Is your organization interested in hiring UW ChemE students as interns or for permanent positions? Would you like to post a job opening, hold a company information session, or conduct interviews in Benson Hall? If so, our Academic Services team would love to hear from you! Please contact Dave Drischell, Academic Services Director, at rdd@uw.edu.

Company Information Sessions
Connecting employers with ChemE students

2016 Distinguished Alumnus in Academia, Gabriel López

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2016 R. Wells Moulton Distinguished Alumnus in Academia, Prof. Gabriel López (PhD '91), Vice President for Research and Professor of Chemical & Biological Engineering at the University of New Mexico, addressed ChemE students at the Annual Awards Day in April.

As chemical engineers, we are trained to develop new products and optimize processes — sometimes to maximize output of a given product, or minimize the use of a particular feedstock. Thus, good engineering practice can often align with the principle of economic sustainability. However, how well are we preparing engineers to address the other two pillars? Societies tend to rely on good government regulations to inject the environmental and social constraints into our economic activities. We as engineers then collaborate with other disciplines to design and innovate around the most cost effective means to create breakthroughs while operating within these constraints.

It is evident that many of the brightest young people are motivated to tackle the world’s most significant environmental and social challenges. Climate change is prominent among those. And central to the strategy of addressing climate change is accelerating the adoption of low- and zero-emitting technologies. These technologies can only be fairly evaluated by employing robust “lifecycle” calculations that consider the manufacture, operation, maintenance, and end-of-life disposal/recycling of the various components of the system under evaluation.

Earlier this year, transportation overtook electricity generation as the country’s number one source of greenhouse gases. Even with the success of Tesla and the steady increase in model availability from other auto manufacturers, plug-in vehicles still represent less than one percent of new car sales both in the U.S. and globally. How can this transformation be accelerated and emissions be lowered from this sector? It is clear that chemical engineers and material scientists have a critical role to play in this technology shift through the innovation of better performing (and more cost-efficient) batteries and lighter weight materials — but can we accomplish those technology breakthroughs and still meet the broader range of sustainability objectives? Certainly, consideration of battery raw materials and battery disposal will be key, but these are the very questions that society needs our chemical engineers to help address.

An important and comprehensive study recently released by Miotti, et al at MIT shows, for example, that the current vintage of battery plug-in all electric vehicles already outperform internal combustion and hybrid drivetrains on both an economic and greenhouse gas basis when considering the full lifecycle impacts. Chemical engineers are well positioned to contribute to these types of lifecycle analyses.

There are similar and related issues pertaining to the next generation of nuclear power, solar cells, carbon capture and utilization, aviation fuels, agricultural products, and many other important technologies. We must apply an expansive definition of sustainability and integrate that into our pursuits. The UW ChemE curriculum is already evolving accordingly to help our best and brightest illuminate the path forward. Although it may sound a bit cliché, the future of our planet does indeed depend on it.

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Society’s view of sustainability has evolved a bit over the years. One definition suggests that sustainability is our collective ability to meet the needs of the present generation without compromising the ability of future generations to meet their own needs. This definition can be expanded to include the balanced pursuit of environmental, economic, and social needs within this same multi-generational context.

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Sustainability means many different things to many different people and the word has often been stretched beyond recognition to further one agenda or another. At its core, sustainability is about systems thinking: it speaks to always trying to make efficient use of resources – a natural playground for chemical engineers.

Between the first and last courses, faculty incorporate sustainability concepts in the curriculum. This ubiquity emphasizes the importance of sustainability and with strong support from the External Advisory Board, the faculty have been busy rolling out a Sustainability in the Chemical Engineering Curriculum initiative consisting of a signature course and the seamless integration of sustainability concepts relevant to the practice of engineering in all of our classes.

The concept of appropriate use of resources fits naturally in the chemical engineering curriculum and can be used to expose students to sustainability, starting with the very first ChemE course: Material and Energy Balances. In performing mass and energy balances, students learn how to define and draw the boundaries of the system they study. It is straightforward to extend the concept to the environmental impact of products and processes and to demonstrate how alternative definitions of the system and its boundaries affect outcomes. Examples include disposable vs. non-disposable cups, ethanol as a fuel and electric cars.

