



Letter from the Chair

Dear Alumni, Students, Friends and Families,
Many exciting things are in the works, and many of you are an integral part of those efforts. I want to thank all of you who have contributed toward the full funding for the Lou Edwards endowed chair for Chemical Engineering. We have made some excellent progress this Fall with the class chairs and matching challenges with a strong finish in sight for Spring. Please share in our progress at [Lou Edwards Endowed Chair for Chemical Engineering](#)

Thanks to the generous lead gift from LifeLast Inc. (alumni Jeff Buratto, Mark Buratto and Kit Harper), we began the clean-up and clear-out stage of the senior lab design space (BEL 347) this summer and will continue demolition, repairs, and upgrades again next summer, when this academic year's course activities have ceased.

Enjoy reading the highlights of our student and faculty teaching and research accomplishments, and I hope you had a safe and wonderful holiday season! Warm regards from Moscow, ID!

-Eric Aston, Professor & Chair

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

Congratulations to Indrajit Charit on promotion to Full Professor!

Also to Matthew Bernards and James Moberly on promotions to Associate Professor with tenure! Professor Emeritus Dean Edwards has been named a 2019 National Academy of Inventors (NAI) Fellow <https://www.uidaho.edu/news/news-articles/kudos/2019-fall/120619-deanedwards>

Senior Lab Design Space Remodel In honor of David C. Drown, Professor Emeritus

As a core function of our department, providing excellence in the undergraduate student education relies heavily on both dedicated and shared lab spaces and instrumentation. The net advantage of setting aside at least one laboratory in the department as a space for senior student work focused on the capstone experiences of their baccalaureate is a boost to that excellence.

Adaptability: One of the key lab features in mind for the renovated space that is flexible for coursework, teaching, design projects and more. A dedicated space for undergraduate design teams also directly benefits research activities by relieving the strain on graduate student lab spaces that are currently shared.

Modernization: Lab improvements from the 1960s design will be more suited for 21st-century student experiments, design team work, and process or product testing.

Increased safety: Improved lighting, ventilation and room integrity will make the lab a safer place to work and learn.

New modular cabinetry and organized work-stations will provide effective space for new equipment and instrumentation to be secured and maintained for prolonged useful lifecycles.

Budget: Though project scope and budget will evolve as staging times and funding become available. We estimate the space renovations to be no more than \$80,000 to 100,000, and cost-saving design features and product use will allow the supplement to go for equipment and instrument purchases on a station-by-station basis. These may also be guided by donors' inclinations for particular purposes and industry partner or other funding-agency opportunities to make synergistic decisions: viz., more bang for the buck!



Photos: BEL 347, Original sinks, outside of the door which many of you probably remember, and lab fixtures.

For more information, contact:

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

Chemical Engineering Alumnus seminar



On September 27th, Dr. Shrikant V. Joshi gave a department seminar on “Thermal spraying with liquid feedstock: An exciting pathway to realize new generation functional coatings,” partly sponsored by the Tipton Fund. Dr. Joshi is currently a professor at the Department of Engineering Science at University West, Sweden. Because of his visit, we hope to maintain and further enhance fruitful research collaborations. Dr. Joshi received his PhD in ChE from UI in 1989. We were happy to have our alumnus in our midst and learn from him about modern manufacturing research ideas. His past work has attempted to bridge basic research, technology development and transfer for industrial implementation. His current areas of research are solution and solution-powder hybrid thermal spraying and additive manufacturing.

Dr. Indrajit Charit secures IGEM grant Additive Manufacturing of 3D Printed Parts

Indrajit secured an Idaho Global Entrepreneurial Mission (IGEM) grant from the Idaho Department of Commerce for, “Optimizing Manufacturing of High Value Components Using Direct Metal Laser Melting Techniques under Reduced Atmospheric Conditions for Industrial Sectors.” (May 2019–December 2020). Indrajit will collaborate with UI faculty Krishnan Raja, (Materials Science and Engineering), Michael Maughan, (Mechanical Engineering) and Catherine Cantley, (Food Science); Brian Jaques, Boise State University, and Michael McMurtrey, Idaho National Laboratory, Premier Technology Inc. (PTI) of Blackfoot, ID is making 3D printed metal parts to be tested by the IGEM team. Douglas Sayer, from PIT, and their consultant Mark Jaster are participating in the project. The goal of the IGEM program is to support novel technologies for commercialization and thus improve economic opportunities and impact in Idaho. The total funding of this project is about \$274k.

