

Carnegie Mellon University

WINTER 2016

CEE NEWS

CMU.EDU/CEE

ROOM FOR GROWTH

SUPPORTING
UNDERGRADUATE
RESEARCH EXPERIENCES





CEE NEWS Winter 2016

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information about CEE
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hear from you!

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Dear Alumni and Friends,

Research activities in CEE@CMU have long involved undergraduate students. This issue of CEE News highlights some current and recent undergraduate research projects, providing examples of the multitude of ways in which undergraduate students engage in research, and the wide range of the topics that they investigate. Many of our undergraduate research projects are presented in May each year at the CMU Meeting of the Minds Undergraduate Research Symposium. You are welcome to attend on Wednesday, May 4, 2016!



Undergraduate students get involved in research projects in various ways, including invitation from the College of Engineering for Seniors Honors Research, through Research Experiences for Undergraduates (REU) grants sponsored by the National Science Foundation, through the CEE Summer Research Assistant program, through grants from the CMU Undergraduate Research Office, or just by approaching a faculty member and asking to join an ongoing research effort.

Inside you will find stories about Seniors Honors Research projects related to climate change by two of our seniors, **Amelia Jones** and **Madelaine Ku**; an REU program in environmental nanotechnology that is led by Professor **Greg Lowry**; the research of senior **Jessica Guo** on designing digital 3D models with Building Information Modeling; a new undergraduate research course led by Professor **Sarah Christian**; and other projects and initiatives. Undergraduate research in CEE presents a diverse, rich landscape of scholarly activity.

In this issue we also report on a project in Zimbabwe by our Engineers Without Borders chapter, which involved CEE students **Kavin Sanghavi** and **Madelyn Gioffre**. Professor **Kelvin Gregory** is one of the two faculty advisors for EWB at Carnegie Mellon.

We also mark the passing, at age 97, of Dr. **Elio D'Appolonia**, a former professor and longtime friend of our department. Dr. D'Appolonia was a creative, dedicated professional who had an important role in defining the practice of geotechnical engineering. He was a mentor to generations of CEE students.

Spring is on the way, and we look forward to welcoming alums and friends to campus for Spring Carnival, April 14-16. The CEE Alumni Advisory Council will be meeting on Friday, April 15. Also, CEE will host an alumni breakfast on Saturday morning, April 16, from 8:30 a.m. to 10:00 a.m. in the Tung Au Lab. Please plan to join us if you will be on campus for the buggy races!

The faculty, students, and staff of CEE thank all of our loyal and generous alumni who support the department in so many and much appreciated ways. We send our best wishes to all of you.

Dave Dzombak
Hamerschlag University Professor
CEE Department Head

CEE FAST FACTS

INSIDE THIS ISSUE



46% of CEE students are women

55% Undergrad Women
42% Graduate Women

MAY 2015 GRADUATES



BS 37
MS 122
PHD 19



2016 RANKINGS

Civil
UG - 13 // Grad - 9
Environmental
UG - 9 // Grad - 7

Source: US News & World Report

CEE RESEARCH

24 CEE FACULTY

12 Full Professors
4 Associate Professors
8 Assistant Professors



National Academy of Engineering

5 Members
3 Active
2 Emeritus

5 Joint Appointments with ENGINEERING & PUBLIC POLICY

1 Joint Appointment with SCHOOL OF ARCHITECTURE

1 Joint Appointment with HEINZ COLLEGE

\$8.8M

Total Annual Externally Sponsored Research



PRIMARY RESEARCH CENTERS

- CERCA - Center for Engineering & Resilience for Climate Adaptation
- CEINT - Center for the Environmental Implications of NanoTechnology
- GenSCIR - Center for Sensed Critical Infrastructure Research
- CAPS - Center for Atmospheric Particle Studies
- MAC - Mobility Data Analytics Center
- Sii - Smart Infrastructure Institute
- SEER - Steinbrenner Institute for Environmental Education & Research
- WaterQUEST - Water Quality in Urban Environmental Systems
- The Wilton E. Scott Institute for Energy Innovation

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Room for Growth: Supporting Undergraduate Research Experiences

For CEE sophomore **Renee Rios**, all it took was an email and a meeting and she was hooked. She had found the research project that was meant for her.

“This is the perfect mix of what I want to do—infrastructure and environmental engineering,” Rios says, speaking about the independent study project in which she’s been helping develop and test a more environmentally friendly concrete.

“It’s the best thing that I’ve done in my undergraduate time,” she says. “Not only am I enjoying the work, but every time I talk to someone at a career fair or for an internship, this research is what we discuss.”

Within CEE, Rios is one of many undergraduates actively involved in research. From senior honors projects to in-depth independent studies, paid summer internships, and short-term support of ongoing projects, opportunities abound for undergraduates to gain hands-on research experience alongside faculty and graduate students.

According to Hamerschlag University Professor and Department Head **Dave Dzombak**, undergraduates significantly contribute to CEE’s overall research goals. “Our undergraduates help us to get projects started, support the work of our faculty and graduate students, and allow our research to progress faster and farther than it could otherwise,” he says.

Beyond the departmental resources for research, the university offers the Summer Undergraduate Research Fellowship (SURF) program, which awards \$3,500 to undergraduates for 8-10 weeks of full-time summer research.

Small Undergraduate Research Grants (SURG) are also available for up to \$500 for one student and \$1,000 for groups.

Additionally, some student research opportunities are funded by the National Science Foundation’s Research Experiences for Undergraduates (REU) program.



Left to Right:
Amelia Jones,
Renee Rios, and
Madelaine Ku

Opposite Page: Madelaine Ku shows Prof. Dzombak data for monthly average precipitation in Pittsburgh for 1976-2016 compared to 1872-1976.

LEARNING LIFELONG LESSONS

For many students, research is one of their first experiences operating in a less structured environment. "That lack of structure can be challenging, especially at first," says Dzombak. "In a formal course, materials are chosen for you by a professor. You know what is expected for tests and assignments and everything is in a certain order. The boundaries are not as clear in research."

In this way, undergraduate research not only allows students to synthesize and apply what they've learned in the classroom, but it also prepares students to handle uncertainty in the professional world, where projects often are not well-defined initially and can be approached in multiple ways.

Amelia Jones, currently researching the effects of permafrost melting on well-water quality in Alaska, says her seniors honors project has helped her to master valuable skills like self-discipline and time management.

With honors projects, seniors start research in their fall semesters and then present final results the following spring at CMU's annual undergraduate symposium, the Meeting of the Minds. Knowing that she had a year to complete her project, Jones admits that, at first, the temptation for procrastination was certainly present. However, she quickly realized the impracticality of a slow approach.



New CEE Course Teaches Research Skills

Among the CEE department's efforts to support undergraduate research is a new elective course taught by Professor **Sarah Christian**, Research Skills and Topics in Civil and Environmental Engineering, which is designed to equip students with the tools they need to do research.

This practical, hands-on course guides students through everything: selecting a topic, developing a research question, writing grant proposals, locating appropriate resources from the university library and elsewhere, and, finally, communicating project results.

"Whether a student is doing research now or plans to in the future, this course will allow them to work through their ideas and become more comfortable with the entire process," says Christian, who did research as a CMU undergraduate. "The course is also a great way to build problem-solving skills that will be essential both in their research and later in their professional practice."

"With research, you need time to change things. Even then, you go as far as you can, knowing that eventually you may have to step back and reevaluate all over again," she says.