For years, the department has taught elective courses with a strong component of sustainability. We now have retooled ChemE 341, Energy and the Environment, to serve as a flagship class for the effort. The course delves into renewable and non-renewable energy production, energy usage and conservation. It also introduces elements of life cycle inventory and fosters multidimensional critical thinking on non-intuitive problems.

In their penultimate class, ChemE 485 Design 1, students perform an abbreviated life cycle inventory, detailing all of the flows and outflows associated with a process they choose, and discussing which has the most impact on the environment. In addition, they investigate the positive or negative consequences of transitioning the feedstock supply chain from one source to another (e.g., from shale gas to other potential methanol sources).

Students finally encounter elements of sustainability in their capstone design experience. Last year, for example, teams designed a process to convert carbon dioxide into liquid fuels; a key component of the project was a thorough evaluation of the economic feasibility and environmental impact of the design.

The incorporation of sustainability into the curriculum is an ongoing effort and one we feel is paramount as students gain an understanding of the decisions they make as engineers make today impinge on generations to come.

The department has always been dedicated to undergraduate education and has evolved its curriculum to train the best possible workforce for today’s needs. While continuing to teach the fundamentals of the discipline, we emphasize molecular and nanoscale phenomena, offering research experiences and internships to our students, and provide career pathways through product and entrepreneurial design. A new initiative (see accompanying article by Prof. Holt) now seamlessly integrates sustainability concepts in the curriculum. This ubiquitous exposure to non-intuitive problems, life cycle inventory, and the impact of systems boundaries should go a long way in producing even more of those great engineers.

This year brought about many other exciting developments. Thanks to the generosity of Jeet and Jan Bindra and of the Weyerhaeuser Company, we recognized two of our brightest young faculty, Prof. Pfaendtner and Pozzo, with endowed professorships. Prof. Nan coated some of her boundless energy to the creation of WChE, a student-led organization that empowers women in Chemical Engineering. Prof. Pfaendtner received $3M from the National Science Foundation to establish a trailblazing graduate training program in data science for clean energy. The department held its first Science and Engineering as Art competition to awaken blazing graduate training program in data science.

The department has always been grateful for your support and hope you will continue to care and invest in the department. We encourage you to participate in the Chemical Engineering as Art competition to awaken more students to the excitement of science. We hope you will join us in support of our endeavors and be a part of our success.

Contact Chair Baneyx at chechair@uw.edu
The Department of Chemical Engineering hosted its first-ever 50th reunion, welcoming back members of the class of 1966 to Benson Hall.

The reunion was held on June 9 in conjunction with the Chemical Engineering Graduation Ceremony. From the Class of 1966, Nicholas Dobos, Rich Eger, Clayton Radke and Dan Evans were in attendance as well as Dan’s spouse Sharon Bergman, Chair Emeritus Charles Sleicher, Emeritus Prof. Bill Heideger, Professor John Berg and Department Chair François Banexy.

In recognition of 50 years of accomplishments, Chair Banexy presented the group’s education with their.

“I used to constantly take things apart and that’s part of how I learned to be an engineer,” Banexy said. “You can’t really do that with iPhones today.”

Radke told a story about a former graduate student who worked as a truck driver. One day, he called Radke that his truck died and he was stuck on the road. “But guess what? He fixed the blown up engine himself and drove back.” “Having a sense of things – it’s important for engineering thinking.” Without computers, Google, or even calculators in the 60’s, students relied heavily on math skills until it got “into the psyche.”

All agreed that today’s students are much smarter in finding information. “The quality of students is as high as ever,” said Prof. Berg, who celebrates his 52nd year of teaching this year. “There is almost no one in my class who does poorly.”

The event included a surprise from Berg who invited the guests to the recently inaugurated John C. Berg Interfacial and Colloid Science Lab. Cheers and laughter erupted as the group walked into the lab and saw the headshot photos of younger selves posted on the board.

