciplinary efforts to solve.

Here at UB's School of Engineering and Applied Sciences, we are moving quickly on a number of fronts to ensure we are **positioned to address these challenges** without weakening the deep disciplinary strengths on which our research excellence depends.

We have just launched the **Department of Materials Design and Innovation (MDI)** in collaboration with the College of Arts and Sciences, and our faculty members are playing lead roles in the three newly created, university-wide Communities of Excellence, as well as in the Institute for Research and Education in eNergy, Environment and Water (RENEW).

These five exciting **new entities embody the vision of UB 2020** by integrating research, student learning, and community engagement to elevate UB's scholarly and creative activities and learning across the disciplines, enabling UB to achieve even greater levels of impact.

Layered across these efforts is our **commitment to broadening participation** in the engineering disciplines to ensure we are meeting the needs of employers, now and into the future.

Thank you Engineering Partners!

Gold Partners



A Siemens Business



Silver Partners



"I am heartened to see all around me at UB efforts to reach across the discipline boundaries to tackle the toughest challenges, and our SEAS faculty and students are at the heart of many of these efforts."



Photo: Onion Studio

In what might well be our toughest challenge in this decade, we simply must figure out how to **engage all demographic groups in the engineering enterprise** to maximize our potential – regionally, nationally and internationally.

This year, as we celebrated the 20th anniversary of our **Delta Society, whose members are our most dedicated and generous donors**, I am reminded of how deeply indebted we are to the alums and friends who support our teaching, research and service mission with their time, talent and treasure. The ongoing support from the UB 'family' strengthens our school immeasurably.

Liesl Folks, PhD, MBA

Dean, School of Engineering and Applied Sciences

UB places 2nd in Solar Decathlon



Hard work and dedication over the past few years resulted in a second place finish for UB's inaugural entry into the prestigious U.S. Department of Energy's Solar Decathlon competition. Many engineering students, faculty, alumni and staff were in the mix, spending countless hours designing, building, fine-tuning and fundraising for the GRoW (Garden, Relax or Work) house. Led by the School of Architecture and Planning, plans for the GRoW house include turning it into an on-campus energy research and education center.

New Research Faculty

SUSTAINING AND IMPROVING OUR ENVIRONMENT



Materials Informatics

"My research is focused on ways to harness the tools of information science in the characterization, modeling and discovery of new materials.

With this approach, I aim to provide a means to innovate engineering design from the building blocks of matter."

- Krishna Rajan, Materials Design and Innovation PhD, Massachusetts Institute of Technology



Power Electronics

"I work on the control and protection of DC micro grid and high voltage DC transmission, as well as power electronics applications in other high voltage and high power systems. My research can be applied to renewable energy integration, utility power grids, and a variety of electric vehicles, including automobiles, aircraft and ships."

- Xiu Yao, Electrical Engineering PhD, Ohio State University



Renewable Energy

"My research focuses on rational design, through large-scale computations, of the next generation of renewable energy materials. In particular, I investigate efficient and cost effective interconversion of electricity and chemical energy. The research could lead to breakthroughs in the generation and utilization of alternate fuel sources."

- Michel Dupuis, Chemical and Biological Engineering PhD, University at Buffalo



Smart Materials

"I develop smart engineered materials with properties that are not found in nature. This includes acoustic elements for noise

controlled and soundproof environments and cloaks that can render underwater vehicles undetectable by incident waves, as well as architectural materials with graded thermal expansion for small electronic modules and aircraft components."

- Mostafa Nouh, Mechanical and Aerospace Engineering PhD, University of Maryland



59th best graduate engineering school

63rd best undergraduate engineering school

U.S. News & World Report, 2015

INNOVATION TO ACHIEVE TANGIBLE BENEFITS



Information

"We live in an era of data deluge. How can we leverage all that information to learn only its most informative part? To this end, I am developing theory and algorithms that lie at the interplay of signal processing and machine learning, with applications spanning from communication systems to brain networks."

- Konstantinos Slavakis, Electrical Engineering PhD, Tokyo Institute of Technology



Cybersecurity and Privacy

"I design and develop scalable algorithms and systems that characterize, detect and attribute threats on the Internet. I explore new multidisciplinary methods for behavioral profiling that can help us understand malicious software, infrastructure, mobile applications and online services. My goal is to realize a safer cyberspace by containing malicious actors."