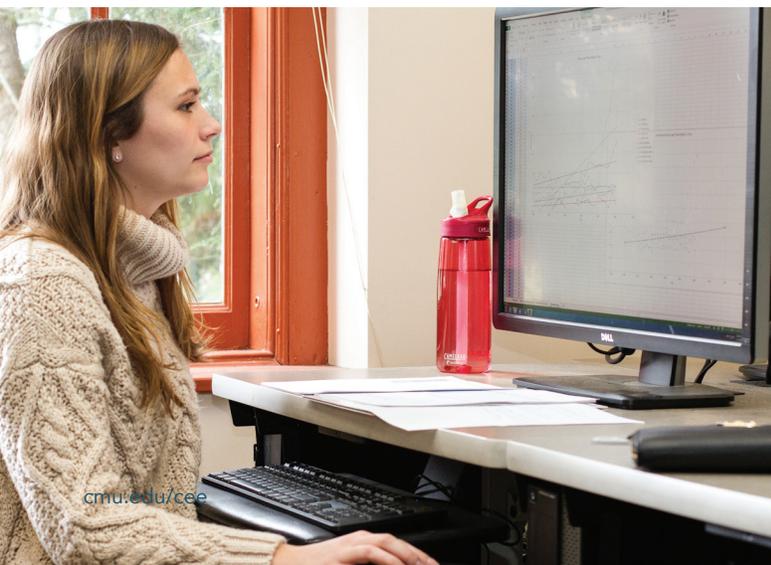
These twists and turns came as a surprise for Jones, who previously imagined research as a straightforward, linear process. "My project has evolved so much over the past four months," she reflects. "I went through four different hypotheses before settling on what I believe is a solid research hypothesis."

Recently, she has been collaborating with individuals from the state of Alaska, who, although eager to help, may not have sufficiently precise records on permafrost changes with time.

"While I can collect decades of detailed data on groundwater quality and arsenic concentrations in specific well locations, so far I've been limited to finding mostly broad yearly trends for permafrost melting, often for five years or less because it is such a recent concern," she explains.

Madelaine Ku, another senior working on an honors project, has also found that data collection can be an exercise in perseverance. Ku is evaluating long-term historical trends in climate data for Western Pennsylvania, comparing temperatures and precipitation from the past 140 years to recent decades.

"A lot of times there are obstacles you can't foresee and that slows down your work. For me it was finding data," she says. "For a while, I felt like I was on a treasure hunt. I got discouraged at



Amelia Jones reviews data from the Circumpolar Active Layer Monitoring Network Laboratories which show that the active layer of permafrost has been thawing since 1990.

first, but you have to be patient with yourself.”

Now that she has reliable data, she’s excited to interpret what she found, using data analysis skills she’s learned throughout the bachelor’s program. “I’m trying to approach it very objectively and not look for increasing or decreasing temperatures or precipitation,” she says. “Pittsburgh’s climate in itself is interesting, so I’m looking forward to understanding what story it has told over the past 140 years.”

FINDING YOUR OWN PATH

For Ku, the biggest reward has been having ownership over the project. “With research, you get to dive into a specific topic as far as you choose,” she says. “If I hadn’t done research as an undergrad, I wouldn’t have a direction for what I want to do next.”

Jones agrees, “It’s a different kind of academic experience. Research is a little more personal, so you can find out what you’re interested in and where you see yourself going for the rest of your career. If you don’t do research, you might not get that.”

Beyond Rios, Jones, and Ku, so many students have stories to tell about their CEE research experiences. Some come from outside the department, like physics student **Robert Buarque de Macedo**, who worked with CEE



Professor Greg Lowry Advises CEINT REU Student

CEE professor **Greg Lowry** hosted University of Maryland Baltimore County student **Nicholas Rogers** for a 10-week research project at CMU in the summer of 2015. With Lowry’s guidance, Rogers conducted research for the Center for Environmental Implications of NanoTechnology (CEINT) as part of the National Science Foundation’s (NSF)

Research Experience for Undergraduates (REU) program.

In October 2015, Rogers presented his project, “Effects of Common Electrolyte Buffers on Zeta Potential Measurements for Titanium Dioxide and Magnetite Nanoparticles,” in a poster session held by the Council on Undergraduate Research and the NSF in Washington, D.C.. The poster was co-authored by Catherine Ninah, another CEINT REU.

CEINT’s annual summer REU program has sites at Duke, CMU, Virginia Tech, and CEREGE in Aix-en-Provence, France, and is a chance for students to research the properties and processes controlling nanomaterial movement, exposure, and uptake in the environment as well as their relationship to effects at the cellular, organismal, and ecosystem levels.

Lowry, CEINT’s deputy director, says, “Rogers’ work is an important first step in understanding the utility of zeta potential measurements to predict the fate and effects of nanomaterials in the environment.”

Professor **Kaushik Dayal** on developing a new model for liquid crystals.

Others traveled abroad, like **Angela Ng**, who tested water purification technology in Bangladesh with

postdoctoral researcher **Teri Dankovich** and is now continuing that research for an honors project.

Yet others realized a new passion, like **Sara Guo**, who under the guidance of Professor **Burcu Akinci** discovered how to merge her creativity and engineering skills by designing digital 3D models with Building Information Modeling, entirely shifting her career aspirations.

While each research experience is unique, the stories share one common refrain: The challenges and the hard work are worth the reward.

In Bangladesh, researcher **Teri Dankovich** (left) and CEE student **Angela Ng** (right) review test samples that indicate the potability of the water sample, post-treatment.

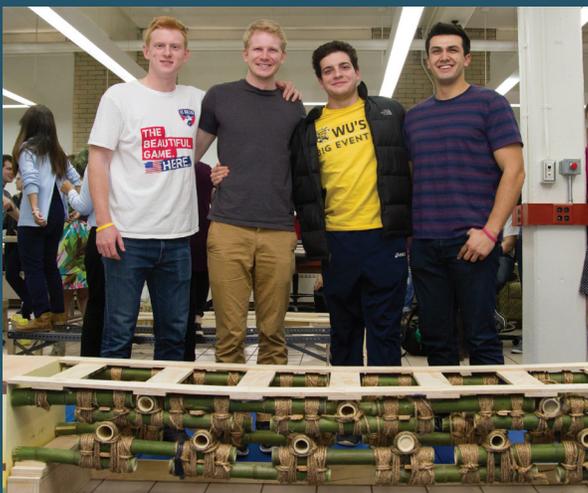
For more information about Ng’s work with the Drinkable Book, please see: bit.ly/angela-water





Coast-2-Coast

With a \$200 budget for each group, CEE Senior Design students designed and built a straight section for a scale model roller coaster. Teams were given extra points for creativity and innovation, and all designs were tested by the CEE Crash Test Dummy team.



Wait, There's More!

Head to our YouTube Channel and find out more about how Christopher Herrera (BS '16) and his teammates used bamboo to design and build their coaster section: bit.ly/2015-cee-final-project

Weighing Environmental Impacts of Obesity in US Population

So could eating healthier benefit not only us, but also the environment? The answer, it turns out, is complicated.



Michelle Tom (PhD '15)

In the United States, more than two-thirds of the adult population is overweight or obese. As individuals, we all know that this excess weight is bad for our health and our futures. But is it also bad for the planet as a whole? How does our weight affect the mark our society leaves on an already delicate environment?

Over the past three years, recent CEE PhD graduate **Michelle Tom**, with guidance from advisors **Chris Hendrickson** and **Paul Fischbeck**, studied the food supply chain and the transportation sector to answer these questions.

From growing, processing, and transporting food, to food sales and service, and, finally, to household storage and use, feeding a nation unavoidably takes a toll on our resources in the form of energy use, water withdrawals, and greenhouse gas (GHG) emissions.

Tom's results show that eating fewer calories, as recommended by the 2010 USDA dietary guidelines, can reduce energy use, water withdrawals, and GHG emissions from within the food supply chain by about 9 percent.

Following guidelines on calories and on the USDA's recommended mix of fruit, vegetables, dairy, seafood, and other food groups leads to a different result. In this case, by eating healthier as a nation we would likely increase our environmental impact across all three

categories measured in her research.

How so? "There's a complex relationship between diet and the environment," explains Tom. Largely though, you can blame the fruits and vegetables.

While the USDA recommends eating more fruits and vegetables, produce typically requires not only the greatest energy use per calorie to get to our tables, but also relatively high GHG

Tom says. "That's important for public health officials to know and for them to be cognizant of these trade-offs as they develop or continue to develop these dietary guidelines in the future."

