I came to the University of Utah and proudly assumed the Chair of the Department of Civil and Environmental Engineering in August 2013. While I already knew about the dedicated faculty, caring staff, and exceptional student body, I have since come to recognize the excitement, passion, and overall commitment level of our wonderful alumni. Working with the CvEEN Alumni Board, the Industrial Advisory Board, and individual U graduates in the greater Salt Lake engineering community during the past six months has allowed me to truly appreciate your essential roles in enhancing the educational experiences of our students.

Our mission is producing outstanding engineers poised to become leaders in the development of innovative solutions for both the opportunities of today and the challenges of tomorrow. We promote this mission by combining high-quality educational experiences with innovative research opportunities that continue to grow and evolve with the world’s ever-changing needs.

CvEEN faculty involve undergraduate and graduate students in transformative research aimed at solving real-world problems of local, state, national, and international interest. In the past year, we awarded more than 70 bachelor’s, 34 master’s and five Ph.D. degrees and our numbers continue to grow as we rebound from the recent economic downturn. We also continue to expand our Utah Nuclear Engineering program, which graduated 10 bachelor’s degrees (minor), six master’s and three Ph.D. students in 2013.

In addition to coursework, many of our students have the opportunity to be involved in innovative research that’s changing the face of the built environment.

However, it is because of the sustained efforts of our alumni that we are able to translate fundamental knowledge into action. By providing feedback into curriculum changes, completing surveys used in our accreditation process, volunteering to give undergraduate seminars, conducting “A Day in the Life of an Engineer” series and being actively involved in a host of other activities, our alumni help shape the foundation of our program. Furthermore, CvEEN was able to award nearly $95,000 in student scholarships this past year thanks to the generous gifts provided by the alumni. Your donations are making a difference! On behalf of all our deserving award recipients, I want to thank each and every one of you who have helped make their educational dreams become a reality.

Our future promises to be very exciting as we strive to grow our student body and expand our research endeavors through both traditional funding avenues and increased use of public-private partnerships. I encourage you to engage with the department and find creative ways to interact with the students to show them the many wonderful opportunities that a degree in CvEEN from the University of Utah can provide. Go Utes!

Yours truly,

Michael E. Barber
Professor and Chair
Civil & Environmental Engineering
University of Utah
In the last decade alone, nearly 400,000 people have died as a result of traffic crashes in the United States. Another 23 million people have been injured. The toll on society is more acute because many of the victims are young and healthy prior to their crashes\textsuperscript{1}. A problem of this magnitude seems sure to have a long history of scientific and systematic inquiry. However, only recently has the study and practice of road safety started to transition from action based on experience, intuition, judgment, and tradition, to action based on empirical evidence, science, and technology\textsuperscript{2}. Dr. R.J. Porter leads a dynamic Utah Traffic Lab research team that develops new, quantitative safety knowledge and tools. This allows transportation professionals – those who plan, design, construct, and operate the transportation system – to take a more objective and scientific approach to understanding how their decisions, policies, and actions will influence the number and severity of crashes. Some of Dr. Porter’s recent and current work includes:

- Reducing Roadway Departure Crashes at Horizontal Curve Sections on Two-Lane Rural Highways
- Work Zone Crash Characteristics and Countermeasure Guidance
- Understanding the Causative, Precipitating, and Predisposing Factors in Rural, Two-Lane Crashes
- Performance-Based Safety Evaluation of Requests for New Access or Modifications to Existing Access on Freeways
- Safety Impacts of Design Exceptions in Utah
- Quantifying Relationships between Geometric Design, Speed, and Safety

The last two research efforts were recognized with national awards from the Transportation Research Board (of the National Academies) in 2012 and 2013.

The Utah Traffic Lab is home to a driving simulator that significantly enhances the lab as a research facility. This driving simulator is very unique, as it is one of the first simulators to join the microscopic simulation of traffic with human driving simulation. This type of integration offers major possibilities beyond those of a classic driving simulator, with more realistic driving scenarios and controllable traffic operations. The simulator supports fundamental research on driver behavior, traffic operations, and safety. It is currently used as part of a U.S. Department of Transportation study to understand driver responses to different types of “active” traffic control devices on rural roads, where approximately 55 percent of fatal crashes occur each year.

