



Department of Chemical and Biological Engineering

NEWSLETTER

Fall 2021



Inside

Undergraduate News

Graduate Program Updates

Honors and Awards

Research Highlights

Student Spotlights

Contact and Support

Welcome

Dear Alumni and Friends,

Although we have encountered a lot of challenges over the last year, I have never been more excited about our department's trajectory! Over the last couple of years, we have hired world-class faculty, we have developed a new Biological Engineering concentration, several new student learning opportunities have been created, and our research portfolio has dramatically expanded.

The recent construction of the UA Science and Engineering Quad transformed the landscape of our college, but behind the scenes, the progress within our department has been just as dramatic. I hope you enjoy reading about some of the updates and news from our department.



*Prof. C. Heath Turner
Department Head
Chemical and
Biological Engineering*

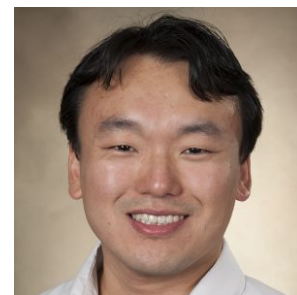
THE UNIVERSITY OF
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College of
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Chemical and Biological Engineering



Undergraduate News

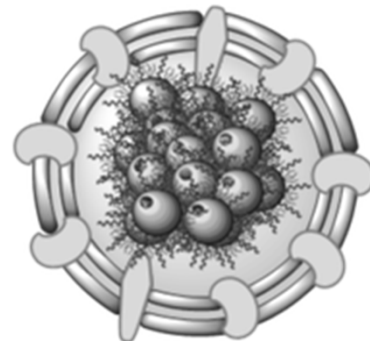
Several major updates to our undergraduate program emerged this year. We developed a concentration in biological engineering, which represents the first formal concentration in our department. Second, we initiated a major transition of our unit operation lab teaching facilities to enable remote equipment monitoring, data collection, and automation.



Prof. Y. John Kim, Undergraduate Program Coordinator

Biological Engineering Concentration

Our department has increasingly added biological content to our undergraduate curriculum over the last decade. In tandem, the faculty expertise in the biological areas has continued to expand. These factors were compounded by very strong academic interest from our students, so it was an easy decision to move forward with a new concentration in Biological Engineering (formally taking effect in Fall 2021). In 2018, the State of Alabama biotechnology industry had an economic impact of \$7.3 billion, and our students will be extremely well prepared to jump into this field right after graduation.



Advanced Automation in the Unit Operations Lab

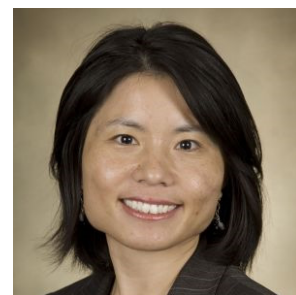
Although COVID disrupted some of our educational activities, it also sparked the development of new learning methodologies. One of the most difficult experiences to emulate remotely is a hands-on laboratory. However, we all worked together (faculty, technicians, students, and alumni) to provide a first-class laboratory experience by adding a variety of new technologies: automated data acquisition, remote equipment monitoring, electronic log books, cloud content management, etc. In the current design, students can work effectively in teams from remote locations in order to run their experiments, collect data, and analyze equipment operation. These advanced automation approaches mimic many of the technologies that are rapidly being deployed in industry, so these experiences should provide excellent real-world preparation.





Graduate Program Updates

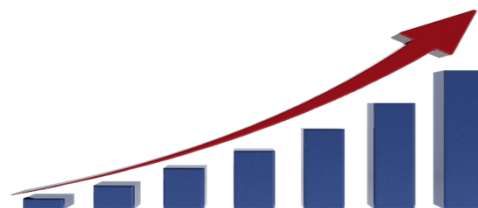
Over the last year, our graduate program and research activities have surpassed all of our expectations. External research awards have dramatically increased, and we have simultaneously accelerated our graduate student recruiting efforts in order to support all of these new research activities.



Prof. Yuping Bao, Graduate Program Coordinator

A Period of Unprecedented Research Growth

Research funding has been growing at a rapid pace, creating new opportunities and increasing the impact of our work. Over the last five years, the departmental research funding has been growing at an average pace of 36% per year.

