

CHEG Notes

News you can use from the Ralph E. Martin Department of Chemical Engineering at the University of Arkansas

From the Department Head

Greetings from Fayetteville! I sincerely hope this edition of *CHEG Notes: News You Can Use* finds you safe and healthy. Much time has passed since our last newsletter in Winter 2019, and the world has changed in some troubling ways. On the positive side, we have welcomed many new people to the department. Dearl “Peach” Peachee joined us as a Master Scientific Research Technician, running the machine shop that supports our undergraduate laboratories and graduate research projects. There were two new additions in the Membrane Center, with Kathy Kirk coming on board as the MAST Site Coordinator and Dr. Yuhe Cao joining as a research faculty member. Shaina Briggs now supports the main office, while our most recent addition, Emily Thompson, oversees departmental communications and supports the home office of the North American Membrane Society; we wish Peggy Anderson well as she leaves that role. We continued to grow the graduate research program and hit an all-time high of 51 peer-reviewed journal articles in 2019, nearly doubling the number from just three years ago. The department was again well-represented at the AIChE Annual Meeting in Orlando with dozens of papers presented, a graduate student recruiting booth, and a reception suite. We also added some new industry partners, Exide Technologies and Albemarle, for senior design projects.

The COVID-19 pandemic completely changed the landscape for us, as I’m sure it did for most of you, and I am proud of the way that that the faculty and students responded. We converted to 100% remote teaching within one week in mid-March 2020. The faculty quickly picked up the tools of online education like “Blackboard Collaborate Ultra” and “Zoom” and in many cases were able to do creative things that added value to their courses. The students persisted through obstacles like poor internet connections and distractions at home to finish strong, and we had some of the highest final grades and teaching evaluation scores in recent years. On the research side, critical efforts like those related to stopping the spread of the novel coronavirus continued under carefully managed conditions. Unfortunately, spring traditions like WERC and Chem-E-Car competitions, spring banquet, and the Arkansas Academy of Chemical Engineers annual induction ceremony were casualties of the pandemic. We are now cautiously reopening according to the campus plan and looking forward to a blended approach that will incorporate face-to-face interactions in fall 2020. We also continue to work together for a more inclusive environment for all students, staff, and faculty in the department. I continue to learn and practice the ways that I can personally combat racism, and I am fortunate to have many great people here who are committed to the same goal and have the patience to teach me.

All my best for a safe and healthy summer.
Dave Ford

Student News

Honoring Our Graduates



College of Engineering Spring 2019 Commencement





Due to the global COVID-19 pandemic, the spring 2020 graduation ceremony was cancelled. To honor our graduates, the Ralph E. Martin Department of Chemical Engineering created a series of videos to recognize the achievements of the class of 2020. Check out our [Facebook page](#) to see the videos.

CHEG undergraduate, Meagan Olsen, received the 2019-2020 Goldwater Scholar



The Goldwater Scholarship is an award for top students in mathematics, science, and engineering. The Goldwater Scholarship recognizes exceptional students who are asking important questions in their fields," said Chancellor Joe Steinmetz. Each recipient will receive a scholarship of up to \$7,500 from the Barry Goldwater Scholarship Foundation.

"I am truly honored to have been selected as a Goldwater Scholar," said Olsen. "It is inspiring to know that the work I have done in four years of research merits this level of recognition. This award will enable me to continue in my research career and explore new academic and professional opportunities. I am passionate about developing new technologies to detect and mitigate biological and chemical disasters, as well as encouraging women and other underrepresented groups in engineering and research. The Goldwater Scholarship provides both opportunities and encouragement towards these goals."

Olsen has published articles in both the 22nd and 24th *Proceedings of the International Conference on DNA Computing and Molecular Programming* and in *The Journal of Natural Computing*. She started work in Matthew Patitz's lab when she was in high school. Since her freshman year she has worked in Shannon Servoss' lab. They are currently working on a project to develop an electrochemical sensor for water contaminants using peptoid-functionalized gold nanoparticles, which is for publication as well. Olsen is a research assistant in the Department of Chemical Engineering and has served as a tutor; she has also been a notetaker through the Center for Educational Access. She is a member of the Society of Women Engineers, the American Institute of Chemical Engineers and Omega Chi Epsilon. She received the Arkansas Governor's Scholarship, the James and Susan von Greppe Honors College Fellowship, and the Student Undergraduate Research Fellowship (SURF).

