



Letter from the Chair

Dear Alumni, Students, Friends and Families,

Our faculty had another near-record year of research activities, with major grants newly awarded from the Department of Energy and the National Science Foundation. As with the rest of the University of Idaho, so goes the College of Engineering's enrollment. For the first time this decade, enrollment was down across the college, and our Department unsurprisingly matched that trend.

Despite it all, our students remain strong and hardworking. We affirm that size matters not in the pursuit of quality educational experiences.

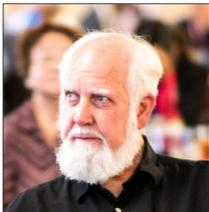
With that goal, we focus this year on two activities to improve our department, even in the face of continuing budget cuts and other university-level financial challenges that include bringing faculty and staff salaries closer to market-based targets over the next several years. Thanks to the generous lead gift from LifeLast, a company led by our alumni Jeff Buratto, Mark Burrato and Kit Harper, we have launched our first full-room renovation plan in BEL this millennium—a teaching lab and design space remodel. Professors Moberly and Bernards will oversee the lab upgrade in honor of Dr. David C. Drown's many years of service in excellence. Secondly, we are identifying alumni class chairs to help us complete fundraising for the Lou Edwards Endowed Chair. We have renewed focus on this effort and raised over \$30k from generous donors in the past six months. With the help of class chairs, we hope to build more momentum and support to fully fund this endowed faculty position in memory of Lou, who was also a department icon for many decades.

Thank you for making the time to be a part of our support system and staying informed of our activities and achievements this past year!

-Eric Aston, Professor & Chair

Please update your contact information with us at che@uidaho.edu or mse@uidaho.edu.

Lab & Senior Design Space In honor of Dr. David Drown



Dr. Drown provided the department with 30+ years of teaching excellence. At the end of the spring 2018 semester, he retired after two years of phased retirement.

Dave at the 2018 WERC competition, NMSU.

Hands-on experience is a signature element of a U of I Engineering education, and renovating the "David Drown Design Lab" (working title) will provide users with flexible workspace that is fundamental to the work of undergraduates, graduates and faculty alike.

Undergraduate design projects collide with the work of graduate researchers, and co-working space is extremely limited. Faculty in Chemical & Materials Engineering must share their research labs and shared spaces with undergraduate design teams in efforts to have enough space.

Impact of Lab Renovation:

- **Adaptability**

The current lab space was built to singular purpose. Renovating the lab will provide researchers, graduate students and undergraduates with a space that is flexible for coursework, teaching, design projects and more.

Shifting undergraduate senior design teams to this renovated lab space will greatly benefit graduate students, (including teaching assistants and research assistants) as dedicated research laboratories will be open for their use.

- **Modernization**

Built in the 1960s, the lab's outdated benching lacks lighting and electrical necessary for multiuse work.



Lab improvements will allow all of the senior design teams to work in the same area, bolstering opportunity for increased collaboration and collective idea generation.

- **Increased safety**

Renovating the lab space with improved lighting and ventilation will make the lab a safer place to work and learn.

New modular cabinetry and renovation will provide a new space for equipment to be locked away when not in use.

Budget:

The project budget is still in development, but roughly estimated to be \$80,000 to 100,000. The renovation of the lab space will focus on mobile unit benching, complete with upgraded lighting and electrical, as well as modular cabinetry for storage of equipment and supplies.

For more information, contact:

Bobbi Hughes, Executive Director of Advancement,
College of Engineering
Email: bhughes@uidaho.edu

AICHe, ASM Paper Night & WERC

AICHe PNW Regional Jeopardy at MSU, Bozeman, MT—2018

The U of I ChE dynamic duo took on the older and larger teams in a cut-throat Regional ChE Jeopardy competition and emerged victorious, earning an invite to the national competition in October! Note that they played as a team of only two and knocked off teams of four even when faced with subjects they haven't had yet (control and design).



L-R: John "Jack" McAlpine and Chris Kingsley

Student Paper Night of the ASM Inland Empire Chapter - 2018

- *Characterization of Nickel Based Alloy 718 Processed via Electron Beam Melting*, Jack Armstrong
- *Bismuth Sesquioxide Based Supercapacitors*, Bethany Kersten
- *Mg-RE alloy ZE10A as Anode for Mg-Air Battery Applications*, James Zillinger

Our three student speakers took the team trophy back for best aggregate performances at the ASM Inland Empire Student Paper Night, held at WSU. Bethany Kersten, ChE, took second place. Kersten, James Zillinger, MSE, and Jack Armstrong, MSE, all took home cash awards for their work with Drs. Raja and Charit.



