Dear Friends of Civil & Environmental Engineering,

As we advance, we acknowledge that the accomplishments of the CEE department are powered by its people, the students, staff, faculty, alumni and friends who work together to engineer a better future for us all. I am excited to share with you some of our new pursuits in academics, research and outreach activities in this Spring 2016 edition of the newsletter. These projects include those that benefit health, the environment, and civil infrastructure around the globe. Faculty, staff and students have gained new insights into the materials and processes that will ultimately change the world in which we live.

Our researchers continue to make notable contributions in intelligent transportation, sustainable environmental and resilient infrastructure. Our annual external research funding has quadrupled in the last several years to nearly $6M, becoming a major portion of the institute's faculty-led research expenditures.

In the classroom, our faculty expose students to project-based learning and hands-on experiences that prepare them to become exceptional civil engineers. This and other academic initiatives have contributed to our all-time high retention rate of 92% and 6-year graduation rate of 68%.

As always, we welcome your support in the department's vision through involvement in our educational, research, and service activities and invite you to join us for the Annual CEE Commencement Ceremony at 1pm on May 17, 2016 (RSVP CEE@NJIT.EDU).

Sincerely,

(973) 596-2444

Taha F. Marhaba, Ph.D., P. E., F. ASCE
Civil Engineering Students in Qatar

Qatar’s preparation for the 2022 World Soccer Cup took two of our students to Doha in 2015. As part of a graduate internship, Walid Bouabid and Said Ouabi worked with Qatar engineers designing what will be one of the most modern transit systems in the world. "It was as if we were building the New York City subway system from scratch," said Walid.

On November 3, 2015, Walid and Said presented the work they did in Qatar as part of the Louis Berger Group (LBG) internship program. Representatives from the company were on hand to answer questions about their graduate internships and fellowship programs available to NJIT students.

Sophomore is on the ball!

Not all college athletes are prepared to cope simultaneously with the cascade of academic work at a top engineering school and the demands of being on a team. But Phillip Costa, a sophomore is one of them; however, "I received all A's and one B+, missing an "A" by one point," said Costa in a recent interview.

After a stellar high school soccer career, Costa made a seamless transition to NJIT’s team in 2014 and has continued starting all 19 games last season for the Highlanders, generating four assists.

In 2014 he was named to TopDrawerSoccer.com’s Top100 list of college freshmen men. His success on and off the field has continued
FED 101 Students Discover Newark's Fascinating Past

On a brisk spring day, Tom Jaworski P.E., took his students on a historical walking tour of downtown Newark. Sites on the tour included the following:

- Eberhardt Hall, circa 1857
- Military Park, circa 1667
- Trinity and St. Phillip's Cathedral, circa 1810
- Washington Park, circa 1666
- The Newark Library, circa 1898
- The Newark Museum, circa 1909
- Historic James Street, site of Lincoln's 1860 address to citizens

The famous monument "Wars of America" hosts the impressive bronze sculpture by Gutzon Borglum, who designed the face of Mount Rushmore in South Dakota.

The tour offered students a view into historical Civil Engineering projects and allowed them to reflect on various styles and applications in relation to current design and construction.
Civil Engineering to the Rescue: A water filter for Sri Lanka

12th Annual EPA, The United States Environmental Protection Agency's P3 Awards: A National Student Design Competition for Sustainability Focusing on People, Prosperity and the Planet

Backed by a grant from the U.S. Environmental Protection Agency (EPA), an interdisciplinary, student-led team of Engineers Without Borders, (EWB) has been developing on low-cost water filters for villagers in Sri Lanka.  For the villagers in the northern-central farming region these filters will mean clean water and a decrease in the high occurrence of chronic kidney disease.

The Chapter was awarded $15,000 at the 12th Annual P3 (People, Prosperity and Planet) competition last September.  In April 2016, the team went to Washington D.C. to present their results.

The filter, which will sit inside a five-pound bucket, will be made of locally available clay mixed with saw dust, hematite, a mineral containing iron oxide that binds with heavy metals.  This is critical to remove these metals since heavy metal-laden fertilizer is applied to their fields, causing the health issues.