“Having shared their troublemaker stories, the group compared today’s chemical engineering education with theirs.

Class of 1967 50th Reunion

Calling all members from the Chemical Engineering Class of 1967! We hope you will join us for our 50th reunion held in conjunction with the 2017 Chemical Engineering Graduation. Come back to campus to reconnect with classmates, visit with faculty, and be formally honored during the graduation ceremony. An official invitation will be sent to everyone. Please make a reservation at kaitcoll@uw.edu or 206-685-6192 with any immediate inquiries.

Class of 1967 50th Reunion

2016 Distinguished Alumnus in Industry, James Chang

We are pleased to honor Dr. James Chang (Ph.D. ’86) with the 2016 R. Wells Moulton Award for Distinguished Alumnus in Industry. Since 1993, the R. Wells Moulton Distinguished Alumnus Award has been presented to alumni who have made exceptional contributions in industry, academia, government or public service.

The 2016 recipient of the industry award, James Chang, is the CEO of TaiMed Biologies, a publicly traded company in Taiwan with a U.S. subsidiary. TaiMed focuses on developing monoclonal antibodies for the treatment of HIV/AIDS infection. James started his career at Procter & Gamble and later became Senior Director at Allergan Pharmaceuticals where he played a key role in BOTOX® development.

James received his Ph.D. in 1986 under the direction of Professor Eric Kalter. He delivered a seminar entitled “Career Paths in Pharmaceutical/Biotechnology Industries: A Chemical Engineer’s Perspective” during the 2014 Leadership Seminar Series. James is a strong supporter of the department. His generosity stems from his deep gratitude for the fellowship he received while pursuing his Ph.D. and his strong belief in giving back. We congratulate James on joining the prestigious cohort of Moulton award recipients.
Eligible for certain recognition and benefits. To learn more, please contact Jessie Muhm at jmuhm@uw.edu or (206) 685-7748.

Supporters who choose to establish a planned gift during the UW's current campaign, Engineering and ensuring our students have access to an outstanding chemical engineering education.

"While I was a graduate student at the UW, my education was all but free. Since the university was so good to me, I would like to give something back and help future graduate students. Establishing this trust allows me to do more with my money today, providing me a source of steady income until the time that I no longer need it. I will be pleased to have the UW receive the principal of the trust upon my passing."

Some planned gifts provide you with income and many can reduce your taxes. The greatest benefit, however, lies in knowing you are supporting the work in Chemical Engineering and ensuring our students have access to an outstanding chemical engineering education.

Supporters who choose to establish a planned gift during the UW’s current campaign, Be Boundless – For Washington, for the World, are eligible for certain recognition and benefits. To learn more, please contact Jessie Muhm at jmuhm@uw.edu or (206) 685-7748.

In conjunction with the November AICHE meeting, the Department hosted a reception to connect with Bay Area alumni. Attendees gathered in Berkeley included alumni Jon Bagg (BS '71), Denny Roja (MS '69) and Tony Huang (BS '82). In addition to Profs. DeForest and Caroloths, ChemE graduate students presenting at the conference were also in attendance. Among them were Wesley Beckner and Kayla Sprenger from the Pfandtner Group, Erik Liu, Andy Sinclair and Peng Zhang from the Jiang Group, and Britney Hellner and Jessica Soto-Rodriguez from the Baneyx Group. “We wanted to create an opportunity for Bay Area alumni to meet new faculty and students and learn of the state of the department. Alumni are a big part of the ChemE community and the opportunity for our students to network with them is invaluable,” Chair Baneyx said.

Art work produced during the inaugural and subsequent SEA competitions will adorn the walls of Benson Hall and make a long lasting impact beyond research. Visit cheme.washington.edu/news/2016_SEA to experience the masterpieces firsthand.