\textit{(Continued on pg 3)}

In addition to research, Dr. Porter and his team also use the simulator to conduct outreach activities, where they educate teenage drivers on the negative effects of distracted driving.

Dr. Porter is the University of Utah’s director for the Mountain Plains Consortium (MPC), a competitively selected university transportation research program sponsored by the United States Department of Transportation through its Research and Innovative Technology Administration. The MPC includes Colorado State University, North Dakota State University, South Dakota State University, University of Colorado Denver, University of Denver, University of Utah, University of Wyoming, and Utah State University. The MPC research theme is “Transportation Infrastructure and Operations to Support Sustainable Energy Development and the Safe Movement of People and Goods.” Through this center, Dr. Porter has brought more than $800,000 to the department during the past two years and recently received the good news of another $600,000+ in grants for the next two years. These funds are currently supporting the cutting edge transportation research work of 13 different faculty members, 21 graduate students, and 10 undergraduate students.

New Faculty

Xiaoyue Cathy Liu

Dr. Xiaoyue Cathy Liu is an assistant professor. Dr. Liu holds a Ph.D. in transportation engineering from the University of Washington, a master’s degree in transportation planning and management from Texas Southern University, and a bachelor’s degree in electronics and electrical engineering from Beijing Jiaotong University. She serves as a member on the Transportation Research Board Managed Lane Committee. Recently, Dr. Liu was appointed as a board member of the Transportation Advisory Board in Salt Lake City, where she will serve as a representative of Transportation Academia.

Doug Schmucker

Dr. Doug Schmucker is an assistant professor who has nearly 20 years of experience in structural engineering through combining research and development, teaching, and private consulting. His primary consulting work has included structural performance assessment, failure investigation, litigation support, as well as the design of repairs and renovations. Dr. Schmucker has 15 years of experience with undergraduate and graduate instruction at a variety of institutions, small and large, comprehensive and research and sees himself not as a fount of knowledge but as a facilitator of learning experiences.

Luther McDonald

Dr. Luther McDonald joins the department focusing on research in the Utah Nuclear Engineering Program. Dr. McDonald served as a postdoctoral fellow in National Technical Nuclear Forensics at Pacific Northwest National Laboratory. His research experience includes extraction and identification of inositol and O-methylinositol, developing rapid in-line analytical monitoring tools, and spectrometric methods for characterization of uranium and plutonium complexed to tributyl phosphate and dibutyl phosphate. Dr. McDonald currently serves as the Secretary of the American Chemical Society’s Division of Nuclear Science and Technology.
Alumni Impact

PAUL AND MATT HIRST

Paul (B.S. ’74) and Matt Hirst (B.S. ’99, M.S. ’07) are both actively involved with CvEEN students here at the U. Paul, President/CEO of Caldwell Richards Sorensen (CRS), and Matt, Executive Vice President & Chief Operations Officer for CRS, have always found time to spend with the students while maintaining demanding and remarkable careers. Through their involvement, they continually find ways to motivate and inspire our students.

The family has mutually, and individually, been involved with the Industrial Advisory Board, Civil Engineering Alumni Society, ASCE Career Fair, and numerous other student events and groups on campus. Recently, Matt conducted a panel discussion to educate students on the significance of obtaining a successful career. The panel discussions allow professionals to share the diverse possibilities of engineering to CvEEN students. Paul and Matt Hirst’s interaction with the students has provided guidance and opportunities for professional engineering experiences. If you would like to help support students by being involved with the department, please contact Ashley.Arpero@utah.edu to find out about the different opportunities available.

LARRY MILNER

Larry Milner graduated from the Department of Civil and Environmental Engineering in (B.S. ’87). He is currently the Vice President and Environmental Regional Global Practice Manager for the Chicago regional office of Burns & McDonnell.

Larry has served on the Industrial Advisory Board since 2008. He has been a significant factor in helping establish student leadership space and has helped ensure educational success through scholarships. Despite living in Chicago, Larry impacts U students every year through scholarships, leadership and other engineering opportunities.