In addition to studying the impact of our diet on the environment, Tom has also studied the effects of increased weight on fuel use, greenhouse gas emissions, and fuel costs in transportation in the United States.

vehicles, transit systems, and passenger aircraft to support extra weight of the American population, resulting in 503 million metric tons of CO₂-eq and \$103 billion of extra fuel cost.

Thus, even while fuel-efficiency technology and policies have improved, additional passenger weight could be offsetting these gains toward a more sustainable future. In fact, their research predicts that if our population's weight continues increasing at the same pace over the next 50 years, total excess fuel use could result in an extra 1.1 billion metric tons of CO₂-eq and \$200 billion of additional fuel costs.

"What is good for us health-wise isn't always what's best for the environment," she says. "That's important for public health officials to know and for them to be cognizant of these trade-offs as they develop or continue to develop these dietary guidelines in the future."

emissions and water withdrawals to grow, irrigate, and harvest. While cantaloupe, for example, might be better for our waistlines, potato chips are better for the environment.

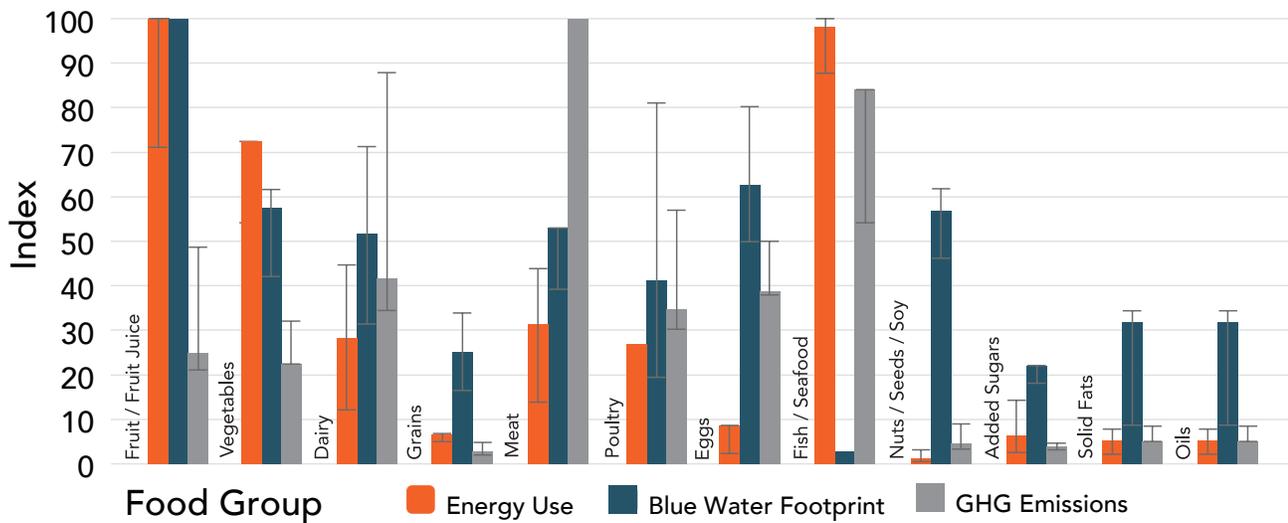
In this area, the results are a bit clearer. "In the transportation sector, what's good for public health is also good for the environment," she says.

What these findings mean for future guidelines and policy is yet to be seen, but for dietary guidelines in particular, Tom sees a need for "cooperative efforts between policy makers, health officials, and consumers." For now, she believes drawing attention to these issues is a good starting point.

"What is good for us health-wise isn't always what's best for the environment,"

According to their research, from 1970 to 2010, more than 205 billion additional liters of fuel were consumed by light-duty

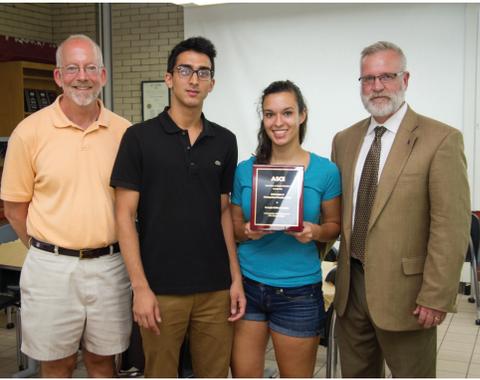
"Being aware of the relationship between excess population weight and environmental sustainability is the first step."



IMPACT PER CALORIE: Indices of average energy use, blue water footprint, and GHG emissions per calorie of food for each food group. An index score of 100 represents the highest resource use and emissions per calorie. Scores were developed based on the weighted averages of energy use, blue water footprint, and GHG emissions per calorie estimates for comparable food types within each food group. Whiskers represent the range of scores based on the minimum intensity values for all food types and the maximum intensity values for all food types.

Source: Michelle Tom, Chris Hendrickson, and Paul Fischbeck, *Impacts of the Overweight and Obese on the U.S. Food Supply and Transportation Systems*

ASCE: Award-Winning Student Leadership



Jim Thompson along with ASCE Chapter Presidents Ahmad Khanzada (2015) and Miriam Hegglin (2014) accept the ASCE Regional Distinguished Chapter Award from section President Jack Raudenbush.

The CMU chapter of ASCE was recognized with its second consecutive ASCE Regional Distinguished Chapter Award (2014 and 2015), which reflects the strong leadership and excellence of the group. Outgoing President **Ahmad Khanzada** and newly elected President **Julie Kim** are just as optimistic that the chapter will continue at this level for the year to come.

"This chapter is very active," says faculty advisor **Jim Thompson**. "The students are out there doing something at least once every month, maybe more. It's a good group." In addition to the monthly general body meetings, which provide updates and professional development talks, ASCE provides social, service, and professional opportunities to CEE students.

"Within the department our goal is to bring the different years together," says Kim. Events are open to all CEE students, faculty, and professionals and the chapter is entering the third year of the ASCE - Chi Epsilon mentorship program. Underclassmen are paired with upperclassmen and graduate students to seek advice about school, careers, and life in general, and this program has shown an increase in participation in ASCE and department events, projects, and programs.

Along with service inside the department, members recently volunteered with Habitat for Humanity, where they helped build a home for a family in need.

"Getting down and dirty really gives you perspective," says Khanzada. "Knowing that I'm building this house for a real person and a real family actually makes a difference."

In 2015, the chapter was awarded a 2015 Letter of Recognition for Community Service for its exemplary community service projects which included outreach at area schools and at the Carnegie Science Center for National Engineer's Week. The student chapter also partnered with the Engineers Without Borders student chapter to clean up a local park and construct a boardwalk to improve accessibility.

"We are very proud of the accomplishments of our ASCE Student Chapter in 2014 and commend the student chapter leaders and members," Professor Thompson says. "Earning both the Distinguished Chapter Award and the Letter of Recognition for Community Service is an outstanding achievement."



Rebecca Tien (BS '17) at the SciTech Fall STEM Festival, a service event held for sixth-graders to 12th-graders that focuses on science and technology-based educational opportunities.



ASCE chapter visited Sippel Steel to learn about steel fabrication and toured an apartment complex under construction in Oakland.



ASCE 2015-2016

ENGINEERS WITHOUT BORDERS: Shedding Light in Rural Zimbabwe

After nightfall, the people of Nyadire, Zimbabwe, commute around the community in encompassing darkness. They watch for approaching cars and dodge them in clouds of dust. Rough ground and snakes become hidden hazards as the residents travel between homes, dorms, schools, a hospital, and an orphanage with no source of light to illuminate their way.

It's not safe to walk at night, but CEE student **Kavin Sanghavi** (BS '17) is leading a project to change that. He and a group of students in the Carnegie Mellon chapter of Engineers Without Borders (EWB) are working to design and implement a sustainable system to light the Nyadire streets.

