As the year draws to a close, I’d like to share some highlights for the Department of Chemical and Biomolecular Engineering. We have hired Nicholas Sandoval (PhD, Colorado; Post-doc, University of Delaware) as an Assistant Professor in the area of biochemical engineering. Dr. Sandoval’s research interests are in genome and metabolic engineering, applying advanced synthetic biology tools for sustainable fuel and chemical production. Our department now has twelve full-time faculty and one professor of practice. Hank Ashbaugh was promoted to Full Professor in recognition of his outstanding scholarship, teaching, and service.

The strong undergraduate program graduated over thirty students last year. Our graduate student population has also nearly doubled in the last five years, reflecting a substantial rise in research activity among our faculty. We are fortunate to have received additional space in Flower Hall, which has accommodated our increased needs for student research and office space.

We are continually grateful to the alumni who “pay it forward” by connecting current students to internships or jobs at their companies, and to those who have been involved in Practice School. Please contact me if you have opportunities you would like to share.
Julie Albert Wins CAREER Award

Julie Albert, Assistant Professor and the Robert and Gayle Longmire Early Career Professor was awarded a National Science Foundation (NSF) Faculty Early Career Development (CAREER) grant through the Chemical, Bioengineering, Environmental and Transport Systems (CBET) Division. The CAREER program is the NSF’s most prestigious junior faculty award program, recognizing outstanding integration of research and education. In her proposal, Dr. Albert described a plan for coupling basic thermodynamic principles with experiments to investigate the morphology of nano- and micro-structured polymer films. Long term, these materials will contribute to next generation technologies like medical diagnostic devices that are more accurate and portable; electronic devices that are faster, smaller, and capable of storing more information; and energy sources that are cleaner without sacrificing capacity or power. The cornerstone of Dr. Albert’s education plan was integration of research and education by developing Service Learning course offerings in which students apply their academic learning to service activities that highlight the role of engineers in the community. “I feel very fortunate and honored to have received this award, and I am excited about implementing the research and education plans I proposed,” Dr. Albert says of the grant, which began officially on July 1. “I have had several fantastic mentors both at Tulane and at other institutions whose advice has definitely contributed to my success.”

Stem cell research wins major NSF Grant

Kim O’Connor has been awarded a $599,638 grant as principal investigator from the National Science Foundation for her research on mesenchymal stem cells. These adult stem cells have the potential to improve the quality of life for patients by repairing damaged tissue.

The NSF grant enables Dr. O’Connor and her research team to address a major challenge to realize the regenerative potential of mesenchymal stem cells — their rapid depletion upon implantation at the site of tissue injury. There is significant cell-to-cell variation in the ability of mesenchymal stem cells to survive implantation and engraft into host tissue. Dr. O’Connor’s team is investigating the molecular basis for this variation. Their goal is to develop novel methods to improve the survival and engraftment of these stem cells during tissue repair.

Research & Education Take International Stage

Brian S. Mitchell gave an invited talk on “Competition and Differentiation in Higher Education” at the Friedrich-Ebert Stiftung scientific conference in Berlin, Germany on September 20, 2016. He also took part as an invited guest in the German Research Foundation workshop on International Research Training Groups in New York City on October 20-22, and the Annual Colloquium on International Engineering Education in Newport, RI on November 2-5.

Congratulations to Anne Robinson for being named a fellow of AIChE at the San Francisco annual conference in November this year!
Welcome!

Nicholas Sandoval joined the department in August 2016 as an Assistant Professor. His research areas include the development of advanced biology tools in non-model microbes and directed evolution to engineer microbes. He earned his Ph.D. from University of Colorado Boulder and most recently was a postdoctoral fellow at the University of Delaware, in the lab of E. Terry Papoutsakis. It is an honor to welcome him to the faculty!

Alumni News

Pictured Left: Steffen Hallman (PhD, 2011) and his family currently reside in Hannover, Germany where Steffen works as Chemist for Compound and Process Development Commercial Specialty Tires at Continental Tires.

Pictured Right: Claudio De Castro (PhD, 2005) is currently a Research and Development manager for Proctor and Gamble in Cincinnati, OH. Also shown with Claudio and Brian (right) is Brian’s wife, Bonnie.

Check this out!

We are excited to announce the launch of our new career opportunities page (http://www2.tulane.edu/sse/cbe/academics/career-opportunities.cfm)! Students can go and find internships and job openings in industry, post doc positions, and faculty positions — all specifically for CBE majors. This new resource will help current students look for positions that will fit with their aspirations. If you or anyone you know has an opening that they would like us to post, please forward a job description and a link to either the webpage or application to Megan Bishop at mbishop3@tulane.edu.

Brian S. Mitchell met with two former PhD students in Washington, DC while he was on leave to the National Science Foundation and Council of Graduate Schools during 2015-16.

Pictured Left: Steffen Hallman (PhD, 2011) and his family currently reside in Hannover, Germany where Steffen works as Chemist for Compound and Process Development Commercial Specialty Tires at Continental Tires.
Department Renovations:
Main Office

One of the many changes that have happened is the construction of a new administrative suite in Boggs 300. The new structure offers more privacy for the chair and separation for the reception area, while still fostering a welcoming atmosphere in the main office.