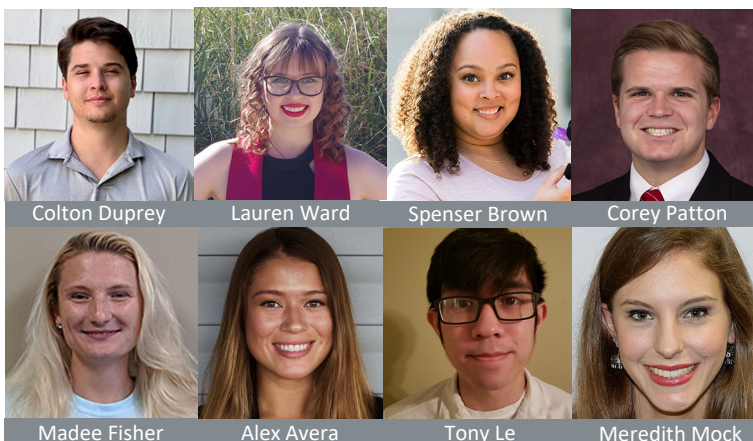


Graduate Student Recruitment and Program Expansion

With expanded faculty expertise, new facilities, and external financial support, our graduate program has become a top destination for pursuing advanced degrees. To provide some perspective, our graduate program has fluctuated around 20 students over the last 1-2 decades. Just this calendar year, we have added 29 *new* Ph.D. students into our program. The impact of this “step change” in our graduate program is expected to be profound, leading to more opportunities for industrial research partnerships, an increased rate of technology commercialization, and greater opportunities for current undergraduate students to become immersed in a culture of innovation.

Learning by Teaching: GAANN Fellows Enter the Classroom

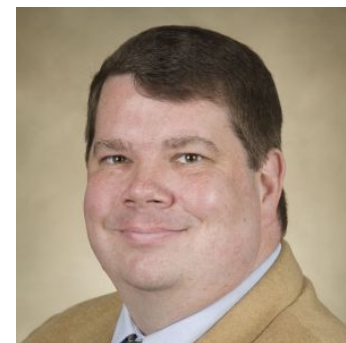
Several of our top Ph.D. students have recently been named GAANN Fellows (financially supported by the U. S. Department of Education). This is a focused training program that immerses doctoral students in more classroom and teaching activities, as well as additional professional development. Students help with test design, occasionally deliver guest lectures, and they are individually paired with a member of our Industrial Advisory Board for additional mentoring interactions throughout their studies.





Honors and Awards

We recruit some of the top student talent from across the nation into our department, reflected by exceptional GPAs, high test scores, and many National Merit Scholars. It is difficult to stand out in a department with so much raw talent, but it is important to recognize some of the individuals that have achieved particularly noteworthy accomplishments over the last year.



Prof. Christopher Brazel, Honors Program Coordinator

Annual Awards Ceremony Goes Virtual

Due to COVID precautions, we moved our ceremony online in 2021. We definitely missed interacting with our students in person, but an unexpected benefit was getting to see many friends and family members joining and viewing our virtual ceremony this year!

Undergraduate Students

American Institute of Chemists Senior Award: Zane Parkerson

AIChE H.F. Johnston Jr. Memorial Senior Award: Hannah Slater

Central Alabama Section of AIChE Outstanding Senior (Chilton) Award: Madison Knapp

Central Alabama Section of AIChE Outstanding Junior (Chilton) Award: Addie Thomsen

AIChE Donald F. Othmer Sophomore Academic Excellence Award: Brenner Kar

The Alexander Stanton Memorial Undergraduate Research Award: Nick Scudder

ChBE Outstanding Seniors: Charley Diemer, Nicholas Dulaney, Alivia Bergman, Greg Shank, Jeremy Server, Stephanie Parker

ChBE Outstanding Juniors: Thomas Schweiger, Garrett Wolfe, Gabe Allen, Nick Scudder, Troy Bearden, Nick Belt

ChBE Outstanding Sophomores: Catherine Stodola, Annamaria Bleyer, Ennis Lange, Abby Sandvos

AIChE Outstanding Member: Greg Shank

Omega Chi Epsilon Outstanding Member: Emma Sanders

Capstone Engineering Society Outstanding Senior: Emma Sanders

ECOB Outstanding Undergraduate Student, ChBE Nominee: Joshua Perch

Chemical and Biological Engineering Honors Graduates: Alivia Bergman, Emma Sanders, Elizabeth Connick, Hannah Slater, Hallie Hudson, Tina Tran, Lillie McCullough, Jordan Walker, Lauren Pan, John White, Joshua Perch

Graduate Students

American Institute of Chemists Graduate Award: Raghu Kondapaneni

Outstanding Graduate Student Teaching Assistants: Alexandra Avera, River Samad

Outstanding Graduate Student Service to the Department: Spenser Brown

ECOB Outstanding Graduate Student: Katie O'Harra

Faculty/Staff

ChBE Outstanding Staff Member: Genice Reedy

Outstanding Research Impact Awards: Jason Bara, Shreyas Rao

AIChE Outstanding Faculty Members: Steven Weinman, Evan Wujcik

Omega Chi Epsilon Outstanding Faculty: Ryan Summers



Research Highlights

The research culture in the department permeates so many aspects of our operation. Our faculty have been very successful at winning highly-competitive research grants, our graduate students immerse themselves in their laboratory research, and many of our undergraduate students are extremely active in our labs.