Sanghavi, along with CEE student **Maddie Gioffre** (BS '15, MS '16) and SCS student **Allison Fisher** (BS '17), took an assessment trip to Nyadire in summer 2015 to talk to community members about their needs and collect data. Working closely with The Nyadire Connection, a mission organization based in Pittsburgh, the team found that Nyadire residents were interested in the proposed streetlighting project.

The Zimbabwe Electric Supply Authority (Zesa) cannot produce as much power as the country needs, leaving residents with working electricity only a few days per week. The EWB team is looking to power the streetlights with sustainable, alternative energy sources to keep the lights working on the roadway.

"The four alternatives that we set the stage for investigating were solar, hydro, bio-gas, and pre-charged batteries,"

says Fisher. The team measured patterns of sunlight, septic tank gas emissions, the length, depth, and flow of the Nyatinga river, and the lengths of all pathways in Nyadire.

Sanghavi, Gioffre, and Fisher rejoined the full team in Pittsburgh and worked with the data to determine the best energy source for Nyadire. The students performed technical and cost-benefit analyses for each option and once they have completed the design, the group will start fundraising to return to Nyadire in August to complete the project.

Lighting the roadways of Nyadire will significantly improve the lives of residents and for the people who frequent the mission's hospital. "You don't think of street lighting as a real urgent need," says **Drew Harvey**, project mentor and chairman of The Nyadire Connection, "but when you're there and it's so dark, you start to appreciate how important it would really be to light some of those areas."

EWB requires a minimum five-year commitment to a community, so the students will remain involved with Nyadire long after the initial installation



Kavin, Allison, and Maddie with Nyadire residents



of the streetlights. They will help maintain the lights and explore additional opportunities to help the community.

"The idea is that we don't just show up, build something, and leave. We're interested in an ongoing commitment, an ongoing relationship, so that hopefully this lighting project is not the end. We'll go back and make sure it's still working and then hopefully begin other projects for the community," says Sanghavi.

In Their Words



Nur Orak

PhD – EESS
Advisor: Mitch Small

Undergraduate Degree:
Environmental Engineering
Istanbul Technical
University (Turkey)

CMU Activities

EWRI-CMU Graduate Student Chapter
(board member since 2013, current president)
CMU Model United Nations
EWRI National Society Student Council Member

What do you like most about CEE and CMU?

I love the international atmosphere! Even though CEE is smaller than many similar programs, productivity is very high. This attracts many successful students from around the world and the diversity makes me feel very welcome. I also really like how everyone collaborates and knows that we can achieve more when we think and work together.

Our faculty members are aware of local and global problems so they motivate students to think and design applicable research which can potentially solve problems. This modern engineering style helps us to think about the big picture and solve the problems before they occur.



Ahmad Khanzada

Undergraduate
Class of 2016

Hometown:
Roslyn Heights, NY

CMU Activities

Chi Epsilon (current president)
ASCE (outgoing president)
IMPAQT
Habitat for Humanity

How has CMU affected you the most in your time here?

Leadership. I have learned to work well in groups and become a key collaborator thanks to the CEE Department. I was also the president of ASCE and am currently the president of Chi Epsilon. The school has allowed me to challenge myself and develop as leader.

I came in just wanting to graduate and in constant fear of failure. Now, I have aspirations that CMU has helped me develop. I want to become a PE, work in a legislature to help improve American infrastructure, and just be successful. Coming in I was only worried about passing but now I'm just excited to take on new challenges.



120 CEE students met with 19 civil and environmental engineering firms to talk about internship and career opportunities. CEE alumni made up half of the recruiters who came to campus.

Finding Success: CEE Career Fair

"We like to hire CMU students—we have a number of alumni at our company and we know that CMU students are capable. CEE students are used to problem-solving and learning on the fly. In our industry, you have to learn quickly, make decisions, and problem solve."

- Kurtis Meyer (CEE '09), Manganaro Midatlantic

"I greatly respect the analytical skills and work ethic developed here. The students are really well-suited to work in our high-pressure construction industry."

- Noel Titus (CEE '13), Manganaro Midatlantic

"Having gone to Carnegie Mellon, we know the education and the experience it gave us. That's why we wanted to come here and show the students what we have to offer them."

- Daniel Cox (CEE/EPP '08, '09), U.S. Army Corp of Engineers

Have a career or internship opportunity? Contact **Shelby Ikeba** at sikeda@andrew.cmu.edu to find out how to connect with CEE students.



Jessica Guo



Stephanie Tjan

ASCE Student Awards

CEE students **Jessica Guo** (BS '16) and **Stephanie Tjan** (BS '17) were recently awarded the ASCE Pittsburgh Section Achievement Award. Students who are selected to receive this award have demonstrated an ability to become a future civil engineering leader.

Guo has demonstrated herself as a dedicated and entrepreneurial student in the department. She has held a number of leadership roles including ASCE Executive Board vice president and social chair. She is also a co-leader for Habitat for Humanity and is a member of the CEE Steel Bridge Team.

Additionally, she was asked to be a teaching assistant for Intro to Civil and Environmental Engineering and held weekly tutoring sessions for students in the course.

Tjan holds a leadership roles in both ASCE and Chi Epsilon. She spent her summer 2015 working on an REU project at California Polytechnic State University where she completed an ambitious project related to emissions of trace gases from MSW landfills.



Consolazio Awarded Scholarship

PhD student **Nizette Consolazio** was awarded one of seven 2015 Anchor QEA Scholarships. This highly competitive scholarship was developed to assist graduate students in the fields of or relating to water resources, surface and groundwater quality, coastal development, habitat restoration, and contaminated sediment management.

Consolazio studies the fate of chemical additives used for the extraction of oil and natural gas and is advised by **Athanasios Karamalidis**.

Students Create Opportunities with New MCAA Chapter

Mechanical contractors can perform up to 40 percent of the work (by cost) on construction sites and are important players in major engineering projects, but most students don't know much about the field.

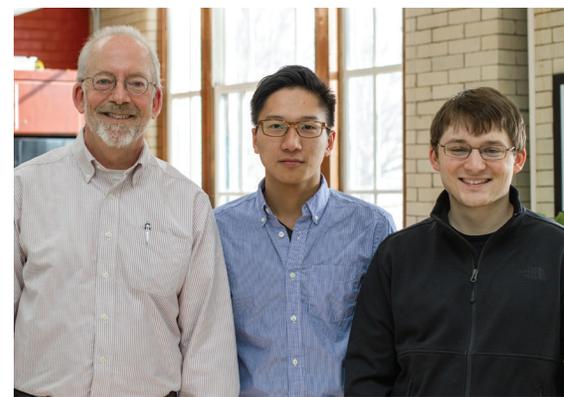
Joe Dryer (MS '16) is working to establish a student chapter of the Mechanical Contractors Association of America (MCAA), a trade organization composed of the companies in the construction industry that are involved in mechanical contracting. The student chapter would be able to involve students in site visits, informational seminars, and networking opportunities.

"It's a unique area because there are a lot of companies involved in mechanical contracting, but there aren't a lot of

students engaged in it," says Dryer. "I'm excited for getting people to learn about the industry."

The MCAA is not yet an established club at CMU, but Dryer and other students are taking steps to make it so. Dryer, along with **Lisheng Cai** (MS '16), recently hosted their first event, an informational seminar, and invited mechanical contracting companies to CEE's annual career fair.

"Mechanical contractors are looking to hire engineers, but they're having a difficult time finding them," says Professor **Jim Thompson**, the club's faculty advisor. The MCAA will provide CEE students with opportunities to learn about mechanical contracting and to fill a need within the field.



L-R: Jim Thompson, Lisheng Cai (MS '16), Joe Dryer (MS '16)

Graduate Student Fellowships

James Sprague Fellowship



Timothy Bartholomew researches the water management of the shale gas industry and is interested in quantifying the environmental impacts associated with the water-management activities. He plans to integrate environmental impacts into optimization models in order to understand the relationship between the economic and environmental costs.