"Meagan has a mind for research that is highly unusual at her stage in life," said Servoss, associate professor of chemical engineering. "She is thorough, creative, and hardworking, a unique skill set that will serve her well throughout her career. I am very excited for her and all that this award will lead to."

[Read the full story here.](#)

2019 CHEG alumnus, Alexander O'Brien, awarded 2019 National Science Foundation Graduate Research Fellowship and named 2018-2019 Outstanding Senior in Chemical Engineering



The highly competitive National Science Foundation Graduate Research Fellowship awards are given to students in science, technology, engineering and mathematics and recognize academic excellence and the potential contribution that each student will make to his or her field and to society at large.

Alex O'Brien performed undergraduate research with Keith Roper, former professor of chemical engineering. As a freshman, O'Brien interned with Argonne National Laboratory in Illinois. He has also studied renewable energies in Pamplona, Spain, and attended the American Chemical Society's Summer School for Nuclear

Radiochemistry at San Jose State University in 2017.

“For the last four years, I have performed research in chemical engineering,” said O’Brien. “After graduating, I will switch over to nuclear engineering and start a doctoral program at MIT. This award means a lot to me, not only because of the financial support that it will bring, but also because it means that I have convinced people that I can succeed, even in a new field. I am very grateful for all of the support from Dr. Roper and the rest of the university that has brought me to this point.”

“It’s been a pleasure having Alex assist in research in my NanoBioPhotonics Laboratory these past two years,” said Roper. “My optimism in the future of nuclear energy in the U.S. is increased knowing that Alex is pursuing a career in the field.”

[Read the full story here.](#)

CHEG undergraduate, Lauren Shepard, spent summer researching at Clemson University



Lauren Shepard gained international research experience over the summer in the Microanalytical Chemistry Lab at Clemson University in South Carolina. The research focused on analytical applications of nanomaterials and microfluidic devices. Shepard is a rising sophomore Chemical Engineering and Physics double major at the University of Arkansas. Her former research focused on the production of platinum decorated transition metal dichalcogenide nanosheets through more energy and cost-efficient methods to improve their catalytic ability in hydrogen evolution reaction. She worked under the supervision of Drs. Gomez, Colnaghi-Simionato, and Grespan-Bottoli.

CHEG undergraduate, Patricia Means, was a 2019 Gilman International Scholarship recipient and spent summer researching in Japan



The scholarship program aims to increase international experiences for U.S. students, so they will be better prepared to thrive in the increasingly global economy. The U.S. Department of State sponsors the program. Patricia will study Intensive Intermediate Japanese while abroad. This program will allow her to complete a year's worth of Japanese in one summer and allow her to complete professional level Japanese courses by graduation.

Undergraduate students on the 'Freeze Team' won 1st place in Task 4 at the WERC International Environmental Design Contest

First Place
Task 4

University of Arkansas
Fayetteville

2019
29th WERC Environmental
Design Contest

NM STATE Engineering New Mexico
Resource Network
engrnm.nmsu.edu

Undergraduate students on the 'CAFO Team' won 2nd place in Task 5 at the WERC International Environmental Design Contest



Second Place
Task 5

**University of Arkansas
Fayetteville**



2019
**29th WERC Environmental
Design Contest**

NM STATE Engineering New Mexico
Resource Network
engrnm.nmsu.edu

Undergraduate students Christina Trexler and Haley Knighten (CHEG) won 1st place for their short video at Planet Forward Storyfest 2019



A video plea for more women to lead efforts to curb climate change won national recognition for two University of Arkansas students: Haley Knighten, a chemical engineering junior from Hot Springs, and Christina Trexler, an honors computer science and math freshman and Bodenhamer Fellow from Springdale.