**Student Achievements**

**Graduate Students**

- ACS COMP Graduate Student Award, AIChE Biomaterials Graduate Student Award: 
  Yanbo Qi, Yutian Qian, Samson Smith, Niccolo Fortes, Nannan Jiang
- Best Consumer Product Idea:
  Clean Tech Prize:
  Decaf Style (Pozzo)
- UW Foster School of Business Plan Competition:
  Chen Liu, Sam Smith, Matt Willet
- AIChE Chem-E Car Competition Poster 2nd place:
  Other winners: (Bennett Battistoni, Max Calcagno, Jacob Hatzinger, Austin Im)
- Grand prize:
  UW ChemE Bowen Design Awards
  Austin Wright-Pettibone
- CEI Best Clean Energy Research in ChemE:
  UW ACES Graduate Student Symposium
  Yanbo Qi
- Other:
  Lawrence Award
  • Faculty Lecture Award: Peng Zhang
  • High Impact Publication Award: Tao Bai

**Undergraduate Students**

- UW Student Regent: Austin Wright-Pettibone
- UW ChemE Bowen Design Awards:
  Grand prize: Design: Bing Xin: Exergenetic Boogaloo (Bennett Battistoni, Max Calcagno, Jacob Hatzinger, Austin Im)
- Other winners:
  Pirates of Ross Island (Graham Henry, Victoria Hildreth, Connor Zeleny)
  Carbon Cowboys (Julian Son, Junsuk Kim, Seungha Shaar)
  Alex Liqui-Fuelers (Brendon Cjwietz, Nick Larson, Melissa Le)
- AIChE Chem-E Car Competition Poster 2nd place:
  Pash Shamaprasad, Tad Lienjaya, Victoria Hildreth, Heather Huang, Yu Chen Liu, Sam Smith, Matt Willet
- UW Foster School of Business Plan Competition:
  2nd place & Best Retail Innovation Idea:
  Decaf Style (Pozzo)
  Clean Tech Prize:
  Ionic Windows (Pozzo)
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  Ionic Windows (Pozzo)
  Clean Tech Prize:
  Ionic Windows (Pozzo)

**WChE Women’s Networking Session**

“Did you all know women leave Chemical Engineering, Mechanical Engineering, and Industrial Engineering professions more than any other fields? I want us to do something about that,” said Elizabeth Nance, Clare Boothe Luce Assistant Professor of Chemical Engineering. “Our students gathered at the first WChE meeting in January. Prof. Nance, along with an elected group of ChemE students, founded WChE - Women in Chemical Engineering @ UW. Their mission is to educate and empower women in chemical engineering, and their supporters, by providing a safe and open space for dialogue, advocacy, mentorship, collaboration, camaraderie and skill building.

In less than a year, WChE has organized a women’s networking session, a graduate student panel, the first ChemE senior send-off, started CheMentoring Circles, and partnered with the Society of Women Engineers, Time To Change: Women’s STEM Networking Session. It has provided a safe and open space for women in chemical engineering, and the women in their respective fields.

In the future, WChE will be partnering with the Society of Women Engineers, Time To Change: Women’s STEM Networking Session. They will be holding a networking event, where women in chemical engineering will be able to connect with alums and other women in the field. WChE is actively recruiting ChemE alum to support their efforts. Please contact WChE at wche@uw.edu.

**Inspire New Ideas Support Chemical Engineering**

Now more than ever, a dynamic education requires the involvement and investment of many. It no longer happens with just tuition dollars. Private support is essential to our success. Endowed scholarships, fellowships, professorships and chairs, along with flexible unrestricted gifts can translate into real opportunities for our students and faculty.

To learn more about supporting Chemical Engineering, please contact Jessie Muimh at jmuimh@uw.edu or 206.685.7748.

Austin Wright-Pettibone is having quite a year which culminated in being selected as the first-ever engineering student to serve on the UW Board of Regents. He conducts research in the Carothers Lab and is supported by The Armstrong Scholarship and The Bemiss Franki Scholarship in Chemical Engineering. He was recently featured as one of six students embodying the Husky Experience.

I got plugged into President Obama’s campaign when I was in high school. It was such a rush of excitement to be able to not just witness history, but be part of making changes in our society. I think that’s one of the great things about getting involved with the political process. My time volunteering led to an internship at the White House my freshman year. I started the week before Obama’s second inauguration, and got to help with everything from social media to the State of the Union. It was an amazing opportunity.