PhD Advisor: Meagan Mauter (CEE/EPP)
UG: Washington University in St. Louis

Jared and Maureen Cohon Graduate Fellowship



Stephanie Laughton's environmental nanotechnology doctoral work focuses on improved understanding and quantification of nanometals' transport in realistic release environmental scenarios.

PhD Advisor: Greg Lowry
UG: Duke University

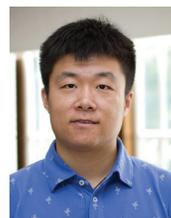
Neil and Jo Bushnell Fellowship



Mahnoush Babaei's research is focused on modeling the self-assembly of biomaterials, such as membrane proteins, using atomistic methods. Her research provides insight into the selection of parameters to efficiently fabricate 2D crystals that have more predictable membrane proteins which play a role in functional microfluidic devices like those used for analytical separations or drug testing.

PhD Advisor: Kaushik Dayal
UG: Ferdowsi University of Mashhad (Iran)

Mao Yishing Fellowship



Xuechen Lei's research is focused on the integration of BIM and sensor technology for use in infrastructures such as airports.

PhD Advisors: Burcu Akinci and Mario Berges
UG: Southeast University (China)

John and Claire Bertucci Fellowships



Lauren Cook connects civil engineers and climate scientists in order to design for and adapt to increases in extreme rainfall that are expected under climate change. Engineers can use these models to adapt and design stormwater drainage systems and respond to how infrastructure needs to manage heavier rainfall and flooding.

PhD Advisor: Costa Samaras
UG: University of Maryland at College Park



Kyle Gorkowski aims to understand how particle pollution in the atmosphere changes as it is transported by wind. Using optical tweezers he is developing, he studies how microscopic droplets of water react with humidity and other gases.

PhD Advisors: Peter Adams (CEE/EPP), Ryan Sullivan (Chem), and Neil Donahue (ChemE/Chem/EPP)
UG: Michigan Technological University

Julia and Michael Ellegood Fellowship



Sabyasachi Chatterjee's research focuses on studying crack propagation using a mesoscale phase field model of fracture based on field crack mechanics.

PhD Advisor: Amit Acharya
UG: Indian Institute of Technology, Kharagpur

Elio D'Appolonia Fellowship



Yasamin Sadat Hashemi Tari is working to understand and identify interdependencies between infrastructure systems and leveraging that knowledge to design more resilient infrastructures in the face of extreme events and climate change impacts.

PhD Advisors: Matteo Pozzi, Mario Berges, Burcu Akinci
UG: K.N. Toosi University of Technology (Iran)

Recent PhD Theses

Negin Ashoori - *Forecasting the Effects of Climate, Population, Price, and Conservation Behavior on Water Use in Los Angeles, California*
Advisors: Dzombak and Small

Aniela Burant - *Fate of Organic Compounds in High Salinity Waters and Supercritical CO₂ Associated with Carbon Storage Environments*
Advisors: Karamalidis and Lowry

Erin Dauson - *Microparticle Separation Using Bulk Acoustic Waves in a PMMA Prism with a Tilted-Angle Channel*
Advisor: Oppenheim

Samuel Markolf - *Climate Change Decision-Making at the Metropolitan Level: Current Estimates and Future Drivers of Greenhouse Gas Emissions in U.S. Metropolitan Areas*
Advisors: Matthews and Hendrickson

Milad Memarzadeh - *System-Level Adaptive Monitoring and Control of Infrastructures: A POMDP-based Framework*
Advisor: Pozzi

Clinton Noack - *Measurement and Recovery of Rare Earth Elements from Hypersaline Fluids*
Advisors: Dzombak and Karamalidis

Dana Peck - *Data Driven Analyses & Policy Implications in the Transportation Works: A Focus on Pennsylvania Inspection & Registration Data*
Advisors: Matthews, Hendrickson, and Fischbeck

Gong Peng - *Ultrasonic Signal Processing for Structural Damage Detection and Quantification*
Advisor: Oppenheim

Arka Roy - *Rheology, Diffusion and Plastic Correlations in Jammed Suspensions*
Advisor: Maloney

Michelle Tom - *Impacts of the Overweight and Obese on the U.S. Food Supply and Transportation Systems*
Advisors: Hendrickson and Fischbeck



CEE Seniors Named Andrew Carnegie Society Scholars

Paige Sieffert has served as secretary of Chi Epsilon, secretary of ASCE, and captain of the Steel Bridge Team. She is also involved in Engineers Without Borders and SWE, and is a member of the CMU varsity swimming team.

Sieffert received an American Bridge Achievement Award from the ASCE Pittsburgh Section in 2015. Next year she will be working toward her master's as part of the integrated BS/MS program.

Christopher Herrera is a strong academic performer and a leader on the Tartan football team. In 2014, Herrera was named Academic All-District by the College Sports Information Directors of America and is a member of Lambda Sigma Honor Society.

He is an active member of Engineers Without Borders and serves as a mentor for the El Círculo Juvenil de Cultura program, tutoring young students in grammar and writing. Herrera plans to start medical school once he graduates this May.

ACS Scholars are selected each year by their deans and department heads to represent their class in service and leadership.



Find out more about the exciting research our PhD students are working on at our new YouTube channel!

bit.ly/cee-phd-research

FACULTY NEWS

CMU Hosts Food-Water-Energy Nexus Workshop

In October 2015, CMU hosted a Food-Water-Energy Nexus Workshop, which was part of a series of workshops sponsored by the National Science Foundation (NSF).

The NSF awarded 17 grants to promote research on the interactions between food, energy, and water. With drought and urbanization on the rise, providing these vital resources to an increasing population has become a challenge.

CEE Blenko Professor and conference chair **Greg Lowry** focused the two-day

workshop on identifying opportunities and challenges for nanotechnology to optimize and unify food, energy, and water systems. The workshop brought together researchers from such institutions as Duke University, the Sustainable Nanotechnology Organization, and the U.S. Department of Agriculture (USDA).

Keynote speakers included Nick Dokoozlian from E&J Gallo Winery, Maximilian Safarpour from BASF, Michael Appell from the USDA, Pedro Alvarez from Rice University, and CEE Assistant Professor Meagan Mauter.

Interdisciplinary groups explored the role of nanotechnology in reaching sustainability at the food-water-energy nexus. By collaborating to answer these questions, the groups sought to determine ways to employ nanotechnology to prevent soil erosion, decrease food waste, reduce water consumption and energy use in agriculture, and lower agriculture's



Keynote Speaker: Nick Dokoozlian, E&J Gallo

environmental impacts.

The ideas generated by this multidisciplinary collaboration will have significant influence on the use of nanotechnology in regards to food-water-energy sustainability, as members of academia, industry, and government organizations will be able to integrate the shared expertise from this workshop into their respective fields.



Professor Greg Lowry

Dean Garrett Awarded ESWP Metcalf Award

The Engineers' Society of Western Pennsylvania (ESWP) has named **Jim Garrett**, dean of the College of Engineering and the Thomas Lord Professor of Civil and Environmental Engineering the 2016 Metcalf Award winner. The award recognizes engineers who make outstanding contributions to the region. The Metcalf Award is one of the highest honors given by the ESWP.

As dean of the College of Engineering, Garrett has launched major research initiatives in additive manufacturing and smart cities, both serving to drive regional growth and inspire future engineers.

Throughout his career, Dean Garrett has received numerous awards for his work and has strong ties to the Western Pennsylvania engineering community.

He became dean of the College of Engineering in 2013, served as head of the Department of Civil and Environmental Engineering from 2006 to 2012, and earned his BS, MS, and PhD in civil engineering from Carnegie Mellon. He is also a registered professional engineer in Texas.





Members of the CERCA research group with CEE/EPP faculty member Peter Adams and EPP Research Scientist Iris Grossman

New CEE Concentration Prepares Students to Lead in Climate Change Adaptation

Projections about climate change say that global sea levels will rise by about one to four feet or more before the end of the century, severe weather could occur more frequently, and humans will live—and build—under more extreme climate conditions.