The Alabama Water Institute (AWI) has selected **Prof. Milad Esfahani** as one of three faculty at UA as inaugural fellows in the AWI Faculty Fellowship Program. As part of this Fellowship, Prof. Esfahani will continue working on the fabrication and functionalization of polymeric membranes for water treatment and desalination, treating fracking wastewater, and removal of emerging contaminants from water, and resource recovery.



Prof. Steven Weinman was recently awarded a \$2 million research grant from the National Science Foundation titled *EFRI E3P: End of Life Plastics as Starting Materials for Filtration and Barrier Applications*. This is a multi-investigator effort that will develop processes for upcycling waste plastic materials. It also includes several community outreach events, a river cleanup project, and summer student interns from local community colleges.

Prof. Shreyas Rao was recently awarded a \$792K grant from the American Cancer Society. The title of the project is *Engineered environments to examine drug resistance in cancer metastasis*. Metastatic breast cancer (also known as stage IV or advanced stage cancer) is the spread of breast cancer to other parts of the body -- most commonly to the bones, liver, lungs and/or brain.



Based on a previous sabbatical visit to Spain, **Prof. Jason Bara** was recently awarded a \$300K grant from the National Science Foundation to develop an eight-week international research experience for undergraduate students. The grant titled *Innovative Macromolecular & Polymer Research Experience in San Sebastián (IMPRESS)* is focused on polymer and macromolecule research, and it helps support underrepresented STEM students by providing them with international exposure at a top research institute. In addition to their research activities, students will participate in multiple professional development workshops and cultural excursions while in Spain.



Student Spotlights

Following the completion of her Ph.D. degree at UA, **Dr. Kathryn (Katie) O'Harra** has joined UA's Honors College as the Engineering Positive and Intentional Change (EPIC) Scholars Program and University Honors Program assistant professor. EPIC is an intentional, small, cohort-based Honors program for engineering and computer science students. This unique program emphasizes diversity, equity, inclusion and justice to develop students into leaders, advocates and agents of positive and intentional change in service to their profession, community and society. O'Harra recently developed and taught a new Honors College seminar course — *The Chemistry of Baking* — as you might guess, it was extremely popular!



Emma Sanders received the 2021 Capstone Engineering Society Outstanding Senior Award. She is a student in the Honors College with a premedical concentration and minors in biology and the Randall Research Scholars Program. In addition, she previously received the Chemical Engineering Outstanding Junior Award in 2020, and in the year prior, she was given the AIChE Donald F. Othmer Sophomore Academic Excellence Award. She is a member of Phi Kappa Phi and Golden Key International honor societies. She served as president of UA's Tau chapter of Omega Chi Epsilon, a chemical engineering honor society, and as a member of UA's chapter of the American Institute of Chemical Engineers. Sanders has been an Ambassador for the College of Engineering since 2018 and worked as vice president of communications in 2019 and vice president of recruitment in 2020.

Former UA soccer player, **Nealy Martin** (B.S. CHE 2020) recently signed with Racing Louisville FC. While at UA, she appeared in 76 collegiate soccer games. She was also formerly recognized in 2019 as the SEC Co-Scholar Athlete of the Year and was selected as a first-team CoSIDA Academic All-American. Chemical engineers really can do it all!



Elizabeth Bury and **John White** were selected to participate in NC State University's *Future Leaders in Chemical Engineering* Symposium. This is a National Award Symposium for undergraduate researchers and only 22 students from across the nation were selected to participate. Separately, **Elizabeth Bury** was also awarded a highly-competitive Graduate Research Fellowship from NSF. It provides an annual stipend of \$34,000 and a cost of education allowance of \$12,000 to the institution for three years.



Contact and Support

By providing exceptional learning opportunities and cutting-edge facilities, our students and faculty are able to excel on the UA campus and around the world.



What is everyone looking at? Alumni contributions provided a new viscometer for the Fluid Flow Operations course. Students work in teams to investigate the rheology of unknown substances to identify the mystery compound!



Chemical Engineering is a global discipline. Getting out of the classroom and into the world can educate our students in many different ways. Financial support from our alumni have exposed our students to unique chemical engineering operations at some of the top universities around the world. Beyond the technical training, students learn to navigate different cultural situations, build teamwork skills, and sharpen their communication skills.



Our past chemical engineering graduates regularly return to campus to share career advice with our graduating seniors, deliver guest lectures in our senior design classes, or find ways to financially contribute. Our alumni are a powerful reminder to us all about the types of innovative experiences, academic achievements, and research breakthroughs that can be achieved when we all work together. If you have a desire to give back or learn more about the department, we would love to talk with you.

*Roll Tide!
Heath Turner*

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