Flower Hall

Initial partial build-out of Flower Hall 3rd floor was completed October 2016, and will house the Shantz lab.
Along with excellent lab facilities, the new space in Flower Hall has offered our students an upgrade in office space. Students sharing these spaces are those from the labs of Professors Ashbaugh, John, Pesika, and Shantz.
Amy Goodson, a PhD candidate in Chemical and Biomolecular Engineering who entered the program in Fall 2015, was awarded a National Science Foundation Graduate Research Fellowship. This fellowship not only recognizes excellence in research but also the merits of mentorship and outreach. Academically, Amy is one of our program’s top students, and is co-advised by Dr. Ashbaugh and Dr. Albert. Her doctoral research combines computational and experimental methods to study the mechanisms of phase separation in multi-component polymer blends that could be used for membrane and nanotemplating applications. Amy is actively involved in the Tulane engineering community, working with the undergraduate Society of Women Engineers (SWE) section to prepare them for interviews at the national SWE Conference each year and co-founding the Graduate Women’s in Science and Engineering (WISE) group on campus. She was also the first Cowen Scholar in the School of Science and Engineering, as part of a scholarship created by the Thomas and Helen Armer Endowed Fund.

Outstanding Student Highlight

Baraka Lwoya, a PhD candidate in Chemical and Biomolecular Engineering who entered the program in Fall 2013, received several accolades this year for academic achievement, scholarship, and service related to increasing the representation of underrepresented groups in STEM disciplines. Baraka’s research is on the fabrication of nanoporous membranes from block copolymers for oil/water separations (advised by Dr. Albert). When he is not in the lab, Baraka is involved in mentoring undergraduate students and participating in K-12 outreach activities. Most recently, he was awarded the 2016 Owens Corning Scholarship for Graduate Women and was recognized at the Society of Women Engineers National Conference in Philadelphia (October 2016). Other scholarship awards include an Honor Society Scholarship, Kellogg’s Scholarship (National Society of Hispanic Engineers), and Fulfilling the Legacy Scholarship (National Society of Black Engineers). Baraka also received two conference travel awards to present his research; the first award was from the American Chemical Society Polymers Division (ACS Spring Meeting, March 2016) and the second from the National Institute of Standards and Technology (National Graduate Research Polymers Conference, June 2016). At Tulane’s School of Science and Engineering Symposium in April 2016, Baraka also received the Best Poster Award.

CBE Student Named Schlumberger Scholar

Yueyun (Maya) Lou was named a 2016-2017 Schlumberger Scholar in September by the School of Science and Engineering in coordination with Schlumberger. This award recognizes Maya’s achievements as a young scholar in both research and the classroom environment. Maya is currently a third year PhD student in the Chemical and Biomolecular Engineering Department working in the Shantz Lab. Maya’s research focuses on new materials that will be able to selectively capture carbon dioxide from power plant flue gas, and then convert it to methanol, that can be turned into fuels and chemicals. Such technologies will be needed as part of a multi-faceted approach to dealing with carbon dioxide emissions. “Maya has been an outstanding member of my laboratory and is strongly deserving of this recognition”, say Professor Shantz. “She is making excellent progress on a very important and challenging problem.” The award from Schlumberger includes both a financial award as well as the opportunity to network with Schlumberger employees. The award is another example of Schlumberger’s long-standing commitment of support to the School of Science and Engineering at Tulane. Maya joined Tulane August of 2014 after completing her B.S. and M.S. degrees in Chemical Engineering at Nanjing Technical University.
Tulane’s AIChE Student Chapter is having a great semester! In addition to hosting career and internship information sessions, our executive board has organized events aimed at encouraging the students both to connect and to succeed. Our goal has been to provide a balance between intellectual stimulation and social interaction. We try to collaborate with the faculty, university clubs, and other engineering departments as much as possible to expand and share knowledge and interests.

At the end of October the students went to see the Deepwater Horizon movie, and the next weekend AIChE set up a tent at Tulane’s Homecoming tailgate! We have arranged a faculty meet-and-greet lunch to encourage the freshmen and sophomore chemical engineering students to become acquainted with their professors, as well as to learn about various career paths and research topics.

Finding an internship is crucial to the sophomore or junior chemical engineering major, so we often host companies and organizations that wish to interview students for summer positions. The senior students, myself included, are busy job-hunting or completing applications for graduate school. The executive board has had a productive few months, and we will continue to provide an environment to encourage the success of our students.
—Hayden Houser

“Finding an internship is crucial to the sophomore or junior chemical engineering major”

The Tulane Interdisciplinary Experience Seminar (TIDES) Program promotes interdisciplinary scholarship and brings together small groups of students and faculty with similar interests. This semester, Katie Russell and Julie Albert developed a TIDES course intended to attract more students to the engineering major. Engineering in the Modern World was designed to introduce students to the modern approaches engineers employ to solve real-world problems. Topics included energy production and conservation, biotechnology, engineering materials, and water purification. Students learn through relevant readings, discussions, and guest lectures from leaders in the field. In addition, students gain hands-on experience utilizing a modern biotechnology technique by introducing DNA into bacterial cells. Also, fieldtrips to the Aquarium of the Americans, the Tulane Power Plant and the Jefferson Parish Water Board expose students to real-world applications.