L-R: Bethany Kersten, James Zillinger, MSE, and Jack Armstrong, MSE, all took home cash awards for their work with Drs. Raja and Charit.

L-R: Bethany Kersten, James Zillinger, and Jack Armstrong

WERC Task 2—Sulfate Removal from Mine Impacted Waters.

Nathan Myers, Nigel Hebbeln, Lillian Malloy, Abdullah Alnafisah and Sam Rasmussen.

The GYPSOS design group investigated an Ettringite precipitation process to treat mine water runoff contaminated with sulfate at concentrations as high as 1,500 mg/L. The process was engineered to reduce sulfate concentration to below the 250 mg/L EPA secondary standards requirement. A continuous 20 ml/min process was demonstrated and the economics of a 2,000 gpm inlet flow rate installation were analyzed.

Judges Choice for the Best Bench Design and Performance



L-R: Nathan Myers, Nigel Hebbeln, Lillian Malloy, Abdullah Alnafisah, Dr. David Drown. Not pictured: Sam Rasmussen

Outstanding Seniors 2017-18



Aaron Hope
ChE



Margaret Fitzgerald
MSE



Congratulations to Ezekiel Adekanmbi (left) on winning the 3MT competition both at UI (2nd place) and statewide (1st place- held Feb. 12, 2019) ! Soumya Srivastava Ph.D., P.E.

<https://www.uidaho.edu/3MT>

Professor Batric Pesic continues to practice the concept he pioneered in 2008 of placing selected undergraduate students in his lab for training and research toward their advanced degree.

The concept adds only one graduate level course into a student's BS curriculum per semester, starting in their sophomore year. By the time their degree requirements are completed, the student meets almost half of the graduate-level coursework required toward a Master of Science.

Therefore in 2018, one of his students was ready for the master's graduation only one semester after receiving the BS degree, while the other student required two semesters (delay due to opted internship with the Navy). Their research topic was electrodeposition of La and Nd from ionic liquid electrolytes.

On another note, Professor Pesic has extended his NEUP molten salt project for another year. Last summer, he attended the European Chemistry Conference in Rome, Italy, and will go back to



Left: Professor Pesic

Europe to another conference this summer. Also, this year, he is expecting another visiting professor from China to conduct the research in metallurgy of titanium.

Chlorinated organic solvents are one of the most common pollutants in groundwater in the United States. Pollution of water supplies by these compounds represent a significant risk to public health, as several are known carcinogens that can result in exposure through drinking water. While engineers have developed treatment technology that uses the ability of microbes to consume these pollutants as food, the process can result in the production of harmful acids that eventually halts activity.

Drs. Waynant (Chemistry), Roll, and Moberly received a ~\$330k National Science Foundation award (NSF#1805358, September 1, 2018-August 31, 2021) to construct polymer "armor" that will shield these beneficial microbes in protective capsules called biobeads. These capsules will allow the beneficial microbes to continue to consume chlorinated organic solvents while producing clean water. These biobeads can be used with different microbes to address many environmental problems, with applications in many other fields including drug delivery, pharmaceuticals, food processing, and wastewater treatment. If successful, this project will help protect the Nation's water security and ensure safe drinking water availability to the U.S. public.

They're off to a good start having presented their research at national meetings (ACS and AICHE) and enough data for a scientific manuscript (currently in preparation for submission). At the 2018 American Institute of Chemical Engineers Annual Student Conference, Thomas Christensen II, a summer student from the University of Wyoming under Dr. James Moberly, presented his research on "Measuring Diffusion of Trichloroethylene Breakdown Products in Polyvinylalginate".



Thomas Christensen II



Kris Waynant



Mark Roll



James Moberly

Thomas received a third-place recognition by the judging panel who evaluated the >350 undergraduate posters for his research efforts and presentations skills.