Their video, "[Environmental STEMInism](#)," won the "Fan Favorite" award in the Storyfest 2019 competition hosted by Planet Forward, an outreach project of the Center for Innovative Media at the George Washington University School of Media and Public Affairs.

The Planet Forward Storyfest Awards recognizes the best student-told stories illuminating environmental issues and solutions. Prizes are offered for best article, video, short video, podcast, multimedia essay, and fan favorite, which recognizes the entry that sparks the most engagement online across all social media platforms. More than 200 entries were submitted from across the U.S.

This year's prize winners embarked on a 10-day storytelling voyage through the Galápagos Islands with Lindblad Expeditions, National Geographic and Planet Forward.

[Read the full story here.](#)

Undergraduate students Juan Marin, Loc Huynh Aryana Mitchel, Elizabeth Gomez, Gage Agee, Sean Simkins, Vera Rodriguez, Ashley Cox, Kyle Davin, Kyle Williams, Brandon Howell, and Grekeem Cartwright won 3rd place for their poster at the CHEM-E-Car Competition



The trip to a regional chemical engineering competition was a success for students in the local chapter of the American Institute of Chemical Engineering.

About a dozen undergraduates traveled to Rolla, Missouri, for the three-day AIChE conference and competition, and returned with the group's first student prize. The competition took place April 12-14 at the Missouri University of Science and Technology. Student teams from universities across the region gathered to for the event.

Students competed in a variety of events, including a poster competition, paper competition and the Chem E Car Competition — a multi-part event in which students build a small vehicle that starts and stops using only chemical reactions. The vehicle must travel a pre-determined distance while carrying a specified weight determined only an hour before the contest begins.

The ChemE car team members are Aryana Mitchell, Ashley Cox, Brandon Howell, Elizabeth Gomez, Gage Agee, Juan Marin, Grekeem Cartwright, Kyle Davin, Kyle Williams, Loc Huynh, Sean Simkins and Vera Rodriguez.

The University of Arkansas team took third place in the Chem E Car poster competition, which is a chance for students to present their research related to the car competition.

[Read the full story here.](#)

Due to the COVID-19 pandemic, the 2020 CHEM-E Car competition was cancelled.

Undergraduate student, Sandrina DePaz, participated in Spring 2019 RAPID Student Intern Program



During the spring 2019 semester, Sandrina DePaz conducted research on Electrospun Nanofiber Membranes for Hydraulic Fracturing Waste Water Remediation via Membrane Distillation. This project is supervised by co-PI's Dr. Ranil Wickramasinghe and Dr. Jorge Almodovar, and supported by AIChE's Rapid Advancement in Process Intensification Deployment (RAPID) Manufacturing Institute, in part by the Department of Energy. Subsequent to her project appointment, she was nominated by her supervisors to the Spring 2019 RAPID Student Intern Program and was selected as one of seven interns. This virtual internship program worked in conjunction with the hands-on research, enhancing DePaz's knowledge on process design, scalability, process intensification principles, applications, and related equipment through courses on AIChE Academy. "The weekly meetings and webinars allowed me to enhance my leadership, project management, and professional etiquette skills, plus network with guest speakers from industry," said DePaz. "Moreover," she said, "my colleagues and I engaged in specific topic discussions related to the weekly courses, as well as triumphs and tribulations in the lab."

The intern program ended on April 12th, when DePaz presented her technical work and program takeaways to a panel of RAPID members including RAPID's CEO, personnel from the Lubrizol Corporation, Texas A&M University, and Stony Brook University. Thereafter, she received a certificate of completion and helpful feedback on her presentation. "Overall, it was a wonderful experience and I'm glad to be a part of the growing RAPID Intern community where they share job opportunities, networking events, and intriguing discussions," said DePaz. On April 13th, she also had the opportunity to present a research poster at the Regional Conference in Rolla, Missouri. This was her third membrane research project, of which all are viable for wastewater treatment, petrochemical, and biomedical applications. DePaz's first co-authored research paper entitled "Poly (ionic liquid) augmented membranes for π electron induced separation/fractionation of aromatics" was published earlier this year in the Journal of Membrane Science. She was also selected as one of the first recipients of the North American Membrane Society's Undergraduate Student Travel Award and attended their 28th annual meeting held in Pittsburgh this past May. "The NAMS conference opened my eyes to the vast field of membrane science and technology," said DePaz. Currently, she is a Pilot Scale Development co-op at Biogen in Research Triangle Park, North Carolina. DePaz said she is "thankful for my research mentors, professors, and friends who have all helped make this possible."