New Freshman TIDES Course

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Unit Operations Lab Updates

Big changes took place in the Unit Operations Laboratory during the Spring 2016 semester. The junior-level course has always challenged students to apply their engineering knowledge in order to design and perform experiments in a team setting, but Katie Russell, a Professor of Practice who has taught the lab since 2014, felt the lab could offer more than the existing bench-scale experiments. “Based on student feedback, I wanted to design a hands-on laboratory which exposed the students to pilot and full-scale industrial equipment and the chance to analyze real-world data,” says Dr. Russell.

On-Campus Power Plant Experiments

The most significant change to the lab was the addition of four experiments developed by Dr. Russell and board of advisor member, Franz Vogt, utilizing an on-campus industrial facility. The Tulane University Power Plant provides the heating and cooling for the majority of the Uptown campus and allows students access to unit operations designed for the production of electricity, steam, and chilled water. Throughout the semester, teams visited the Power Plant and worked closely with crew members to determine efficiency in the cooling towers, optimize chiller performance and investigate the economics of installing a cogeneration system. The collaboration gives students a truly unique opportunity to step outside of the lab and work with industrial equipment in their own backyard. “Using data from the power plant gave us a chance to see how conditions vary in real-time versus the ideal situations in our textbooks” said Hayden Houser, Class of 2017. The department would like to thank Ismet Sulejmanagic, Project Engineer, and Mark Lebeau, Assistant Director of Plant Operations at the Tulane Power Plant for their help with the implementation of these experiments.

Chemical Plant at Nunez Community College

To provide students with real-world chemical plant experience, students also visit the pilot-scale methanol plant at Nunez Community College as part of the Unit Operations Laboratory. The plant (similar to the large-scale plants students may work in after graduation) was funded through the Louisiana Board of Reagents as a three-way collaboration between Tulane, Nunez and Xavier University. The experiment gives students a taste of being on the control room floor and provides them with experience analyzing performance data, reading P&IDs and equipment spec sheets, using process simulation software, and troubleshooting.

Pilot-Scale Polymer Reactor

With the generous donation of resources from Advanced Polymer Monitoring Technologies Inc. (APMT) students are provided the opportunity to monitor and analyze polymer properties in a pilot-scale reactor. Using APMT’s ACOMP platform, students monitor the synthesis of polyacrylamide allowing them better understanding of polymerization kinetics models and exposure to cutting edge instrumentation for improved control of pilot-scale reactions.
Congratulations Class of 2016!

Top Row (left to right): Falk Boyle, Kevin Kozek, Tommy Brophy, Henry Lively, Brad Chauvin, Brett Bomwell, Tony Miller, Cole Ashman, Thomas Zekoski, Michael Kosson, Daniel Folse, Wilson Jeter, Tyler Staggs, Alex Miller

Bottom Row (left to right): Ruthie Winkler, Lindsey Nelson, Megan Lipp, Austin Vale, John Steele, Natalia Da Silva Moura, Samantha Budin, Meaghan Hart, Madeline Sell, Brett Salomon, April Miguez, Monica Germann, Jake Kobylarz, Corey Simpleman, Sheila Wright

Not Pictured: Christopher Chedid, Cameron Morris

2016 Department Awards

AIChE Activity Award - Samantha Budin
AIChE Senior Scholarship Award - Cole Ashman
Francis M. Taylor Award - Wilson Jeter
American Institute of Chemists Student Award - April Miguez
AIChE Junior Scholastic Award - Tiffany Lou
Randall K. Nichols Award - Thomas Frederick

R. V. Bailey Teacher of the Year Award - Dr. Katie Russell
Outstanding Teaching Assistant - Amy Goodson
Chevron Undergraduate Award - Yukihiro Kurusu
Zoe Poncher
Student Practice School Award - Wilson Jeter
Jake Kobylarz
Michael Kosson
April Miguez
Congratulations to Our Newest Ph. D.’s!

Dr. Jaspreet Arora
Vijay John, Advisor
“Fabrication of Functional Films and Self Assembled Lipid Structures for Gene Delivery”
Senior Research Chemist
Capsugel - Bend

Dr. Olasehinde Owoseni
Vijay John, Advisor
“Synergistically Engineered Hollow Particle and Molecular Amphiphile Systems for Oil Spill Remediation”
Process Engineer
Intel’s Logic Technology Development (LTD)

Dr. Yufei Duan
Kyriakos Papadopoulos, Advisor
“Novel Uses of Capillary Video-Microscopy”
Senior Application Engineer
Hermes Microvision

Dr. Tushar Khosla
Noshir Pesika, Advisor
“The Use of Surface Texturing and Microspheres in Aqueous Based Lubrication”
Applications Scientist
Rtec-Instruments