Just recently, Governor Inslee appointed me to the Board of Regents, which is a huge honor. The UW changed my life. Beyond teaching me a whole lot, it’s made me a better person, a better leader, and someone who feels a strong commitment to the state and to the University. To me, being selected is about ensuring everyone who comes to the University has an experience as good as — or better than — mine. I want to share with people the same sense of wonder and excitement I feel.

I worked as an undergraduate researcher in the Carothers Lab. I like to explain our work as if we’re flipping a light switch in E. coli in order to get the bacteria to produce industrial plastics. The goal is to sustainably produce chemicals through engineering controls in bacteria. Of all the engineering disciplines, it’s chemical engineering that really sits at the intersection between science and society — there are giant public benefits that can come from research like this.

Scholarships are all about creating access and opportunity for students. When you receive a scholarship, it’s saying that somebody believes in you and wants to invest in you so that you can go out and make the difference you want to make in the world. In one part it’s about education. In another it’s about creating a sustainable future. And in another it’s about creating opportunities for students to make the difference they want to make in the world.

Private support is essential to our success. Endowed scholarships, fellowships, professorships and chairs, along with flexible unrestricted gifts can translate into real opportunities for our students and faculty.

Our continued success depends on your partnership.

“Scholarships mean people believe in your potential to make a difference.”

— Austin Wright-Pettibone

“WChE Women’s Networking Session”

"I want to do work that makes a difference in society, impacts people daily, and informs the direction of our country.”

**ChemE Car at AIChE**

AIChE’s annual Chem-E-Car Competition™ engages college students in designing and constructing a car powered by a chemical energy source that will safely carry a specified load over a given distance and stop. This year, the UW team (advisor: Prof. Adler) beat the tough regional competition and participated in finals at the AIChE meeting in November. The team’s effort to optimize the car until the last minute unfortunately resulted in a technical difficulty that prevented them from making a successful run. But all was not lost. The UW Team won second place in the poster competition, behind a fellow Pacific Northwest rival UBC. Our students stood out by providing technical details about the design process and philosophy. Check out their video journey in the news section of our website.
Faculty UPDATES

2016 Bruce A. Finlayson Lecture Features Ed Cussler

The Lecture, named in honor of Bruce A. Finlayson, Rehnborg Chair Professor Emeritus of Chemical Engineering, features distinguished chemical engineers who demonstrate exceptional scholarship, teaching and service in their field.

The 2016 Finlayson Lecturer was Prof. Edward L. Cussler, Distinguished Institute Professor at the University of Minnesota. Prof. Cussler received his B.E. with honors from Yale University in 1961, and his M.S. and Ph.D. in Chemical Engineering from the University of Wisconsin in 1963 and 1965, respectively, working with E. N. Lightfoot. After thirteen years teaching at Carnegie-Mellon University, he joined the University of Minnesota in 1980. He has written over 250 articles and five books, including Diffusion, Bioseparations, and more recently, Chemical Product Design. Prof. Cussler has received the Colburn and Lewis Awards from the American Institute of Chemical Engineers (AIChE), for whom he served as Director, Vice President, and President. He has received the Separations Science Award from the American Chemical Society, the Merryfield Award from the American Society of Engineering Education, and honorary doctorate degrees from the Universities of Lund and Nancy. He is a Fellow of the American Association for the Advancement of Science and a member of the National Academy of Engineering.

Prof. Cussler delivered two lectures: A Sustainable Chemical Industry May Imply Dispersed Manufacturing (research) and Will Swimmers Swim Faster or Slower in Syrup? (public).

Stu Adler has co-developed a new technique for designing better batteries which was featured on the cover of the May 28 issue of the Journal of Applied Physics.

François Baneyx was elected to the Washington State Academy of Sciences.

John Berg was honored at the University of Florida as the 2016 D. O. Shah Annual Lecturer.