Defense Titles

Ezekiel Adekanmbi PhD ChE *Dielectrophoretic Characterization of Living Cells Real-Time on a Point-and-Planar Microwell (PPM) Platform*

Isaac Curtis MS MSE *Process-Structure Linkages in Materials via Deep Learning from Phase-Field Simulation Data*

Arnab Kundu PhD MSE *A Study on Microstructure and Properties of Fe-xCr Alloys and Fe-9Cr Based ODS Alloys Processed via Spark Plasma Sintering*

Jieun Lee MS NE *Risk-Informed Nuclear Safeguards of Pyroprocessing for Advanced Nuclear Fuel Concepts*

Emily Mariner MS ChE *Polyampholyte Hydrogels for Tissue Engineering and Drug Delivery Applications*

Anirban Naskar MS MSE *Composition-Structure-Property Relationship in Cs-based Halide Perovskites using Electronic Structure Calculations*

Amey Shigrekar MS NE *Comparative Analysis of Conventional and Compact Heat Exchangers for Next Generation Nuclear Reactors*

Nathan Yergenson MS ChE *Coffee Roasting Process Monitoring with In Situ NIR Spectroscopy*

Dr. Vivek Utgikar's activities this year included:

- Initiating two new DOE-Nuclear Energy University Program (NEUP) funded projects: a) Novel Processes for Capture of Radioactive Iodine Species from Vessel Off-Gas Streams, b) Development of Nuclear Hybrid Energy Systems: Temperature Amplification through Chemical Heat Pumps for Industrial Applications. Dr. Krishnan Raja is a co-investigator on the first project, while the second project features a collaboration with Oregon State University. INL is a collaborating partner on both.
- Member of UI–COE delegation visiting China in March 2019, a trip partially sponsored by the UI Confucius Institute. Conducted a Short Term Training Program on “Research Methodology, Innovation, and Academic Administration in Engineering” at Sardar Vallabhbhai National Institute of Technology (SVNIT), Gurat, India, in July 2019.
- Developed a new course entitled “Computer Programming for Chemical Engineers” for the sophomore class.
- Grad student, Aman Gupta received an award for Best Paper by the Operations and Power Division of the American Nuclear Society (ANS), at the winter meeting (November 2019) for the paper “Potential of Chemical-Absorption Heat Pumps for Thermoamplification in Nuclear Hybrid Energy Systems”.



Aman Gupta

Dr. Soumya Srivastava's student, Ezekiel Adekanmbi (PhD ChE May 2019), recently had an article accepted in Applied Physics Reviews (Impact Factor 12.75) to be a featured article titled: *Dielectric characterization of bioparticles via electrokinetics: The past, present, and the future*. Ezekiel is a process engineer at Intel.

Two of Soumya's students, juniors Sierra Knowles and Kendall Reeder, won Office of Undergraduate Research (OUR) travel grants to present posters at the Oregon Bioengineering Symposium in Corvallis, OR (Nov 22).

Courtney Molvig (senior) won OUR research grants for both Fall & Spring, and placed first at the AIChE PNW conference with her poster on characterizing red blood cells using stress and aging tests.

Soumya served on a panel for Women in Engineering (WIE) day, sponsored by the College of Engineering. She was also invited by Women in Idaho Science and Engineering (WiSE) to welcome female science and engineering freshmen students as a panelists.

Anthony Giduthuri (MS ChE 2020) traveled to Palm Springs in October to attend SciX-AES (American Electrophoresis Society; <https://www.scixconference.org>) annual meeting and his talk was selected for a special issue in Electrophoresis by the guest editors (*Electrophysiology of Biosorbent: Cupriavidus Necator*). Travel was funded by GPSA and INBRE.



Anthony Giduthuri

TMS 2019 Annual Meeting & Exhibition—March 2019

UI MSE students participated in the bladesmithing competition for the first time, winning an Honorable Mention with a cash prize.

The team consisted of both undergrad and grad students. Elijah Williams provided the forge and expertise.

Team: Brandon Day (GR) - Captain, Jadzia Grave, Paul Riebe Anumat Sittiho (GR), Arnab Kundu (GR), Mark Currier, Kendra Wallace, Jackson Mitchell, Vanessa Beasley, Mohammed Alqahatani, Paul Adisa (GR) and Lilly Mortensen.



L-R Mark Currier, Jadzia Graves, Vanessa Beasley, Paul Adisa, Kevin J. Hemker (2018 TMS President)

WERC Competition—April 2019 New Mexico



L-R: Jarod Perko, Jack McAlpine, Brandan Brewer, Andrea Condie, front: Bethany Kersten. All ChE's.