AICHE Activities Expand—The department’s American Institute of Chemical Engineers (AIChE) student chapter activities have successfully expanded over the past year, thanks in large part to the outgoing group of chapter officers. This effort began in April 2018, with the UI chapter continuing their participation in the Pacific Northwest (PNW) AIChE Regional Conference. What was new, was the group of UI conference attendees participating in the chemical engineering Jeopardy Competition for the first time in recent history. The undersized UI team composed of Christopher Kingsley and Jack McAlpine, both juniors at the time, took on teams of four from the other regional Universities and still placed first in the region, earning the right to compete at the National AIChE Jeopardy Competition.

This past October, Christopher and Jack recruited a few additional team members (Jamie Tatko and Jackie Martinez-Alvarez) and brought our UI team to the National competition. This competition was held during the 2018 National AIChE Undergraduate Student Conference. The team made it through the first round, defeating one of the international participants, Universidad Nacional de Colombia, Sede Medellin, but ultimately they were eliminated in the semi-final round by Louisiana State University. However, the team has tasted success and the next group is already preparing to compete again in the upcoming PNW Regional Conference, which will be hosted by UI this coming April 2019.

The student activities at the national meeting did not stop at the Jeopardy competition. This year, two of the students also participated in the Undergraduate Research Poster Competition, presenting their work among >350 other undergraduates from around the world. Christopher Kingsley presented his poster entitled “Coupling UV-Vis and NMR Titration Models to Determine the Association Constants of Arylazothioformamide Ligands with Various Cu(I) Salts”, which was based on his research efforts under the mentorship of Dr. James Moberly. Jackie Martinez-Alvarez presented her poster “Implantable Air-Brushed Nonfouling Microfiber Mats for Drug Delivery”, which was based on her research with Dr. Matthew Bernards. While neither student was an award recipient, both did a wonderful job presenting their research progress.



L to R: Chris Kingsley, Jack McAlpine, Jackie Martinez-Alvarez, Jamie Tatko,

THINGS YOU MAY NOT KNOW ABOUT ChE AT IDAHO

We all know the great relations that have always existed between faculty and students in the chemical engineering program, but you may not know some of the unique history behind this tradition. As one of the program’s elder chroniclers (dated to 1966), I agreed to share my recollections. First of all, this collection of anecdotes will not be about the chronological events of the program’s history, but about some of the events that shaped the character of the program and led to its tradition. - Bill Thomson (PhD, ChE, ‘69)

Women in Engineering In the early 1970s, the country went into recession. U of I enrollments plummeted, which really hurt our small ChE department. Bob Furgason, then department chair, came up with a great idea to bolster ChE enrollments: Recruit women. Back then, women were a tiny fraction of engineering majors. Bob Furgason, Wayne Hager (former professor and department chair) and Bill Thomson began a program they named “Women IN Engineering” (WIE). They solicited funding from companies and sought to bring women to campus for two summer weeks between their junior and senior high school years, all expenses paid. They spent one week learning computer programming (the “JETS” program) and one week in the department being introduced to chemical engineering by Wayne. It was fabulously successful, recruiting the very best high school students in Idaho. Forty years later and counting, ChE continues to attract some of the best women students!

Student research and highlights

Ezekiel Adekanmbi, doctoral candidate working for Dr. Srivastava, was selected to attend Future Faculty Development Program at Virginia Tech in November. The program is an exciting and rewarding two-day program for doctoral candidates and post-doctoral scholars traditionally underrepresented in their fields who are interested in entering academic careers.

Engineering EXPO 2018 award winners:

Booth Award Winner:

Using NIR Spectroscopy to Control Coffee Roasts by ChE students: Saad Alanzi, Amanda Murdock, Logan Peterson, Austin Porter

Technical Presentation Award Winners:

Gypsos Sulfate Removal from Mine Impacted Waters (WERC team).

