SPOTLIGHT on Women in the College of Engineering and Mathematical Sciences 2016

We imagine design and build A BETTER FUTURE
What’s New in CEMS
At the February 2016 meeting of the UVM Board of Trustees, two new bachelor’s degrees were approved in CEMS. Starting this fall we are excited to offer a B.S. in Biomedical Engineering in partnership with the College of Medicine. We will also offer a B.S. in Data Science, a collaboration between the departments of Mathematics & Statistics and Computer Science.

Biomedical Engineering
The B.S. in Biomedical Engineering (BME) is a 4-year degree that trains engineers to work at the interface between engineering and the biomedical sciences. The curriculum is structured into two phases: Foundational and Specialization.

The Foundational Phase establishes a core of math and science, builds a solid foundation in quantitative engineering methods and biomedical sciences, and exposes students to opportunities in biomedical engineering. In the Specialization Phase students continue their studies in one of three areas:

- Biosensing & Instrumentation
- Cell, Tissue, & Organ Biomechanics
- Systems & Network Biology

The BME degree leverages strong ties between UVM’s School of Engineering and the College of Medicine. This BME collaboration will provide students unique biomedical opportunities in a professional setting.

Data Science
The curriculum of this degree combines courses from the disciplines of Statistics, Mathematics, and Computer Science and prepares students for careers in Big Data Science & Analytics, a rapidly growing field with huge unmet demand. The unique interdisciplinary educational experience allows students the opportunity to acquire the broad base of knowledge and skills that employers are seeking.

Why Data Science?
The study and applications of Data Science impact our lives in myriad ways every moment of every day. Oftentimes we are unaware of the role this important field plays in our daily routines, but we have data scientists to thank as we read the latest news on our social media feed of choice, or watch a movie suggested by our go-to streaming app; even the food you eat has likely been guided by the study of big data. Researchers are working hand in hand with farms of all sizes to help analyze data which in turn can identify and reduce areas of inefficiency and waste, and bring food to your table in a faster, safer, and more cost-effective way.
“In CEMS, there are so many incredible female faculty members, I have no shortage of role models or inspiration here.”

Megan Yeigh
Mechanical Engineering major | Class of 2016 | Annapolis, Maryland

Megan knew in high school she wanted to be an engineer after hearing a lecture on tissue engineering. She later chose UVM because of opportunities to connect engineering and medicine through the close linkages between CEMS and UVM’s College of Medicine. UVM’s highly ranked sailing team also helped cement her decision. Megan has been on the team since she started at UVM and advises new students to get involved with a club outside of CEMS or a sport to round out their university experience. She is now the sailing team’s president. She is also social media coordinator for UVM’s Society of Women Engineers. After graduation, she plans to study prosthetics in graduate school to pursue a career developing prosthetics that can be integrated with a patient’s nervous system. William Louisos has been one of her most inspiring professors. “His classes have truly challenged me. His teaching has led me to become a more innovative thinker.”

“At UVM, I have felt that I have had every opportunity possible open to me.”

Kira Kelley
Environmental Engineering major | Class of 2016 | Hartland, Vermont

As a tutor with UVM’s Learning Co-Op and a teaching assistant for the introductory programming course for engineers, Kira isn’t just instructing—she’s gaining knowledge, too, about leadership. “It’s tempting to offer answers too quickly to students’ questions, but I am learning to wait, to push students to try solutions on their own and to be creative when faced with roadblocks, so they develop habits of making several attempts before conceding defeat to Yahoo! Answers,” she says. Kira has taken advantage of diverse leadership opportunities at UVM. At the UVM Student Research Conference last spring, she and other students presented their findings on the issue of fossil fuel divestment at UVM, and she’s a captain of the women’s rugby team. Additionally she received a prestigious Barrett Scholarship, a program that offers competitive paid awards to outstanding undergraduate engineers who wish to pursue a specific research project under the mentorship of a faculty member. Her advice for women in CEMS? “Be bold. Once you know the ropes a bit, be vocal in class when you don’t understand something, and don’t fixate on gender or let it be a deterrent to you being visible in a situation,” she says.
Julianna has found ways to network and meet other women in STEM fields as a CEMS student. “There is a lot of support for student clubs, projects and other opportunities,” she says. She has made helpful connections through UVM’s Society of Women in Computer Science (SWICS), is a leader of the student-run computer science community CS Crew, and has helped with web development and marketing for CEMS’ annual Computer Science Fair. Her involvement in the CS community has given her valuable leadership experience. “I’ve become better at asserting my ideas and making calls on decisions that affect a large number of people,” she says. “There has been a great deal of emphasis on recruiting more women into CEMS at UVM,” she says. After graduation, she plans to work in the software-web development industry and then possibly pursue graduate school to focus on human-computer interaction or data science.

“Going abroad helped me discover what I want to do with my education and career.”

Emily Phelp
Mathematics & Statistics major | Class of 2016 | Colchester, Vermont

Of all the things Emily likes about CEMS, feeling supported is high on the list. So is her adviser, Joan “Rosi” Rosebush, her first math professor at UVM. “She has supported me throughout college and cemented my faith in pursuing a math degree multiple times, right from that first semester,” says Emily, who plans to pursue a career in the field of data mining. As a founding member of CEMS SMART (the College’s peer mentoring club), she has returned that support. “Through this experience, I’ve learned how to effectively work with a group to implement a goal, and I’ve expanded my skills in teaching and connecting with younger students,” Emily says.