Colloidal silver, a suspension containing silver particles that captures biological pathogens such as e-coli and cholera, will be added to the filter.  "Adapting the filter to screen heavy metals as well definitely raises the level of complexity," said Patrick Delong,(CEE), who joined the organization his freshman year, (CEE), and is now the president of NJIT's EWB chapter.

As the work continues, the team's advisor, Jay Meegoda, Ph.D., P. E., encourages students from all disciplines to get involved in this project.  Delong adds that he plans to travel to Sri Lanka's farming region this summer with a filter prototype in hand.

ACHEIVEMENTS

Congratulations to members of the John A. Reif, Jr. Department of CEE

The 18th Annual Salute to Engineering Excellence celebrated the outstanding accomplishments of our students, alumni, faculty and staff members.  This year's program included a reception and networking event and awards presentation held on March 9, 2016 at the Newark Museum.  Awards were presented by Dean Moshe Kam.
**CONGRATULATIONS TO KIERA NISSEN!**

Kiera Nissen, a junior undergraduate, received the 2016 Sol Seid $10,000 student scholarship from the New Jersey Professional Engineers in Construction (NJPEC).

Candidates are nominated by the department and must demonstrate excellence in academic and extra-curricular activities and express interest in a career in engineered construction.

**RESEARCH INNOVATION TEAM WINS!**

The undergraduate research innovation (URI) team, lead by Dr. Wen Zhang received the 2016 TechQuest First Place (1st Time) Award in the ASCE Grand Challenge Innovation Contest. The team consisted of three female undergraduate students, Andrea Cano (Civil Engineering), Maira Valencia (Biochemistry) and Arisha Javed (Chemical Engineering).

The research topic is a portable and scalable microbial fuel cells-lighting system designed to offer off-grid power using renewable waste stream such as human urine as the electron donors in the microbial fuel cell systems. For more information see: [http://centers.njit.edu/uri/competitions/index.php]
Congratulations to Wanyi Fu!

On March 16, Wanyi Fu won first place in the Student Research Poster Competition, Graduate Division at the The American Waterworks Association (AWWA) NJ Annual Conference. The AWWA provides education to the community. The organization puts on programs, contests, support and mentoring for New Jersey students in an effort to promote careers in safe drinking water. The conference was held in Atlantic City.

Award Criteria:

Presenters were evaluated on the applicability of their research to the field of safe drinking water, their apparent knowledge of the subject area, the quality of their presentation, its technical content and creativity.

The Moles

The 2016 Moles Student Day field trip to the site of the new bridge spanning the Hudson River between Tarrytown and Nyack, New York now replacing the 61-year-old Tappan Zee Bridge. The trip was led by Professor Ivan Guzman, and sponsored by MOLES.

The bridge stretches over approximately 3-mile wide river and was designed to last 100 years without major maintenance. Construction currently underway requires large-diameter pilings to be driven over 300 feet into the soil beneath the river bottom. During the visit, students had a chance to see the "Left Coast Lifter" crane in action. The "Left Coast Lifter" as it is nicknamed, is one of the worlds largest floating cranes capable to lifting a load of 2,000 tons (roughly eight Statues of Liberty). At the time of the visit the crane was hoisting one of the huge tower beams.

In November 2015, the Educational Committee awarded scholarships and student awards to motivate
and fund students completing their degrees. Three students from NJIT's Department of Civil and Environmental Engineering received awards. Devin Berniz, '15 and David Heber, '16 received the 2015 Moles Scholarship. Whittier Hua, junior was presented the 2015 Moles Student Award.

The Moles is a fraternal organization devoted to the heavy construction industry. Members are industry leaders who are involved in construction and its related fields. The Moles' Education Committee supports young people from twenty participating schools with events such as the Annual Student Day, student awards, scholarships, career connections and networking opportunities. NJIT, Cornell University, Manhattan College and Stevens Institute of Technology are some of the universities of this exclusive educational program.