Undergraduate student, Vanessa Weidling, held the Bodenhamer Fellowship in 2018-2019



Undergraduate student Vanessa Weidling continued to hold the Bodenhamer Fellowship in 2018-2019. She first received it as an entering freshman in 2015. Bodenhamer Fellowship, which offers \$70,000 in financial support and a strong sense of community to exceptional students with leadership potential. In addition to covering the normal costs of attending the university, the fellowship may be used for study abroad, attendance at professional and educational conferences, research, and special equipment that a fellow may need.

The Bodenhamer Foundation, acting through its trustee Lee Bodenhamer (B.S.B.A. 1957, M.B.A. 1961) established the Bodenhamer Fellowships at the university in 1998. Students must score 32 on the ACT or 1400 on the SAT and have a 3.8 high school grade point average to be eligible to apply. Extracurricular activities, community service and evidence of intellectual curiosity and creativity are also considered in the selection process.

2019 CHEG alumnus and now Postdoc, Imann Mosleh, and Researchers Develop New Method for Making Inorganic Catalytic Nanoparticles



Chemical engineering researchers at the University of Arkansas have developed a method to synthesize inorganic nanoparticles using inhomogeneous, or impure, biomaterials, a process that could decrease the cost of pharmaceutical production.

The new approach circumvents the need for expensive peptide purification from protein sources and thus challenges the conventional method for producing bio-templated nanoparticles. Used for making molecules for pharmaceuticals, the biological nanoparticles also have catalytic properties for potential use in the production of ammonia and other industrial chemicals.

Mosleh conducted the research as his dissertation project for a doctorate in chemical engineering. His advisor was Bob Beitle, professor of chemical engineering and associate vice chancellor for research and innovation. The study was published in *Materials Letters* as a "featured letter."

[Read the full story here.](#)

Departmental, Faculty, and Staff News

College of Engineering Mourns Passing of Jim Turpin



The College of Engineering is saddened to announce the passing of Jim Turpin, a University of Arkansas alumnus and longtime member of the chemical engineering faculty. He died Aug. 15, 2019.

Turpin received his B.S and M.S. degrees in chemical engineering from the University of Arkansas in 1960 and 1961, respectively, and his Ph.D. from the University of Oklahoma in 1966. He married Joyce in 1963, and upon his graduation, they made their home in Fayetteville where Jim taught chemical engineering at the University of Arkansas until his retirement in 2009.

During his distinguished career, he was the recipient of multiple teaching awards including the UA Alumni Association Outstanding Teaching Award in 1982, the Catalyst National Award for Excellence in Teaching in 1991, the Carnegie Foundation Arkansas Professor of the Year in 1996, and the College of Engineering Outstanding Service to Students Award in 2003. He was also a founding member of the UA Teaching Academy and a co-director of the Wally Cordes Teaching and Faculty Support Center.

More importantly, he made it his goal to personally know each of his students, and in doing so encouraged, mentored and profoundly impacted hundreds if not thousands of young lives.

Neil Schmitt, dean emeritus of the College of Engineering, praised Turpin's contributions to the college.

"Dr. Turpin was dedicated and consistent," he said. "He was dedicated to being an excellent professor and student mentor. He consistently achieved those goals throughout his many years in the College of Engineering. As a teacher, he was a role model for new faculty. He was very well respected, not only within the university community, but nationally among his chemical engineering peers."