- Aziz Mohaisen, Computer Science and Engineering PhD, University of Minnesota



Improved Logistics

"I develop mathematical optimization techniques to better utilize emerging autonomous vehicle capabilities in the commercial and military sectors. This includes new algorithms that efficiently route fleets of unmanned aircraft (drones) for rapid parcel delivery or military surveillance, as well as the coordination of heavy-duty truck platoons that reduce fuel consumption."

- Chase Murray, Industrial and Systems Engineering PhD, University at Buffalo



Better Decision Making

"In this era of information technology, decisions need to be made more quickly, such as scheduling jobs in real-time on machines, organizing data for efficient retrieval and computation, or displaying ads on a webpage. However, many of these problems are intractable in our daily lives. My research focuses on designing and analyzing fast heuristic algorithms that can compute near-optimal solutions."

- Shi Li, Computer Science and Engineering PhD, Princeton University

New Initiatives



SMART: Advancing manufacturing and design

Kemper Lewis, professor and chair of the Department of Mechanical and Aerospace Engineering, is leading one of UB's new Communities of Excellence, Sustainable Manufacturing and Advanced Robotic Technologies (SMART). SMART builds upon UB's reputation as a leader in advanced manufacturing and design, and aims to develop the next generation of manufacturing technologies, processes and educational offerings. With over 35 faculty collaborators from across campus, SMART is partnering with regional companies to educate future manufacturing leaders and shape national policy.

A key milestone of SMART's first year has been UB's membership in the Digital Manufacturing and Design Innovation Institute (DMDII). As a Tier 1 member, UB is positioned to help shape the research, commercialization and workforce development vision of this \$250 million national public-private partnership.



Photo: Oxfam International

CGHE: Improving health equity around the globe

Global health inequity is one of the defining issues of the 21st century. With the aim to improve health equity in low- and middle-income countries, UB scholars in the health sciences, architecture, planning, engineering, and other synergistic disciplines have joined forces through UB's Community for Global Health Equity (CGHE) to address this grand challenge.

In particular, engineering faculty and UB colleagues from the Schools of Pharmacy and Pharmaceutical Sciences, Public Health and Health Professions, and Management are working with the Clinton Global Health Access Initiative on a project to examine and reduce stock-out of critical drugs in Uganda by redesign and improvement of the "last-mile" supply chains.

In another project, the researchers are working to improve patient flows and alleviate overcrowding in Bangladeshi regional hospitals, in partnership with Save the Children International.

CGHE is led by Pavani Ram, School of Public Health and Health Professions, Korydon Smith and Samina Raja, School of Architecture and Planning,

SEAS joins ASEE and White House to promote diversity in the tech sector

SEAS Dean Liesl Folks coauthored the American Society for Engineering Education (ASEE) Engineering Deans' Council Diversity Initiative letter, which has been signed by over 155 engineering deans across the country. The initiative was announced by President Obama as part of the first-ever White House "Demo Day" in August 2015.

As part of this initiative, the school pledges to promote engineering education to those historically underrepresented, provide an experience that's equitable and inclusive, and improve the broader engineering culture to fully engage future generations.



1,675 degrees

Bachelor's: **782**

Master's: **815**

Doctorates: **78**

Academic Year 2014-2015



Philanthropy

5,247 students

Undergraduates: **3,478**

Graduate students: **1,769**

Academic Year 2015-2016



190 Faculty

55 new hires since 2013



33 National
Science Foundation
CAREER awards
among current faculty



52 Fellows
among current faculty



\$58.6 million in
research expenditures



6 new student clubs
started in 2015
40 student organizations

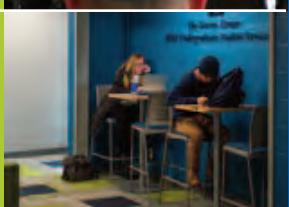


30,000+ alumni
in **50** states and
70 countries



Over **\$19 million**
in gifts and pledges

Fiscal Year 2014-2015



269 students
benefitted from **64**
scholarships, totaling
over **\$500,000**



Delta Society celebrates 20 years

The Delta Society celebrated its 20th anniversary this fall with a celebration in Barbara and Jack Davis Hall on UB's North Campus. Delta members new and old, as well as UB President Satish Tripathi, were on hand to honor 20 years of loyal annual giving by the School of Engineering and Applied Sciences alumni, friends, faculty and staff. The event featured a student club expo, dinner, drinks and live music, as well as a keynote speech by Delta Society Chairman Norman Hayes, BS '80.