To purchase tickets visit: https://umarket.utah.edu/civilmarket
Graduate Research

Ananda Shankar Bhattacharjee, Ph.D., under the supervision of Dr. Ramesh Goel, is studying the role of bacteriophages in spreading antibiotic-resistant genes through the environment. He is currently working on human gastrointestinal microbes through sampling feces of patients before and after being prescribed antibiotics. Similarly, he is working on sampling from municipal wastewater treatment plants, as well as natural systems such as wetlands to understand and provide evidence that phages play a role in enriching the resistome (all antibiotic-resistant genes) in natural and engineered systems. For his research he is collaborating with researchers from Scripps Research Institute and is utilizing advanced molecular and extensive bioinformatic tools to provide clues. For training he attended a workshop at the Joint Genome Institute, at Lawrence Berkeley National Laboratory and spent two weeks at the Institute of Genomics and Integrative Biology in India.

Ivana Tasic (working with Dr. R.J. Porter) is researching multimodal transportation systems in urban environments. Her thesis focused on traffic incident management procedures in traffic operations centers and the use of advanced traveler information systems. As part of obtaining her Ph.D., Ivana is involved with a project related to Transit Oriented Development (TOD), learning about the integration of transportation and land use. She is combining transportation engineering and urban planning methods to perform a traffic analysis for one of the potential TOD sites in the Wasatch Front Region. Ivana is also collaborating with Dr. Milan Zlatkovic on the analysis of a new light rail line in Salt Lake City.

Joel Edgar Parks, Ph.D., worked with Dr. Chris Pantelides on repairing damaged bridge elements following an earthquake by using a beneficial alternative to replacing damaged structural components. The benefits of the practice include cost savings, reduced construction time and decreased interruption for emergency services and the general public. He developed a novel repair technique for damaged precast reinforced concrete bridge column to pier cap joints with grouted splice sleeve connections by using plastic hinge relocation. The objective was rehabilitating the damaged bridge elements to near-original performance levels by restoring strength and displacement capacity. The method, which utilized headed steel bars, non-shrink concrete and carbon fiber composite jackets, was successful in repairing the column.

“Guidance and constant support from Dr. Ramesh Goel has helped shape my research and the systematize approach towards the problem.” -Bhattacharjee
As a student at the University of Utah, I’ve had many experiences, and all of them were made possible by scholarships.

Scholarships provide students with opportunity. When I was a sophomore, I joined the U’s Engineers Without Borders student chapter. I became secretary as a junior, and now I am president as a senior. Through Engineers Without Borders, I helped write and win a proposal to the U.S. Environmental Protection Agency to begin a project installing clean cook stoves in Nepal. There I was able to connect with people, make new friends around the world, and personally observe how engineering affects the lives of so many people. I’ve also been involved in several other campus initiatives such as conducting research with professors and being a peer advisor to incoming engineering freshmen. But I was only able to do all of this because I did not need a mediocre job outside of school. I received great scholarships that allowed me to fully invest my time into my education and get the most out of my university experience.

I want to thank the many individuals that have donated to make each scholarship possible. The monetary donations help the next generation obtain an affordable education. As a personal goal, I have made it to my senior year with no debt thanks to scholarships. I have been able to invest in experiences such as an additional week in Nepal trekking in the Himalayas, or a trip to California on the U’s club water polo team.

But the students that seem to prosper, are the ones that truly have a passion for their choice of study. This is also the case with the donors. I dream of having the same successes that our donors have so that I, too, can give back to education. So that I can provide for a future student the feeling of success, the chance for opportunity, and the monetary means to enjoy college. Students, don’t be afraid of what you love, because it might just love you back.
The Department of Civil and Environmental Engineering offers comprehensive degrees in all areas of civil engineering, a specialized program in nuclear engineering, and an interdisciplinary program in environmental engineering. Opportunities are available to conduct interdisciplinary research and take business courses in Engineering Management. Graduate students can also take part in real-world research projects at the renowned Energy and Geoscience Institute.

**Research Areas in CvEEN:**

- Environmental
- Geotechnical & Construction Materials
- Nuclear
- Structural
- Transportation
- Water Resources

Find out more at [www.civil.utah.edu/graduate](http://www.civil.utah.edu/graduate)