Doing Our Part: Helping Combat the Global COVID-19 Pandemic

In response to the global COVID-19 pandemic, all classes at the UofA went completely virtual. CHEG professors and students dealt with poor internet connections and technology issues and got innovative with virtual classes. Despite these obstacles, the Spring 2020 semester had some of the highest grades and teacher evaluations in recent years.

Critical research, like finding ways to battle the novel coronavirus, continued under carefully managed conditions. Some of these efforts are highlighted in the stories below.

This summer, the CHEG department has measures to ensure the health and safety of its students, faculty and staff during the fall semester. Office spaces have been rearranged to promote social distancing and all faculty and staff have been given masks to wear in communal spaces. We will continue to adjust and make improvements as we work closely with UofA and state officials to create a healthy campus community.

Researchers Develop Long-Lasting Disinfecting Spray for Surfaces



Researchers at the University of Arkansas and the University of Arkansas for Medical Sciences have developed a long-lasting spray that disinfects surfaces for extended periods, even in heavy use, and is less likely to transmit infectious diseases.

The spray has been shown to be an effective antibacterial agent and is being explored for antiviral properties. The spray also lasts longer than standard cleaning solutions — researchers have demonstrated it can withstand up to 50 touches on a metal surface before it needs to be reapplied.

The spray was developed by a team that includes professor Jamie Hestekin and doctoral student John Moore, both in chemical engineering at the U of A, as well as professor Peter Crooks and postdoctoral fellow Soma Shekar Dachavaram, both from UAMS. The original development of this work came from an NSF Epscor Track 1 project led by Min Zou, professor of mechanical engineering, and Steve Stanley from the Arkansas Economic Development Commission.

[Read Full Story](#)

Leadership Transition in the Office of Sponsored Programs



Daniel Sui, vice chancellor for research and innovation, has appointed Bob Beitle, professor of chemical engineering and associate vice chancellor for research and innovation, to serve as interim director for the office of sponsored programs. The transition will take effect on Friday, May 29. The office for research and innovation will be conducting a national search for a qualified candidate to fill the position.

The current OSP director and assistant vice chancellor for research and innovation, Jennifer Taylor, has recently accepted the position of [vice president for research at Tennessee Tech University](#). She will assume this new role in August.

College of Engineering recognized CHEG faculty, Greg Thoma and Jamie Hestekin, for their excellence in teaching, research, service and collaboration



College of Engineering faculty and staff gathered May 7 to celebrate faculty excellence in teaching, research, service and collaboration.

Greg Thoma, professor and Bates Teaching Endowed Professorship in Chemical Engineering from the Ralph E. Martin Department of Chemical Engineering, earned the John L Imhoff Award for Research. Thoma was recognized for his standing as an international expert in the field of agricultural lifecycle assessment. He serves on two United Nations Technical Advisory Groups and has been invited to present to audiences around the world, including a speech to the World Bank about fruit and vegetable sustainability that was simulcast to 15 countries.

Jamie Hestekin, Professor of Chemical Engineering and holder of the Ralph E. Martin Professorship in Chemical Engineering, earned the College's Collaborative Faculty Research Award. Hestekin was chosen for both the scope and success of his interdisciplinary research. He has earned nearly \$3 million in collaborative grant funding since 2014 and has published 10 collaborative papers that span work in five departments.

Lauren Greenlee Helped Find Cost-Effective Method for Hydrogen Fuel Production Process



Nanoparticles composed of nickel and iron have been found to be more effective and efficient than other, more costly materials when used as catalysts in the production of hydrogen fuel through water electrolysis.

The discovery was made by University of Arkansas researchers Jingyi Chen, associate professor of physical chemistry, and **Lauren Greenlee**, associate professor of chemical engineering, as well as colleagues from Brookhaven National Lab and Argonne National Lab.

The researchers demonstrated that using nanocatalysts composed of nickel and iron increases the efficiency of water electrolysis, the process of breaking water atoms apart to produce hydrogen and oxygen and combining them with electrons to create hydrogen gas.