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.

150 Delta Society
members in Fiscal
Year 2014-2015



The best public
universities have
the strongest
private support.



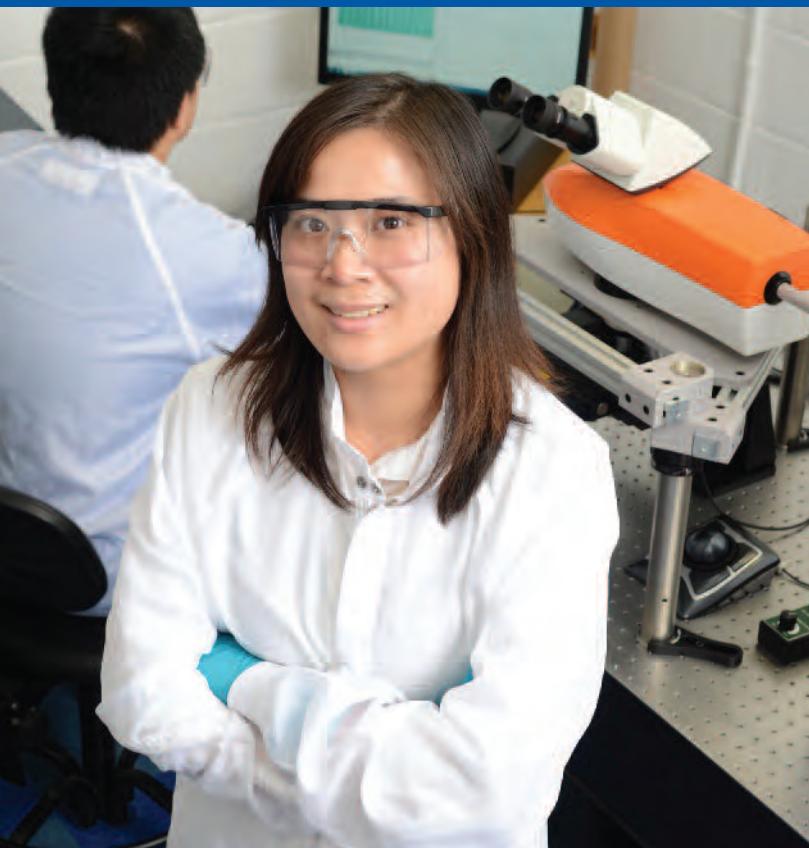
University at Buffalo

School of Engineering and Applied Sciences

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Our unique “bench science-information science” paradigm makes UB’s Materials Design and Innovation Department a world leader in advancing innovations in materials science and engineering.

MDI: Advancing innovations in materials science and engineering

Materials Design and Innovation (MDI) is a new department with a revolutionary approach to accelerate innovation, from understanding the building blocks of matter to the advancement of new engineering design.

Led by Krishna Rajan, Erich Bloch Chair, MDI is a unique joint effort between UB’s College of Arts and Sciences and the School of Engineering and Applied Sciences. With an emphasis on the use of advanced computational tools for modeling, simulation, informatics and automation, in conjunction with experimental driven science, the MDI department will train the 21st generation of materials scientists and engineers to significantly accelerate the pace of materials discovery and engineering design.

The MDI department is introducing transformative approaches to teaching and learning. Students will be partnered with world class faculty and state-of-the-art laboratory and classroom facilities to conduct highly interdisciplinary research.

With opportunities for partnerships with industry and international experiences, MDI will educate highly adaptable individuals with expertise in materials science and engineering. They will develop strong skills in the field of data science, coupled with training in the integration of experimental and computational methods in materials science.

Find out more at <http://engineering.buffalo.edu mdi>.