CEE is at the forefront of a rapidly evolving push to build resilient infrastructure such as roadways, power plants, and water systems with a new MS concentration: Climate Change Adaptation for Infrastructure.

CMU is among the first universities to offer a group of courses to prepare students to account for climate trends in their engineering work. The program, part of a rich offering of MS concentrations within the department, teaches students to engineer buildings and other infrastructure to account for the effects that climate change can have on them.

The concentration also helps students to think about the ways in which infrastructure is operated and maintained. Students learn through an interdisciplinary approach how projected climate changes will affect engineering designs. They explore how data can inform energy and infrastructure management, how uncertainty about

future conditions can be addressed in design, and how engineered and natural systems can be molded so that they are adaptable to climate change while mitigating costs and risks.

“We believe that the successful engineers of the future will be comfortable designing for resiliency under climate uncertainty,” says Professor **Costa Samaras**, director of the Center for Engineering and Resilience for Climate Adaptation (CERCA).

Students currently pursuing the concentration are working on projects such as adapting how water supplies and stormwater are managed in cities, looking into the likelihood that extreme weather events will affect future infrastructure, and deciding how to design and operate buildings for particular regions.

“Our unique master’s concentration in Climate Change Adaptation for Infrastructure will enable our students



Costa Samaras discusses a group assignment in the Climate Change Adaptation course

to become leaders in planning and designing resilient infrastructure,” says **Dave Dzombak**, Hamerschlag University Professor and head of Civil and Environmental Engineering.

With its new Climate Change Adaptation for Infrastructure concentration, Carnegie Mellon is preparing students to not only engineer infrastructure for the present, but for what the future will bring as well.



Sean Qian

Predicting Human Behavior to Improve Transportation Systems

There are a number of things that can turn a morning commute into a hassle, particularly in urban areas where traffic often runs thick and sparse parking can be expensive. But with advances by Carnegie Mellon's Mobility Data Analytics Center, a problematic commute can now be turned into a more cost- and time-efficient ride.

The Mobility Data Analytics Center, directed by CEE Assistant Professor **Sean Qian**, is working to make urban transit easier by helping decision makers, like state and local agencies, understand how people travel. If they can understand travel behaviors, they can determine how to best reduce congestion and emissions, such as by rerouting people around construction or changing the ways they park.

New technologies and innovations in transportation systems have

produced large amounts of data, but until now the data were scattered among different organizations that did not communicate.

As a result, data were only analyzed for a particular piece of a transportation system, such as an intersection, a stretch of freeway, or bus routes operated by the same agency.

Qian's center collects, integrates, and learns from the data so

“If we can change parking availability, accessibility, and pricing ... we can change people’s behaviors to improve the system’s performance and reduce emissions.”

agencies can make smarter multimodal transportation systems. Multimodal systems include not only cars, but other modes of travel like trains, bikes, and even feet.

When looking at travel behavior, Qian looks to four main areas: the modes of transportation people use, the routes they take, when they depart, and where they park. As data are collected, he can better predict driver behavior when their usual route changes.

Qian currently is leading a project funded by the National Science Foundation to manage parking in order to reduce congestion, emissions, and fuel consumption.

Parking, while only a small part of most people’s commutes, greatly influences congestion. In fact, about 30 percent of city congestion results from drivers looking for parking spaces, according to the International Parking Institute.

“Parking is a very important part of the multimodal transportation system that has been overlooked for decades,” Qian says. “If we can change parking availability, accessibility, and pricing ... we can change people’s behaviors to improve the system’s performance and reduce emissions.”

For example, parking prices could be raised during congested times and lowered at less busy hours to encourage some people to travel at different times.

The center is also working with the city of Pittsburgh while its Greenfield bridge is closed to test a data-based model in order to determine the best ways to manage traffic around the bridge while it is replaced.

This study is one of the first of its kind in the Pittsburgh metropolitan area, and could validate the model to predict behavior and influence management strategies in other traffic scenarios.

Unlike mobile applications that track traffic, like Google Maps, Apple Maps, and MapQuest, the Mobility Data Analytics Center primarily aims to serve public agencies.

Existing mobile applications can push data to individuals to give them the best travel options at a given moment. They do not take into account people’s

behaviors upon receiving that data. If a significant number of people use those map suggestions, a roadway that was once not congested could become congested.

“Map applications provide information in real time, but are not interested in optimizing transportation systems overall,” Qian says. “They can’t provide that type of information for our city managers and planners. If you optimize the entire system, everyone will benefit from it.”



Qian with PhD student Wei Ma

FIND OUT MORE

We all hate when roads close—no one’s happy when the inevitable traffic jams jar our routines. But what if we could predict how road closings will affect traffic?

Find out more about Qian’s research: bit.ly/qian-traffic-video

Adams Joins EPA Air Pollution Panel



Particulate matter air pollution contributes to 50,000-100,000 premature deaths per year in the U.S., making it arguably the most dangerous airborne pollutant. Globally that number rises to 2 or 3 million. Breathing in particulate matter significantly increases one's risk of heart attack, and many fatal heart attacks might not occur if the air were cleaner.

CEE Professor **Peter J. Adams** has been appointed to the Particulate Matter Review Panel, an advisory committee to the Environmental Protection Agency (EPA) that will review scientific literature and make recommendations for new air-quality standards. Over the next two to three years, Adams and the other panel members will read through available research and convene to determine the safest levels of particulate matter on an annual and daily basis.

The panel unites professors and researchers with varying expertise—from emissions or atmospheric chemistry to health effects. “There’s really some education that has to happen between disciplines, so I think that will be interesting,” says Adams.

The panel will have to make some hard decisions, because particulate matter originates from the things that are so central to our daily lives: transportation, electricity, and even food. Emissions from cars and power plants become particulate matter in the atmosphere. Agricultural burning, manure from livestock, and cooking also contribute to much of the particulate matter pollution. Historically, most improvements to particulate matter levels have come not from altering daily life but from integrating cleaner technologies.

“I am excited about it,” says Adams. “On the one hand it’s a lot of work and it’s high stakes. But on the other hand, it’s sort of an honor. And it’s an opportunity for all this research and publishing papers to make a difference in the real world.”



The Center for Atmospheric Particle Studies (CAPS) Mobile Air Quality Lab takes air samples from the region



Professor Sean Qian filming his College of Engineering faculty research video



Dave Dzombak, Andrea Francioni Rooney, Jeanne VanBriesen, and Jim Thompson at the Engineering Society of Western Pennsylvania Awards Banquet



Lowry Named Among World's Most Highly Cited Researchers

Blenko Professor of Civil and Environmental Engineering **Greg Lowry** is one of the world's most highly cited researchers in the sciences and social sciences, according to the new Thomson-Reuters list published online this month. The list includes about 3,000 highly cited researchers in the sciences and social sciences. Researchers make the list if their research publications were in the top one percent of the most cited papers for their subject field and year and indexed in the Web of Science.

Lowry is a well-known expert in water quality engineering with a focus on contaminant fate, transport, and in situ treatment in sediment and groundwater systems. His research interests broadly include environmental nanotechnology, energy and environment, and environmental remediation.

His research, teaching, and professional service are well-known in the environmental engineering and science academic communities, both nationally and internationally. He is also the deputy director of the Center for Environmental Implications of NanoTechnology (CEINT), which explores the relationship between a vast array of nanomaterials—from natural to manufactured, to those produced incidentally by human activities—and their potential environmental exposure, biological effects, and ecological impacts.

Connecting with Alumni

As proud as we are to hear of your successes, it is wonderful seeing alumni return to campus for events or to talk to students about engineering. On Facebook, **Dave Dzombak** uses his weekly feature, *From Dave's Desk*, to share photos of alumni that come back to campus or are seen at professional events.

Connect with us on our Facebook page to keep in touch with CEE news and events: facebook.com/CarnegieMellonUniversityCEE or join our newly created private alumni group: facebook.com/groups/CMUCEEAlumniNetwork.