[Read the full story here.](#)

MOU signed with Kobe University at 2019 Advanced Membranes and Membrane Based Processes Symposium



The Ralph E. Martin Department of Chemical, in collaboration with The Membrane Science, Engineering and Technology (MAST) Center Engineering at the University of Arkansas and the Japanese Society for the Promotion of Sciences (JSPS) held the Advanced Membranes and Membrane Based Processes Symposium at the historic Inn at Carnall Hall. Because of the North American Membrane Society (NAMS) Annual Meeting held in Pittsburgh, May 11-15, 2019 we were able to invite many membrane science and technology experts from around the world, such as Taiwan, South Africa, Japan, China, and Kazakhstan, to the University of Arkansas for a workshop on May 16 directly after the NAMS meeting. In addition to the introduction to JSPS, given by Ms. Yuke Abe, eleven research talks were given by both visiting guests and UoA faculty. Over 15 posters were also displayed for the poster session.



Dr. Hideto Matsuyama, a representative from Kobe University, and UoA College for Engineering Associate Dean for Research and Professor Heather Nachtmann signed the MOU between UA's College of Engineering and Center for Membrane and Film Technology, Graduate School of Engineering, Kobe University, Japan. The primary goal of the MOU is to formalize an agreement of cooperation and friendship allowing for possibilities in the following areas:

1. Visiting students: PhD students enrolled at Kobe will have the possibility to conduct some of their research at UA. Such short-term visits will be agreed to by the two faculty who wish to collaborate. Similarly, PhD students enrolled at UA could conduct some of their research at Kobe. Such short-term visits will be agreed to by the two faculty who wish to collaborate.
2. Visiting scholars: It is anticipated that through this agreement postdoctoral researchers at UA and Kobe will have the opportunity to visit and conduct research at each other's institution.
3. Faculty: Through this agreement, faculty from UA and Kobe will have the opportunity to spend short term research visits, sabbaticals etc. at each other's institution.
4. Workshops: UA and Kobe will organize occasional workshops in order to promote research collaborations. These workshops could be held at Kobe or UA.

The signing ceremony was the culmination of months of time and effort spearheaded by Dr. Ranil Wickramasinghe, Professor in Chemical Engineering, and Dr. David Ford, Professor and Department Head of the Ralph E. Martin Department of Chemical Engineering.

Academy News

Four Join Arkansas Academy of Chemical Engineers



The 2019 inductees were:

- Matthew Loach, B.S.Ch.E.'96
- Cameron Gross, B.S.Ch.E.'97, M.S.Ch.E. 2000
- Vincent Gaul, B.S.Ch.E.'92
- Daniel Smith, B.S.Ch.E.'85

The Arkansas Academy of Chemical Engineers was founded in 2005 and functions as a nonprofit organization solely for the purpose of recognizing outstanding chemical engineers and providing support for the University of Arkansas Ralph E. Martin Department of Chemical Engineering.

The process for this year's induction began last summer, with nominations from current members of the Academy. Each inductee "shall hold a degree in Chemical Engineering from the University of Arkansas at Fayetteville granted at least 20 years prior to election" and is recognized for outstanding contributions to the field of chemical engineering, according to the Academy.

[Read the full story here.](#)

Due to the COVID-19 pandemic, the 2020 Arkansas Academy of Chemical Engineers meeting was cancelled.

Giving

The pace of change in the field of chemical engineering requires investment on a continual basis to provide for exceptional professors and students, laboratory space, and state-of-the-art equipment. Private support plays a vital role in the future of the Ralph E. Martin Department of Chemical Engineering and provides necessary funding that allows us to strive for excellence in our students, faculty and facilities.

You can make outright gifts to the department in the form of cash, securities, corporate matching gifts, real estate and personal property. Gifts of all kinds may be designated for immediate or current use or as a long-term investment through an endowment. To learn more, visit the College of Engineering [Ways to Give](#).

If you are ready to donate now, [click here](#).

Submit a story

If you have a story or information to share about CHEG faculty, alumni, or student successes, please email Emily Thompson: eet002@uark.edu.