Faculty Honors and Achievements

Cole DeForest was named a 2017 PMSE Young Investigator by the Polymeric Materials Science & Engineering division of the American Chemical Society.

Hugh Hillhouse’s laboratory was visited by U.S. Secretary of Energy, Dr. Ernest Moniz, for their innovations on photovoltaic materials and solution processed solar cells.


Elizabeth Nance founded and is serving as advisor to the WChE (Women in Chemical Engineering) which educates and empowers women in chemical engineering and their supporters.

Graduate Education in Clean Energy due for “Big Data” Overhaul

Led by Prof. Jim Pfaendtner, the $3M National Research Traineeship grant from the National Science Foundation brings “Big Data” to graduate education in clean energy research at the University of Washington.

Automation, advanced instrumentation and high-performance computing have revolutionized science through an exponential growth in data.

Materials scientists, chemists and engineers seeking to discover next-generation materials for energy are stymied by this abundance of information. “Big data” has an intoxicating allure, since the answers are in there — somewhere. But finding them requires new tools, techniques and approaches specifically designed for large datasets.

“In science today, people have big datasets collected from computers, instruments, microscopes,” said Jim Pfaendtner, associate professor of chemical engineering at the University of Washington. “It’s not the amount of data we can collect that’s the limiting factor. Now the limiting factor is data-handling.”

Removing the logjam requires an overhaul in educating young scientists, and Pfaendtner is leading a new endeavor funded by the National Science Foundation, via its new flagship National Research Traineeship (NRT) program, to bring big data to graduate education in clean energy research at the UW. Known as DIRECT — or Data Intensive Research Enabling Clean Technologies — this traineeship will phase in practical, data-driven research projects for graduate students in fields such as chemistry, renewable energy and chemical engineering.

“There’s been a recent ‘explosion’ of data in these fields, and we need new approaches to help our graduate students grow into data-intensive researchers in these subjects,” said Pfaendtner, who is also a member of the UW’s Clean Energy Institute and the Molecular Engineering & Sciences Institute.

Materials and doctoral students in four UW departments — materials science and engineering, chemistry, chemical engineering, and human centered design and engineering — will participate in DIRECT, as well as the Clean Energy Institute (CEI), the Molecular Engineering & Sciences Institute (MoEIS) and the eScience Institute. The program will match students with short, goal-driven projects in renewable energy or materials science early in their graduate education.

This project will not replace independent thesis or dissertation research. Instead, students will work temporarily on a big-data project already underway at UW or a partner institution. Graduate students will learn as they go how to handle, organize and analyze large datasets, both furthering the project and boosting their analysis tools for their own master’s or doctoral research projects.

“The are not classroom exercises. These are not simulations. These projects will support ongoing research,” said Pfaendtner. “Graduate students completing our classroom training will be ready to do this, and learn as they go from senior scientists.”

For example, one graduate student could help develop machine-learning approaches to predict the properties of new materials that have not yet been produced. Her classmate might explore new methods to synthesize the next generation of light-harvesting solar cells. Pfaendtner envisions pairing students with projects that fit their interests, though he stresses that the skills they would acquire would be applicable across the physical and engineering sciences.

“Whether students move on to do experiments, simulations or modeling for their research, the big-data skills they learn here will be invaluable,” he said.

Partner institutions, which will field projects for DIRECT, are the Pacific Northwest National Laboratory, Boeing Research and Technology, Zhejiang University in China, the University of Campinas in Brazil and Bellevue College. The $3,000,000 in support from the NSF for the five-year NRT project is also supported by the UW to allow additional students to participate and leverage the grant to improve the diversity of doctoral students entering the UW to do clean energy research.

Pfaendtner’s co-principal investigators on DIRECT are associate professor of human centered design and engineering Cecilia Aragon, chemistry professor David Ginger, chemistry professor Xiaoxiong Li and professor Christine Luscombe in the Department of Materials Science & Engineering. Aragon is also a member of the eScience Institute, while Pfaendtner, Ginger, Li and Luscombe are members of the CEI and the MoEIS Institute.