UNDERGRADUATE RESEARCH

Tackling Congestion on New Jersey's Garden State Parkway

Did you every wonder if the New Jersey Garden State Parkway could be improved? Well, Engineering students Michael Garcia, Shawn Delaney, Gabrille Grompore, Arzu Alamjan and Areen Faouri took on this challenge. Last year they formed a team under the advisement of Thomas Jaworski P. E., to come up with a solution. Some of their options including a tunnel, flyover structures on both sides of the highway, and removing toll booths.

"We looked at many options" said Arzu Alamjan, a junior Civil Engineering student, "but the best idea was an elevated structure on the right side only", added Alamjan. In the end, the concept provided for two elevated lanes within an eight-mile stretch of parkway in Essex County.

With the finalization of their concept, the team entered the Dana Knox Student Research Showcase, held on April 20. They presented an AutoCAD profile view of the fly-over structure and then explained the concept to judges. The team won first place. "We didn't expect to win after we saw all the other competitor projects, some of which were very complex", said Areen Faouri. "But our hard work paid off," added Areen. The team won first place.

NJIT seeks many ways to involve students with hands-on innovative research. These competitions enhance students' ability to solve societal problems. CEE is proud to have such students in their programs.
GRADUATE RESEARCH

Janitha Batagoda, a Ph.D. candidate, is focused on the contamination in the Passaic River. Over 100 industrial facilities discharge contaminants into this river. Toxins including polychlorinated dibenzofurans (PCDD/F), polychlorinated biphenyl (PCB), Polycyclic aromatic hydrocarbon compounds (PAHs), dichlorodiphenyltrichloroethane (DDT) other pesticides, mercury, lead and other heavy metals have been identified. His research aims to establish feasibility field tests for a remediation plans.

When he began attending meetings on the topic with local authorities, companies and the EPA, he soon saw that they didn’t really have a good plan in place for the clean-up. They were considering a process that did not clean up the sediment and involved costly transportation of the waste to a remote out in the West. Janitha got to work on a plan. "We would actually be treating the problem locally and eventually the river basin would be restored to a normal condition" said Janitha.

Liyuan (Lisa) Kuang, a Ph.D. candidate, has been working with Wen Zhang, Ph.D., P.E., on the sustainable design of visible light-driven photocatalytic systems for harnessing solar energy, hydrogen evolution and efficient degradation of emerging water contaminants.

"Visible light-driven photocatalytic hydrogen (H2) production is an appealing approach to harness solar energy and potentially tackles many environmental issues such as wastewater treatment and disinfection. My research work utilizes a few typical organic acids such as acetic acids and propionic acid to serve as sustainable electron donors H2 production under solar irradiation. "Furthermore", she says, "under visible light (such as room light), our catalyst was shown to inactivate E. coli cells, a model bacterial cell, which may contribute to the development of innovative disinfection processes for safeguarding human health."

Xiaolong (Leo) Geng, a post-doctoral research associate, is working on a bioremediation project in the Gulf of Mexico. The oil released from the Macondo well following the Deepwater Horizon accident in 2010 has caused severe contamination on these beaches. Despite clean-up efforts, some residual pollution remain. Under normal conditions, indigenous microorganisms in the water have the capability of breaking down oil in a product known as "biodegradation". Geng is working to enhance delivery of key nutrients such as nitrogen, phosphorus and oxygen to microbes, which will accelerate this natural process.

This technology was validated through laboratory, field studies and advanced numerical studies using codes developed by Geng and his advisor Michel Boufadel, Ph.D., P. E.. The team confirmed that bioremediation could enhance oil biodegradation situations. This research was funded by the National Oceanic and Atmospheric Administration and the National Science Foundation.
Matt Adams, Ph.D., is an internationally recognized expert on the reuse of concrete as a replacement aggregate in new concrete. This is an eco-friendly process that will reduce greenhouse gas emissions associated with construction.

