Stanford | ENGINEERING
Civil & Environmental Engineering

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Dear Civil and Environmental Engineering Alumni and Friends,

Greetings! This past year has seen some important developments for our department. First and foremost as part of strategic planning in our department and in the School of Engineering, the theme of "Sustainable Urban Systems" has emerged as an important focus of the department for the foreseeable future. By Sustainable Urban Systems (SUS), we mean a network of interdependent built, natural, commercial, political, legal, information, social, or other infrastructures that are necessary to support a high quality of life in a dense human settlement, while not exceeding the carrying capacities of the diverse natural ecosystems upon which life depends. The motivation for thinking about SUS is that building sustainable, livable cities is a central aspect of the field of civil and environmental engineering, and incorporates traditional fields of excellence in our department such as structural and environmental engineering, as well as newly emerging research fields like sensing and data analytics.

As we see our efforts in SUS developing over the next few years, we believe that it will be the merger of what is traditional with what is new that will provide our efforts with the most impact. Moreover, our success will also depend on our ability to transcend the boundaries that exist between the traditional sub-disciplines of our field. A recent example of how this might work can be seen in the exciting structural bio-composites work of **Sarah Billington** (structures) and **Craig Criddle** (environmental engineering). Future opportunities could include the application of high-performance computational methods to predict the mechanical properties of energy and water treatment materials, work that **Christian Linder** has already initiated, or the application of **Oliver Fringer**'s complex turbulence simulations to model scale-up of process reactors used in water treatment.

Nonetheless, the future is already taking shape. Led by **Martin Fischer**, researchers at CIFE are harnessing modern information technology to greatly streamline the entire design-build process. In the water realm, the Codiga Resource Recovery Center (CR2C), directed by **Craig Criddle** and supported by a generous gift from William and Cloy Codiga, is now under construction and is expected to start operation at the beginning of 2016. With an initial emphasis on energy-neutral recovery of clean water from wastewater (a topic of great interest in drought-stricken California), CR2C will give us unique capabilities for scale-up and testing of resource recovery technologies. In a like fashion, **Ram Rajagopal** is developing novel technologies that integrate sensing and data analytics to design and optimally manage smart electrical grids. New faculty member **John Dabiri** draws lessons from nature, e.g., the dynamics of fish schooling, in his efforts to develop high-efficiency wind energy farms.

On the educational side, this past year we introduced a new undergraduate major, Environmental Systems Engineering (EnvSE). Intended to be an alternative to our other three undergraduate degrees, including our ABET-accredited degree in Civil Engineering, EnvSE is designed to prepare students for incorporating environmentally sustainable design, strategies, and practices into natural and built systems and infrastructure involving buildings, water supply, and coastal regions. Built on the core of math, science, engineering

fundamentals, and tools and skills considered essential for an engineer, the major allows for a choice of one of three focus areas, Urban Environments, Freshwater Environments, and Coastal Environments, for more in-depth study. We believe that while different from traditional education in our field, this structure will help prepare our students for success as future leaders in the profession.

All in all, given the combination of important problems and a willingness to "make, not ride the wave," we feel that this is a very exciting time for Civil and Environmental Engineering at Stanford and look forward to a bright future in the coming years.

**Awards**

**Jenna Davis** was selected as a Leopold Leadership Fellow.

**Greg Deierlein** was elected a Fellow of the Structural Engineering Association of California.

**Martin Fischer** was a winner, along with several co-authors, of the 2014 best paper award of the ASCE *Journal of Architectural Engineering*.

**David Freyberg** received the 2014 Community Service Award from the Consortium of Universities for the Advancement of Hydrologic Science.

**Anne Kiremidjian** was named a Distinguished Member of the American Society of Civil Engineers.

**Mike Lepech** was awarded the 2014 Tau Beta Pi teaching award. He also was the recipient of a CAREER Award from the NSF Structural and Architectural Engineering program.

**Dick Luthy** was given the Gordon Maskew Fair Award by the American Academy of Environmental Engineers and Scientists. This was in recognition of his sustained and substantial contributions to the environmental engineering profession.

**Eduardo Miranda** was named one of *Engineering News-Record*'s Top 25 Newsmakers of 2015 in recognition of his work on developing economical, quake-resilient wood-framed houses.