“Going abroad helped me discover what I want to do with my education and career.”
Libby Coleman  
Civil Engineering major | Class of 2016 | Chatham, New Jersey

Libby’s dream is to design and manage sustainable building projects. She is currently studying for Green Associate accreditation from the U.S. Green Building Council. “My hope is that eventually my work and accomplishments will contribute toward a societal consciousness about how we build and alter our infrastructure,” Libby says. She has found plenty of support at CEMS, especially from faculty member Donna Rizzo. “Her strong personality and clear passion for not only the course material but also for the education of her students was inspiring to me,” Libby says. She urges new students to take advantage of faculty office hours and participate in a study group. Close relationships with faculty and fellow engineering students helped Libby get into her dream graduate program. Next year she’ll be pursuing a master’s degree in Architectural Engineering at the University of Colorado at Boulder.

Charlene Mburu  
Electrical Engineering major | Class of 2018 | Nairobi, Kenya

In Charlene’s home country of Kenya, she says much of the population does not have access to grid electricity, and in the short-term, the only way to provide electricity is through renewable-energy options including wind and solar power. This has shaped her career plans. “I aim to be part of the innovative group designing simple off-grid energy generation and distribution systems for rural communities in my country as well as other developing countries. With such sources of electricity, the communities could use it to pump water from rivers for irrigation and domestic use. This would enhance food security and improve their livelihoods,” she said. As a woman in a traditionally male field, she has been encouraged by the number of female CEMS professors. “I have no limits except my own.”

“The students at UVM are open-minded, accepting, social and environmental activists, and people that you want to be surrounded by.”

“The fact that women are underrepresented in certain fields does not mean we are any less talented or deserving of a seat at the table.”
Dr. Maggie Eppstein has a broad trans-disciplinary background in biology, engineering, and computing and brings all of these areas together in her research program. “I just want to understand everything about how the world works and make it a better place – working as a computational scientist is so fun because I get to work on such diverse problems that it is never boring!” Her research spans modeling and analysis of complex systems in a variety of physical, biological, sociological, and technological systems, and includes developing and applying bio-inspired approaches to artificial intelligence, such as evolutionary algorithms (which evolve solutions to problems in science and engineering) and artificial neural networks (which learn in ways modeled on how our brains work). She has worked on problems ranging from medical imaging to modeling what makes some plants invasive to optimizing ways to manage surface water runoff to improving quality improvement in healthcare systems. Her current projects include modeling the evolution of drug resistance in malaria (and exploring ways to help slow it down), and assessing risk of cascading failures in power grids (and exploring ways to help mitigate this risk).

“This is an amazing time to go into computing, with unprecedented opportunities. Computers are a ubiquitous and growing presence in all aspects of modern society, and thus there is huge and increasing demand for computing professionals that is far from being met by the profile of today’s graduates.”

Rachael Oldinski works across the disciplines of mechanical engineering and medicine, using biomaterial science and biotechnology to find new treatments for diseases such as osteoarthritis, periodontal disease and lung ailments. She and her student researchers engineer polymeric materials and other biological scaffolds to regenerate human body tissue and assist with drug delivery. Oldinski actively mentors her undergraduate and graduate students, supporting their ongoing publication and presentation of research findings. She frequently collaborates with professors from multiple colleges on campus. Most recently she developed an innovative film – created from elements extracted from seaweed – that can be used to patch holes in a patient’s lungs. “The cool part about this contact-lens-like film is that one side is slippery and the other side sticks to the lung, forming a sort of Band-Aid,” she explains. The team just won a SPARK-VT seed grant from UVM’s Office of the Vice President for Research to move their innovative work one step closer to the marketplace.

“... I personally think I would get bored if I dedicated my entire career to one particular topic.”

Rizzo works closely with student and faculty researchers across UVM and beyond; as part of a recent $28 million grant, she and other Vermont scholars are gathering and analyzing data in the Missisquoi and Winooski watersheds to determine how climate change will affect the state and its ecosystem.

“...One of the best aspects of teaching is that we are always learning – learning more about our fields of expertise as new developments are published, and learning more about the art of teaching.”

Her path to complex systems and mathematics came after Bliss had studied coastal ecology and marine science, as well as several years spent teaching in countries including Venezuela and Costa Rica.

In her new role as a lecturer at CEMS, Bliss says she wants to excite students about working with data, manipulating models, and searching for patterns, no matter what field they pursue. She’s also working on research into how social networks evolve in Massive Open Online Courses.

Dr. Maggie Eppstein
Professor and Chair of Computer Science, CEMS

Rachael Oldinski, Ph.D.
Assistant Professor of Engineering, CEMS
Assistant Professor, Department of Orthopaedics and Rehabilitation, College of Medicine
Director of the Engineered Biomaterials Research Laboratory, CEMS

Donna Rizzo, Ph.D.
Professor of Engineering, CEMS

Cathy Bliss, Ph.D.
Lecturer of Mathematics & Statistics, CEMS
Programs in the College of Engineering and Mathematical Sciences

School of Engineering (SoE)
ABET-Accredited Programs
- BS, Civil Engineering
- BS, Electrical Engineering
- BS, Environmental Engineering
- BS, Mechanical Engineering

ABET-Accreditation Expected
- BS, Biomedical Engineering

Department of Computer Science
- BS, Computer Science
- BS, Major in Computer Science & Information Systems

Department of Mathematics & Statistics
- BS, Mathematics
- BS, Mathematics, Major in Statistics

Interdisciplinary Programs
- Engineering
  - BA, Engineering
  - BS, Engineering
  - BS, Engineering Management

Department of Computer Science and Department of Mathematics and Statistics
- BS, Major in Data Science

CEMS’ Accelerated Master’s Program (AMP) allows talented undergraduates to complete a Master of Science degree in one additional year in the following areas:
- Biostatistics
- Mechanical Engineering
- Civil & Environmental Engineering

- Computer Science
- Mathematics
- Statistics
- Electrical Engineering