Tetsuo Sasaki (MS '99) visited Pittsburgh with his wife **Yukiyo** and his 11-month-old daughter **Yuko**.

Sasaki is a manager of the Environmental Technology Department in the engineering division of Obayashi Corporation in Osaka, Japan. Many of his projects focus on investigation and remediation of contaminated soil, and brownfield redevelopment.



Brittani Grant (BS and MS '12) gave a department seminar describing the nationally significant project on which she has been engaged for the past two years: The National Museum of African American History and Culture on the National Mall in Washington, D.C.

Grant is a project engineer with Clark Construction Group, LLC, headquartered in Bethesda, MD.



Dave Dzombak caught up with **Grant Bromhal** (MS '97, PhD '00) of the U.S. Department of Energy National Energy Technology Laboratory at a National Academies Earth Resources Engineering Symposium in Washington, D.C.

The symposium focused on control of subsurface fractures, reaction and flow, a field of research and development in which Bromhal is a nationally known expert.





Alumna Finds CEE Experiences Reflect Her Work at Google Today

Since graduating from Carnegie Mellon in 1999, **Rebecca Cassler Fearing** has found that the project-based courses she took while studying civil engineering at the university have prepared her for many of the challenges she faces as a manager at Google today.

“Carnegie Mellon forced us to solve real-world problems that weren’t necessarily well-defined ... and that’s how the real world and industry works,” **Rebecca Cassler Fearing** (BS '99) says.

Fearing now works in Austin, Texas, as the associate city manager for Google’s fiber-optics project, Google Fiber, for which she was recently recognized by the *Austin Business Journal*.

The newspaper named Fearing a technology *Titan of the Future* at its annual TechFlash Titan awards ceremony, which celebrates “the best and brightest in Austin’s technology and innovation scene,” according to the paper’s website.

Through her work with Google Fiber, Fearing is building an extensive fiber-optics network in Austin to produce Internet speeds of 1,000 megabytes per second — or about 90 times faster than average nationwide Internet speeds today.

Fearing, who majored in civil engineering, as well as engineering and public policy, at CMU, now solves open-

ended problems similar to the ones she first explored in project-based classes at the university. In her current position, she is “involved in all of the operational functions from business development to engineering, construction, and strategy,” she says. “Every day, there are problems to solve that can have more than one answer.”

She also has found that university research, which confronted her with open-ended scenarios, has laid the foundation for her success. She began research during her sophomore year with **Chris Hendrickson**, Hamerschlag University Professor Emeritus and director of the Traffic 21 Institute.

During that time, she performed life-cycle analyses for manufacturing facilities in affiliation with what is now the university’s Green Design Institute. The institute works with companies, government agencies, and foundations to improve the environmental quality of their processes and products.

That spring, Hendrickson connected her with companies that collaborated on Green Design initiatives as she looked

for internships. She landed one at IBM for the summer.

“Working with Chris Hendrickson got me a connection with IBM. Then in my senior year, my IBM internships helped me get an interview with Dell,” says Fearing.

After graduation, she held a number of roles at Dell, from managing large teams in factory operations to performing analytic evaluations of the company’s markets. During her nine years with Dell, she earned a master’s degree in civil and environmental engineering and a master’s of business administration at MIT.

After Dell, she worked at MIT’s School of Engineering, where she was responsible for the school’s strategy and ran the university’s Transportation@MIT initiative, among other roles.

Today, Fearing is also an advocate of STEM education on the board of the Girl Scouts of Central Texas. She says she has always loved introducing children to engineering, even if it is as simple as introducing herself by saying, “Hi, I’m Becky, and I’m an engineer.”

Leech Honored for Service and Leadership



Ralph Gilbert presents Tom Leech with his award at the 2016 ASCE Pittsburgh Section Awards Banquet

Tom Leech (BS '69) was recognized as the 2016 Distinguished Civil Engineer by the ASCE Pittsburgh Section. Leech recently retired from his role as vice president and national practice bridge manager at Gannett Fleming Inc., and is also a part-time instructor for CEE's Geotechnical Engineering and

Engineering Mechanics course. This award is given to civil engineers who have distinguished themselves and are deserving of special recognition for outstanding accomplishments, service and leadership of major public projects, education, and research.

Leech has led major bridge, tunnel, and highway projects in Western Pennsylvania. In addition to his notable expertise in his field, Leech published "Reflections...", a collection of essays discussing 22 notable leading international bridge engineers and architects.

Leech has received numerous awards, including Engineer of the Year in 2012 from the Engineer's Society of Western Pennsylvania.

Blissit Named Young Professional of the Year



The American Council of Engineering Companies (ACEC) has selected **Annie Blissit (BS '12)** as one of its 2016 ACEC Young Professionals of the Year. This award recognizes

young engineers who have made a significant contribution to the industry.

Blissit developed a keen interest in wastewater engineering early in her undergraduate education. She currently is a water/wastewater engineer at Gresham, Smith and Partners in Atlanta, Georgia where she has worked on several projects in the USA and internationally.

She has co-authored a chapter of a Water Environment Federation (WEF) publication and presented her work at several conferences.

She serves as the ASCE Georgia Section Director of the Younger Members, GAWP, and WEF. Through these organizations, she has taken her experience into STEM programs, classrooms, and career fairs in the Atlanta area. "It has been an invaluable experience to interact with students, see how they approach engineering challenges, and discuss with them about my job and considering engineering as a future career," explains Blissit.

Outside these activities, Blissit has also volunteered with many nonprofits including Habitat for Humanity, St. Jude Research Hospital, and Ronald McDonald House of Atlanta. With ASCE and Rivers of the World, she organized a mission to take a team to Nicaragua to build a footbridge that connected village homes to schools, church, and other community buildings.

"I have always enjoyed giving back as I feel this is one of the most important things you can do with your life," says Blissit.

CEE Advisory Council

Emily Ammerman (BS '02)
Westinghouse

Florian Bechtold (BS '58, MS '62)
DiGioia Gray & Associates

Leslie J. Cohen (BS '62, MS '64, PhD '66)
HITCO Carbon Composites

Omar De Leon (MS '11)
Exxon Mobil

Christopher Ejiofor (BS '14)

Brittani Grant (BS '12, MS '12)
Clark Construction Group

Steve Hinson (BS '97)
Schlumberger

Jeanine Hoey (BS '83, MS '85)
U.S. Army Corp of Engineers

Russel Jones (BS '57, MS '60, PhD '64)
World Enterprises, LLC

George Kane (BS '74)
Turner Construction

Linda Kaplan (BS '07)
TRC

John Kenny (BS '82)
Gannett Fleming

Seth Pearlman (BS '78, MS '79)
DGI-Menard

Mark Pleskow (BS '81, MS '85)
Mark Jacobs, Inc.

Melvin Ramey (MS '66, PhD '67)
UC Davis

Jan Reinhardt (PhD '03)
Turner Construction

Brenda Rian (BS '08)
AOL

Aurora Sharrard (MS '04, PhD '07)
Green Building Alliance

Todd Wilson (BS '06)
GAI Consultants, Inc.

Maria Zufall (MS '95, PhD '98)
Georgia Pacific



ALUMNI AWARDS

2015

The CEE alumni awards are designed to recognize CEE alumni for dedication, support, and contributions to both the department and the general world of civil and environmental engineering. These four awards are the Distinguished Alumnus Award, the Outstanding Service Award, the Recent Alumnus Achievement Award, and the Lt. Col. Christopher K. Raible Distinguished Public Service Award.

They are presented at the annual CEE Alumni Brunch during Cèilidh weekend each fall. The October 2015 event was held at the Phipps Conservatory and Botanical Gardens. All alumni are invited to nominate other alumni who have demonstrated exemplary achievements and service. See the CEE website for information about the nomination process.





DISTINGUISHED ALUMNI

Dr. Melvin R. Ramey (MS '66, PhD '67)

Ramey currently serves as professor emeritus of Civil and Environmental Engineering at the University of California at Davis, where his research has spanned topics in structural design, structural testing, fiber-reinforced concrete, and biomechanics. Notably, he applied physics concepts to the long jump and became a track and field expert for U.S. Olympic athletes.