"NJIT already has a really great teaching laboratory for instructing students about construction materials. Now, as a part of my research into advanced cement-based materials, we are developing a companion research laboratory that will have state of the art equipment for developing and testing new and innovative construction materials. In this lab we'll be able to examine both the mechanical properties and long-term durability of these materials, all while training the next generation of graduate students in advanced construction material technologies."

Joyoung Lee's, Ph.D., research is focused on driving safety. With the proliferation of mobile devices (e.g., smartphones, tablets, personal computers) being used by motorists in their cars, Lee has devised a personal intersection speed advisory system (PISAS). PISAS advises drivers of the optimal driving speed, thus enabling minimal stops and delays when crossing intersections. Instantaneous data collected from drivers devises include: position, speed, and acceleration rate.

From this data, PISAS produces advisory speed information, taking into consideration the traffic signal changes. Motorists are advised of optimal speed range for individual drivers and a descriptive message warning drivers to stop at the downstream intersection.

And the Answer Is: NJIT Alum Who is Making Waves on Sports Jeopardy!

In February, CEE graduate, Vinay Varadarjan (BS ’11) displayed his lifelong passion for sports trivia and Jeopardy by winning Season Two of Sports Jeopardy! Varadarjan, now employed as a transportation engineer in Washington, D.C., still follows the Highlanders basketball team.

Vinay's NJIT career includes:

- Albert Dorman Honors College scholar
- active in the Tau Beta Pi Engineering Honor Society
member of the Alpha Phi Omega service fraternity
- participated on the Steel Bridge Team-sophomore year
- participated in the Study Abroad program during his junior year

"I am forever grateful for the opportunities I was given at NJIT," Varadarajan said. "The Honors College allowed me to concentrate on my studies rather than finances and the hybrid setup of taking classes from professors who were practicing engineers gave students like me a practical understanding of civil engineering."

Young NJIT Grad Named a Top Professional in the NY Region

Dr. Vatsal Atulkumar Shah (BS '08, MA '09, PhD 2015) has been named to Engineering News Record's (ENR) "Top 20 Under 40" list of young professionals in the New York region. While here at NJIT Sha worked on more than 200 projects and earned a doctorate in Civil Engineering. He has expertise in tunneling, bridge-related geotechnical, structural engineering, underground storage tank and site-remediation environmental design.

Additionally, the department is fortunate to have Shah on the staff this year. "I truly enjoyed teaching Foundation Design as an adjunct last semester and look forward to doing it again soon," Shah said. "Reading the student reviews made it all worthwhile."
SPOTLIGHT ON CIVIL AND ENVIRONMENTAL ENGINEERING

The SPOTLIGHT ON CIVIL AND ENVIRONMENTAL ENGINEERING is a periodic publication highlighting some noteworthy news about topics related to the practice and civil and environmental engineering.

The United States ranks from 14th to 30th among all nations in its investments in infrastructure.

"The near-total failure of our political institutions to invest for the future, eschewing what doesn't yield the quick payoff, political or physical, has left us with hopelessly clogged traffic, at risk of being on a bridge that collapses, or on a train that flies off defective rails, or with rusted pipes carrying our drinking water". Source: "A Country Breaking Down" by Elizabeth Drew, The New York Review of Books, February 25, 2016. pages 30 -32.

For additional sources of information please visit.

- *Rust: The Longest War*, by Jonathan Waldman, Simon and Schuster
- *Move: Putting America's Infrastructure Back in the Lead*, by Rosabeth Moss Kanter, Norton
- *The Road Taken: The History and future of America's Infrastructure*, by Henry Petroski, Bloomsbury

STAFF

**Administrative Coordinator**

Anne Daniecki has joined our staff. She comes to us most recently from Schlumberger, (SLB) an international engineering firm specializing in oil and gas discovery. In this position she enjoyed working on various projects with a team of physicists, engineers and project managers. Anne’s work experience includes that of English teacher, corporate communications specialist, event planner, procurement agent and project coordinator. She also lived in Europe for a number of years and will enjoy meeting and
assisting our students. Please drop by and introduce yourself to Anne.