Increasing Polystyrene Recycling with Small Scale Depolymerization Reactors by ChE students: Hussain Aljasim, Maichen Carnes, Preston Goodall

Defense titles:

Ian Ehrsam, M.S. M.S.E.—*Electrochemistry of Lanthanum in Room Temperature Ionic Liquid EMIM-DCA*

Sean M. Instasi, M.S. M.S.E.—*Solid-State Joining of Molybdenum Based Materials via Pressure Resistance Welding*

Todd T. Nichols, Ph.D. Ch.E.—*Predicting Vapor-Liquid Equilibrium Over the Entire Two-Phase Region Equation with Only Limited VLE Data* (Idaho Falls)

Martin R. Taylor, M.S. M.S.E.—*Creep and Microstructural Characterization of Advanced Austenitic Stainless Steel Alloy 709*

Samuel R. Wolfe, M.S. Ch.E.—*An Analytical Spectroscopic Method for the Reliable Determination of Binding Constants and Fluorescent Rare Earth Element Detection*

Nathan A. Yergenson, M.S. Ch.E.—*Coffee Roasting Process Monitoring with In Situ NIR Spectroscopy*

Expected to graduate Spring or Summer 2019

B. S. Ch.E.

Abdullah Aldousari
Brian M. Beatty
Jadyn K. Behm
Brandan J. A. Brewer
Andrea M. Condie
Bethany R. Kersten
Christopher D. Kinglsey
John H. Lyons
John “Jack” M. McAlpine
Matthew J. Morrow
Kasey R. Peach
Jarod M. Perko
Sam J. Rasmussen
Alexandria A. Schlotterbeck
Simon G. Shindler

Jamie C. Tatko
Carter L. West
B.S. M.S.E.
Jack C. Armstrong
Chancler L. Vander Woude
Kendra N. Wallace
M.S. Ch.E.
Emily M. Mariner
Nathan A. Yergenson
M.S. M.S.E.
Isaac I. Curtis
Ph.D. Ch.E.
Ezekiel O. Adekanmbi
Ph.D. M.S.E.
Nathan Jerred (Idaho Falls)

The “Gonzaga” Connection and the First Borah Symposium

Gonzaga University had a chemical engineering program that closed in 1968 due to low enrollment and expense. Their seniors transferred to UI ChE and had immediate influence on the department. At that time, Congress was in a very heated debate over funding a program to develop an antiballistic missile (ABM) with a very close Senate vote. A lot of effort was going into one uncommitted Senator Len Jordan of Idaho. ChE Professor Irving Dunn learned that long-time Idaho Senator Borah had left an unused bequest to UI to sponsor symposia connected with peace and war. Dr. Dunn got permission to use the funds, and together with the Chemical Engineering senior class, they put on the very first Borah Symposium—three days, heavily attended, dealing with the pros and cons of the ABM proposal. The seniors couldn’t believe that everyone they invited come, including the Secretary of the Army, Texas Senator, and a number of military intelligence agencies.

I University of Idaho

Department of Chemical
and Materials Engineering

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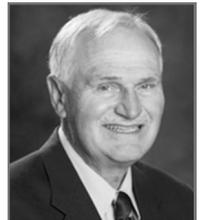


2018 Academy of Engineers Inductees



Timothy D. Arnold

B.S., Mining Engineering, University of Idaho, 1982
M.B.A., Northwestern



Dennis Keiser

B.S., Metallurgical Engineering, University of Idaho, 1966
M.S., Metallurgical Engineering, University of Idaho, 1970
Ph.D., Mining Engineering/Metallurgy, University of Idaho, 1975

<https://www.uidaho.edu/engr/events/academy-of-engineers/2018/timothy-arnold>

<https://www.uidaho.edu/engr/events/academy-of-engineers/2018/dennis-keiser>

The Old Kirtley and New Buchanan Labs Before BEL (1968), the ChE labs and all research was housed in the Kirtley Lab, inside the Mechanical Engineering building (Gauss). To say that situation was dire is an understatement. BEL construction began in 1967 and Bob Furgason (ChE Chair) set about designing ChE space with the faculty for the new space. To say that the Dept was proud of their new home is also an understatement. The graduate students were an innovative bunch, and they saw BEL as still another opportunity – to brew beer. One of the new labs designed for high-pressure work lay vacant. It was a perfect space for biochemical experiments, such as fermentation. At one point, Prof. Furgason showed some visitors the new facilities, including the high-pressure lab, to discover very large glass carboys fermenting away, complete with data logs. To say that he was not pleased is yet another understatement. Bill Thomson's take on it was that it demonstrated the most complete data collection of any experiment being conducted in all the labs.

A very special thank you to all of you who have donated time, money, energy, collaborations, gifts in kind and much more. We couldn't do all that we do, without your support! Please accept our sincere thanks.

Thank you!