University of Utah
Department of Civil and Environmental Engineering
Strategic Plan 2016-2021

Executive Summary

Mission Statement: The mission of the Department of Civil and Environmental Engineering at the University of Utah is to: 1) provide an outstanding educational experience that prepares students for leadership positions and professional practice in academia, government, and industry; 2) improve the productivity, economic competitiveness, quality of life, health, safety, and security of society through high-impact research and the transfer of knowledge and technologies to public and private sectors.

Vision: Provide the quality of learning, research, and broader impact in the Department of Civil and Environmental Engineering at the University of Utah that is expected of any top civil and environmental department in the U.S. High-caliber faculty members will be attracted to and retained in the Department because the learning and research environment provides an outstanding place for them to build successful careers. Students will have a positive experience in a stimulating, diverse, and supportive climate leading to a strong foundation in civil and environmental engineering; exposure to policy, business, community engagement, ethics, and legal issues in civil and environmental engineering; and interactions with national leaders in academia, government and industry.

Strategic Objectives:

- Strengthen the technical content of the undergraduate curriculum based on faculty knowledge of the future of the profession, IAB input, surveys and interviews of graduates in the workforce, ASCE’s Civil Engineering Body of Knowledge for the 21st Century: Second Edition, and ASCE’s Vision 2025.
- Strengthen graduate program policies, procedures, requirements, and support mechanisms to attract high-quality applicants and prepare graduates for advanced, interdisciplinary practice and leadership in academia, government and industry.
- Diversify delivery of course and program content beyond traditional classroom and office interactions leading to enhanced student learning as well as increased enrollment, higher levels of retention, and more seamless program navigation.
- Steadily grow the Department’s research enterprise by coordinating and expanding current research strengths and positioning the Department for future opportunities in emerging strategic areas.
- Increase the global footprint of the Department through coordination and expansion of international research and teaching activities.
- Develop brand recognition for “University of Utah Civil & Environmental Engineering” and increase visibility through elevated faculty and student reputations, improved public relations, and web and media presence.
- Assist faculty in their career development through strong mentoring, professional development opportunities, specific performance expectations, and regular feedback that recognizes alternative faculty-specific roles to achieve overall Department success.
- Nurture alumni relationships by increasing alumni-faculty-student interactions and involving recent alumni in recruiting and mentoring CvEEN students.
Strategic Objective Details

Strengthen the technical content of the undergraduate curriculum based on faculty knowledge of the future of the profession, IAB input, surveys and interviews of graduates in the workforce, ASCE’s Civil Engineering Body of Knowledge for the 21st Century: Second Edition, and ASCE’s Vision 2025.

Goals and Actions:

- Conduct at least two half- to full- day faculty retreats each year focused solely on undergraduate curriculum assessments and improvements
- Develop and implement a strategy to integrate the following critical themes throughout the undergraduate curriculum:
  - a) civil infrastructure as a system to include the concepts of infrastructure interdependencies, resiliency, public policy, safety, health, quality of life, and other elements comprising the broader social context
  - b) sustainability (i.e., sustainable infrastructure design, management, and retrofit incorporating life cycle cost analysis for sustainability assessments)
  - c) uncertainty (i.e., explicitly quantifying and considering uncertainty in the design and analysis of civil infrastructure)
  - d) information modeling (i.e. generation and management of multi-dimensional digital representations of civil infrastructure projects)
- Incorporate interdisciplinary projects in the form of linked learning experiences or similar that expand across multiple 5000-level technical electives and better prepare undergraduate students for capstone experiences
- Define expected skillsets and project outputs that build longitudinally across the curriculum and culminate in upper-level technical courses
- Develop more formal mechanisms to regularly gather IAB and alumni curriculum assessments and share the results with faculty
- Regularly compete for external funding opportunities to support innovations in curriculum development and delivery
- Continue to improve laboratories for undergraduate education with funding from the College of Engineering Base Engineering Equipment Fund, department development funds, and other resources
- Incorporate department research into the undergraduate curriculum and grow the number of undergraduate students conducting research to enhance their educational experience

Assessment: The success of this effort will be measured through the following indicators:

- Results of department “self-studies” that assess consistency between undergraduate curriculum, ASCE’s Civil Engineering Body of Knowledge for the 21st Century: Second Edition, corresponding ABET requirements, and other critical themes
- Results of formal accreditation review (expected in 2021)
• Reviews and feedback from IAB members and graduates regarding consistency between undergraduate curriculum and desirable skillsets for leadership and practice in government and industry
• Number of proposals and awards for external funding opportunities that support innovations in curriculum development and delivery
• Log of undergraduate laboratory improvements
• Number of ASEE and other peer-reviewed education/curriculum-related publications authored and co-authored by faculty
Strengthen graduate program policies, procedures, requirements, and support mechanisms to attract high-quality applicants and prepare graduates for advanced, interdisciplinary practice and leadership in academia, government and industry.

**Goals and Actions:**
- Review and critically synthesize graduate program policies, procedures, and requirements from leading civil and environmental departments in the U.S.
- Strengthen structure, content, and branding of M.S. degree program options
- Seek opportunities for joint graduate certificates and/or programs with other engineering departments including, but not limited to, Mechanical Engineering, School of Computing, and Electrical and Computer Engineering
- Improve “fast track” opportunities and options for streamlined B.S.-M.S. degree programs
- Establish high-quality, online M.S. degree options that meet specific needs of government and industry sectors
- Strengthen Ph.D. program policies, procedures, and options to best prepare doctoral students to achieve visible career placement in academia, government, and industry and become leaders in addressing complex, interdisciplinary challenges of the 21st century
- Introduce mechanisms to enhance graduate student research productivity and visibility by increasing collaboration across sub-disciplines, providing incentives and rewards, and supporting opportunities for dissemination

**Assessment:**
The success of this effort will be measured through:
- Qualitative assessments of changes and improvements made to existing M.S. and Ph.D. programs
- Number of new graduate programs and certificates
- Number and quality of graduate applications
- Number of M.S. graduates
- Number of Ph.D. graduates
- Number and quality of student-led research journal publications
- Job placement characteristics (e.g., visibility, impact) for M.S. and Ph.D. students
Diversify delivery of course and program content beyond traditional classroom and office interactions leading to enhanced student learning as well as increased enrollment, higher levels of retention, and more seamless program navigation.

Goals and Actions:
- Conduct a department-level review and synthesis of available tools, technologies, and resources to create online course components and develop a “quick-reference guide” for department faculty
- Execute a monthly, one-hour seminar series for faculty, with presentations led by invited speakers from around campus to illustrate experiences and lessons learned with creating online course content
- Create online course components for each undergraduate course offered by the department that may include one or more of the following: a) remedial training/review of prerequisite knowledge, b) lecture or lab content, c) example problems, d) supplementary material, and/or e) related FE example problems.
- Develop an organized and structured internship program that has clear objectives and helps gain consistency of internship outcomes
- Incorporate training and applications in entrepreneurship and technology/venture development into undergraduate and graduate curricula
- Develop approaches for implementing repeatable and coordinated high impact learning experiences including service learning, study abroad, and simulated work environments

Assessment:
The success of this effort will be measured through:
- qualitative assessments of progress in moving forward with the goals and actions
- number of students enrolled in online courses
- overall number of students enrolled
- retention rates
- student times to complete undergraduate degrees
- percentage of faculty and courses with online content
Steadily grow the Department’s research enterprise by coordinating and expanding current research strengths and positioning the Department for future opportunities in emerging strategic areas.

**Goals and Actions:**

- Conduct analyses that identify: 1) contracts and trends for existing sponsors and programs, 2) existing but underutilized sponsors and programs, and 3) other relevant sponsors and programs that are not currently being pursued, but show promise for existing and future faculty.
- Develop “Request for Proposal (RFP)” newsfeeds of relevant external funding opportunities for CvEEN faculty.
- Expand current department strengths and external collaborations between CvEEN, Mechanical Engineering, School of Computing, Electrical and Computer Engineering, and School of Medicine to advance interdisciplinary research in next generation smart and connected communities. Logical areas for collaboration in this interdisciplinary research area include:
  - Information systems, data mining, and information analysis for designing, adapting, and managing civil infrastructure to enable livable, resilient, and sustainable communities
  - Safety, security, resilience, and robustness in human-cyber-civil infrastructure systems

**Assessment:**

The success of this effort will be measured through:

- total department research expenditures
- number of peer-reviewed publications
- impact of peer-reviewed publications (as measured by citations and journal quality)
- number and size (measured by research funding) of new research programs and interdisciplinary activities
Increase the global footprint of the Department through coordination and expansion of international research and teaching activities.