**Stephen Monismith** was elected a member of the UC Berkeley Civil and Environmental Engineering Academy of Distinguished Alumni.

**Haresh Shah** was awarded the Singapore Public Service Medal by the President of Singapore for his contributions to Singapore and its educational system. He was also awarded an honorary doctorate by Nanyang Technological University.

**Department News**

**Ali Boehm** was promoted to full professor.

**Mike Lepech** was awarded tenure this past year and promoted to associate professor in CEE. We are pleased that Mike has passed this important milestone and look forward to seeing Mike continuing his fine, innovative research and teaching at Stanford for many years to come.

**John Dabiri** joined us this past July as professor in the Environmental Fluid Mechanics and Hydrology group. John, a Princeton and Caltech alum who was a professor at Caltech prior to coming to Stanford, works on a variety of topics in fluid mechanics, including biological fluid mechanics and the physics of wind energy devices. He is currently developing a field wind turbine lab in Altamont Pass, and once lab renovations are complete, he will be studying flows around living jellyfish in the basement of Y2E2.

**Nick Ouellette** joined us this past July as associate professor in the Environmental Fluid Mechanics and Hydrology group. Prior to coming to Stanford, Nick was professor of mechanical engineering at Yale following his PhD in physics at Cornell. While Nick's interests are broad, e.g., fundamental turbulence dynamics, granular flows, and the behavior of insect swarms, the common theme to his research is the behavior of complex systems. Nick, too, will have living organisms in Y2E2: In his case, they will be (non-biting) flies!

Showing that it is never too late, **Bob Street** and former PhD student (and now Cal professor) Tina Chow received funding from NSF to develop more physically realistic turbulence models to be used in numerical simulations of clouds. The average age of the principal investigators is 59. Working with the CR2C, **Perry McCarty** continues to advance the design of the unique anaerobic membrane bioreactor that he developed in South Korea with his former PhD student Jaeho Bae (Inha University).

Besides directing our very successful summer program of undergraduate research (and carrying out her normal teaching and research), **Ali Boehm** co-chaired a bi-national panel on ocean acidification and hypoxia (OAH), whose efforts included developing key scientific messages for policy makers about the expected effects of OAH. Likewise, in addition to directing ReNUWIt, the NSF's Engineering Research Center for Re-Inventing the Nation's Urban Water Infrastructure, **Dick Luthy** also has been busy chairing a major study of the National Research Council on beneficial use of stormwater and graywater. **Lynn Hildemann** has been collaborating with a faculty member in the Medical School on a field project in Fresno assessing the impacts of home indoor air filters on asthma symptoms in children.

Along with three of their PhD students, **Eduardo Miranda** and **Greg Deierlein** conducted shake table testing of a full-scale two-story house using two low-cost seismic isolation systems developed at Stanford that allowed the house to remain damage free even under severe earthquake ground motions (for further information, please see the article in the July/August issue of *Stanford* magazine). In a related vein, **Jack Baker** worked for the California State Senate on a panel convened to review the design and construction of the San Francisco–Oakland Bay Bridge. In June, **Ronnie Borja** chaired the Engineering Mechanics Institute (EMI) Conference of the ASCE. The conference, held on campus, was attended by over 700 delegates from over 35 countries, and featured a Symposium on Performance-Based Earthquake Engineering honoring the late **Helmut Krawinkler. Ray Levitt** launched a new collaboration between the Stanford Global Projects Center and Åbo Akademi in Finland to reconfigure the business ecosystem for marine cargo transportation in the Baltic Sea in order to meet stringent new environmental regulations for air and water pollution.

Continuing his public efforts to transform energy production to 100% renewables, **Mark Jacobson** hosted Leonardo DiCaprio, who is working on a documentary on climate change and energy solutions, and met with Vice President Joe Biden to discuss plans to convert the energy infrastructure of the 50 states to 100% wind, water, and solar.

**Staying Connected**

I hope that you will remain an active member of the department's alumni community by keeping us apprised of your activities and whereabouts. We encourage you to visit our website at cee.stanford.edu regularly for updated information about the department. From this site, you can link to many sources for detailed information about our faculty, students, research programs, and teaching initiatives. I welcome your suggestions regarding the department's directions and activities, and encourage you to visit us to see firsthand our facilities and programs.

With best regards,

Stephen G. Monismith
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