Ramey has remained connected to CEE in many ways, including serving on a Presidential Advisory Board that reviewed CEE in the 1990s. "I learned a lot here," Ramey says of Carnegie Mellon. "We were taught to think broadly and not to put a label on the fact that we're civil engineers."



LT. COL. CHRISTOPHER K. RAIBLE DISTINGUISHED PUBLIC SERVICE AWARD

Major John R. Moran (BS '96)

Moran has designed several base camps for the U.S. Army in his two tours of service. In 2013, he was the deputy director of Public Works for all Army facilities in Kuwait. Moran is currently the director for strategic initiatives at deciBel Research, Inc., where he works with innovative radar components and software. Moran will return to active duty in 2016 to help plan construction projects in Southwest and Central Asia for the U.S. Central Command.

"The department here has been great. They prepared me for my career and all the twists and turns along the way," says Moran.



OUTSTANDING ALUMNI SERVICE

Roberta Marsteller (BS '93)

Marsteller is a business development consultant at Bob Viviant Media since 2009 and launched Conscious Crumbs, a cooking school and catering business, in 2011. She has a talent for strategic planning and problem-solving, and leads projects to success by fostering collaborative relationships between different groups and organizational levels. She has supported the CEE department in numerous capacities throughout the years, including service on the CEE Alumni Advisory Council.

"My path turned out so different than I had imagined it as a student at Carnegie Mellon," says Marsteller. "But the cumulative effect of my education—challenging classes, dedicated professors who saw a better version of me than I could see at times, diversity in the classroom, the emphasis on real world, creative problem-solving—that prepared me for life."



RECENT ALUMNI ACHIEVEMENT

Christopher M. Watts (BS '08)

Watts is the executive director of The National Foundation on Fitness, Sports & Nutrition, which is the official foundation of the President's Council on Fitness, Sports & Nutrition. He has previously served as the managing director at 4POINT4, a sportswear company that donates a percentage of every purchase to various nonprofits. Watts is also an advisor at a crowdfunding platform for amateur athletes called Pursu.it.

"The skills and the knowledge I learned while at Carnegie Mellon are with me every single day, in everything that I do," Watts says.



CEE was awarded first place for the sixth year in a row for the Carnegie Mellon University Cans Across the Cut collection which benefits the Greater Pittsburgh Community Food Bank.

Students, faculty, and staff collected 362 cans and raised \$1,962 in cash—breaking the department record.

NEW STAFF



Deb Lange
(MS '82, PhD '01)
Alumni Relations

Lange recently joined CEE part time to focus on alumni relations. After working in the private sector, she returned to CMU in 1996 and has held several positions on campus, including executive director of the Steinbrenner Institute. Recently she has focused on K-12 STEM outreach for the College of Engineering.

She has been very active professionally, including service as president of the Engineers Society of Western Pennsylvania for 2010-2011.



Shelby Ikeda
CEE Career Consultant -
Graduate Students

New to CEE, Ikeda joins an outstanding team of career consultants at the Carnegie Mellon Career & Professional Development Center (CPDC) and is deployed specifically to CEE and CIT.

Before moving to Pittsburgh, Ikeda worked as assistant director at Harvard's MBA Global Experience Office. She earned her bachelor's at UCLA and her master's of education in higher education administration at Harvard Graduate School of Education.



David Vey
Graduate Admissions and
Recruiting Manager

Vey came to CEE from Chatham University, where he was most recently assistant director of admissions – online programs. Dave has eight years of experience in higher education admissions and recruiting.

He has a bachelor's in history and political science from Edinboro University of Pennsylvania, as well as a master's in education from Duquesne University.



Hannah Diecks
Administrative Assistant

Prior to joining CEE, Diecks served in the Carnegie Mellon Provost's Office as an intern and later a temporary employee. Diecks provides administrative support to the business office and CEE faculty.

She attended Kent State University and studied business management.

Elio D'Appolonia: Influencer in the Field and the Classroom

Dr. Elio D'Appolonia, an influential former Carnegie Mellon civil engineering professor and a pioneer in geotechnical engineering, died peacefully on December 30, 2015. He was 97.

Elio D'Appolonia, known by many as D'App, was born on April 14, 1918, in a coal-mining region of Crow's Nest Pass, near Canada's Coleman, Alberta. In his teens, D'Appolonia—later an ardent Penguins fan—dreamed of a career in hockey.

It wasn't until he began working with his father at his construction company in Coleman that he was drawn to engineering.

In 1948, D'Appolonia moved to Pittsburgh to become a faculty member at the Carnegie Institute of Technology, where he helped to initiate many of the key features of the civil and environmental program at Carnegie Mellon today. He was interdisciplinary in his approach to the field. He first taught structural engineering and researched the characteristics of titanium. Later, he taught soil mechanics and foundations.

"He helped to define and develop the multidisciplinary, creative problem-solving nature of civil engineering at Carnegie Mellon that remains a hallmark of our program," says **Dave Dzombak**, Hamerschlag university professor and CEE department head. "A structural engineer with classical mechanics training, he found the emerging field of geotechnical engineering an intellectually rich area in need of a combination of mechanics knowledge and creative engineering problem-solving."

In 1956, after eight years of working closely with students to define their interests and career paths, D'Appolonia founded his own geotechnical consulting firm, joining several of his former students in the enterprise. First named E. D'Appolonia Associates, the firm later became E. D'Appolonia Consulting Engineers, or EDCE.

D'Appolonia's firm, which over the years developed into a group of companies providing services related to geotechnical engineering, construction, and other environmental services, became a place where many Carnegie Mellon graduates worked. At its height, the company had more than 600 employees and numerous international offices.

In 2012, CEE announced the initiation of the Dr. Elio D'Appolonia Graduate Fellowship Fund to help continue his legacy of innovation and interdisciplinary thinking in the department. The fund was started with the generosity of the Devendra (Dev) & Kshama Shukla Foundation, and continues to grow through the generosity of alumni, friends and former colleagues of D'Appolonia.

"The creative spirit of Dr. D'Appolonia will live on in the department forever through the D'Appolonia Graduate Fellows," Dzombak says.



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Drop by for coffee and donuts Carnival weekend!

CEE Alumni Breakfast || Saturday, April 16 || 8:30 a.m. – 10:00 a.m. || Tung Au Lab
To register for this and other campus Carnival events, visit: bit.ly/2016-cmu-carnival

To our alumni: Thank You!

You support us in our mission in so many ways, and we're very grateful for the generosity you show. We're proud of what you've accomplished since you graduated, and we hope you're equally proud to call us your alma mater.

We'd love to keep in touch with you, and it's easy to update your information with the department. It takes less than 5 minutes to fill out our contact survey: bit.ly/cee-alum-update.

Questions about this survey, or just want to know more about how you can get involved with the department? Please contact Deb Lange at dlange@cmu.edu.



Give Where Your Heart Is

CEE is a remarkable department where faculty, students, alumni, and staff feel connected to each other and the work being done here. Visitors notice the visible signs of our strong community, and new students quickly realize that they are part of someplace special. Our flexible undergraduate and graduate curricula and access to cutting-edge research opportunities allow CEE to continue to graduate classes of creative thinkers and doers.

We are able to provide an engaging, enriching, and encouraging environment because of the support of our donors. Giving to CEE is a vote of confidence in our program and helps keep us competitive with other world-class programs.

Gifts at all levels are needed and appreciated from alumni and friends. Undergraduate alumni participation rates also influence our national rankings in publications such as U.S. News & World Report.

Find details at bit.ly/cee-giving

Current CEE Giving Options:

Lawrence Cartwright Support Fund for Teaching Professors

Dr. Elio D'Appolonia Graduate Fellowship Fund

Chris T. Hendrickson Undergraduate Travel Fund

CEE Strategic Fund