Goals and Actions:
- Develop concept for study abroad program serving entire department at the technical elective level
- Document international activities and areas of interest of CvEEN faculty and seek synergy to form strategic clusters
- Catalog and enhance global learning activities
- Create global learning experiences in undergraduate curriculum
- Establish degree program and research activities at the Utah Asia Campus (UAC)
- Leverage current faculty experience with international research activities to pursue additional funded international research opportunities

Assessment:
The success of this effort will be measured through:
- qualitative assessments of progress in moving forward with the goals and actions
- number of CvEEN courses with international content
- number of CvEEN activities at UAC
- research expenditures related to international activities
- number of research publications related to international activities
Develop brand recognition for “University of Utah Civil & Environmental Engineering” and increase visibility through elevated faculty and student reputations, improved public relations, and web and media presence.

**Goals and Actions:**
- Establish unifying themes and corresponding graphics for department outreach materials
- Consistently reinforce link between department research and society (e.g., productivity, economic competitiveness, health, safety, and quality of life) in all department outreach materials
- Actively engage and incentivize faculty and students to more effectively advertise activities and accomplishments through our websites, newsletters, social media, and local and national media
- Provide support to individual faculty members and research groups for website development and short outreach video productions
- Create a “department message” and corresponding materials for various levels of public relations and outreach, including to: high schools, community colleges, other universities, alumni, and industry
- Benchmark the department to other top civil and environmental engineering departments in the country and strive to achieve the same levels of excellence in teaching, research, and service (advertise positive comparisons in “department message” and outreach materials)

**Assessment:**
The success of this effort will be measured through:
- Department national rankings
- Number and quality of undergraduate and graduate student applications
- Number of local and national media mentions of department faculty and students
- Qualitative assessments of department website, newsletters, social media posts, and other outreach materials
Assist faculty in their career development through strong mentoring, professional development opportunities, specific performance expectations, and regular feedback that recognizes alternative faculty-specific roles to achieve overall Department success.

**Goals and Actions:**
- Establish alternative faculty level of effort models and corresponding expectations for various academic titles and career stages to increase faculty engagement and achieve overall Department success
- Explicitly link faculty assignments and level of effort models for each academic year (or for each semester if changes are made since the start of the year)
- Continue annual performance reviews between chairs and faculty targeted to take place before the end of spring semesters
- Make data (with PII removed) from faculty activity reports and other statistics available to all faculty through performance comparisons inside the Department and throughout the College
- Initiate once per semester seminar delivered by highly successful University of Utah engineering faculty on “experiences and lessons learned” in building a career in academia
- Initiate monthly or quarterly brown-bag or similar faculty internal gatherings to share best practices and ideas to improve professional performance

**Assessment:**
The success of this effort will be measured through qualitative assessments of progress in moving forward with the goals and actions as well as the general success and engagement of the faculty.
Nurture alumni relationships by increasing alumni-faculty-student interactions and involving recent alumni in recruiting and mentoring CvEEN students.

**Goals and Actions:**
- Continue alumni banquet and similar events and increase alumni, faculty, and student participation in its planning and execution
- Increase the number of direct faculty-alumni interactions through brief faculty research presentations to alumni board and quarterly mixers
- Feature alumni on website and in other department outreach materials, such as a feature in each edition of the newsletter
- Involve alumni in Professional Practice and Design course more frequently and in higher volume as evaluators and design advisors

**Assessment:**
The success of this effort will be measured by:
- Number of alumni who are engaged with the Department,
- Number of successful new activities that bring the alumni together with each other, and with students and faculty, and
- Student and faculty participation in activities that bring the alumni together with each other, and with students and faculty