Task 1: Open task
Valvo-clean: A Silver-based Microbial Check Valve for SpaceCraft Potable Water Systems.
Won a peer choice award.

Jack McAlpine selected for Terry McManus individual award.

Dr. Matt Bernards, advisor

Two Time PNW Champions

For the second year in a row, the UI chapter of the American Institute of Chemical Engineers (AIChE) represented the Pacific Northwest Region at the National AIChE Jeopardy Competition. The team from UI won the regional competition in April 2019, coming out ahead of competitors Washington State University, the University of Washington, Oregon State University, and the University of British Columbia. This came on top of serving as the host school for the 2019 Pacific Northwest Regional Conference, which was a highly successful conference. Courtney Molvig won the Regional Student Poster Competition, and Jackie Martinez-Alvarez placed second.

The Jeopardy team, Clay Allred, Daryl Giglio, Melissa Marsing, and Jackie Martinez-Alvarez, traveled to sunny Orlando, FL (November 2019) to face off against the other Regional Champions in the National Competition. In the first round the UI team faced stiff competition: Louisiana State University and the University of Southern California. The team soundly defeated Louisiana State University, placing second but earning enough money to advance to the second of three. In the second round, the UI team defeated Clemson University, but fell to the USC champions.



L-R: Daryl Giglio, Clay Allred, Jackie Martinez, Melissa Marsing

The student activities at the national meeting did not stop at the Jeopardy competition. This is year three students participating in the Undergraduate Research Poster Competition, presenting their work amongst >400 others from around the world. Clay Allred presented a poster entitled "Residence Time Distribution and Holdup in Centrifugal Extractors" based on work with Dr. Vivek Utgikar. Melissa Marsing, with Dr. Madison Powell (Department of Animal and Veterinary Science), presented on "Assessing Gut Transport of Methionine and Lysine in Fast-growing Rainbow Trout". Outgoing AIChE President Jackie Martinez-Alvarez rounded out the presentations with "Implantable Air-Brushed Nonfouling Microfiber Mats for Drug Delivery", with Dr. Matthew Bernards. Overall, our students represented our department well! Dr. Matt Bernards, advisor.

The **UI Office of Undergraduate Research (OUR)** invites undergraduate students to apply for grants to support the growth and development of original, independent research or creative scholarship. Four (4) of our students received awards this fall.

Courtney Molvig "Developing microfluidic platform for electrokinetic characterization: *C. Necator*, *Borrelia burgdorferi*, and stem cells", S. Srivastava, advisor

Keith Murdock "Poly (vinyl alcohol) and related block copolymer hydrogels", M. Roll, advisor

Kael Stelck "Nanoreactors: Production of a catalytic membrane via organo-trialkoxysilane", M. Roll, advisor

Thomas Zelliff "Argon generation by pressure swing adsorption", M. Roll, advisor

Six (6) students have received awards for spring 2020.

Senior ChE students visiting the British Petroleum (BP) Cherry Point Refinery with Dr. Matt Bernards, as part of their Capstone project with BP to evaluate renewable biofeedstocks.



L-R: Bennett Williamson (BP), Clay Allred, Addyson Barnes, Sahara Waymire, and Nicole Yu.

The **Instrument Shop** added new features to provide a more hands-on experience for students. During the recent ventilation upgrades to BEL, one smaller room was repurposed as a 3D printer student design space with 3 units for ABS, PLA and other options. Our intention is to add a computer for solid modeling and model slicing that allows for help from shop staff if. We are also adding MasterCAM so people can try their hand at programming larger machine tools in the shop. This space is a safer and more accessible option for students that want to experience using computer-aided design and fabrication techniques—Charles Cornwall, Shop Manager.

ASM Student Paper Night—April 2019 UI and WSU (at UI)

Sponsored by Hi-Rel Laboratories, Spokane, WA.

Jadzia Graves, MSE & ME—Microstructure & Mechanical Properties of A10.4CoCrFeNi High Entropy Alloy—1st place in Optical Microscopy Images

Sesily Stewart, MSE— Electrochemical Deposition of Copper, Analytical Techniques—4th place in presentations, 1st place in Electron Imaging and 1st place in Artistic Imaging

James Zillinger, MSE— Energy Storage Capabilities of Bismuth Oxide—2nd place in overall presentation session.



L-R: Jadzia Graves, James Zillinger, Sesily Stewart

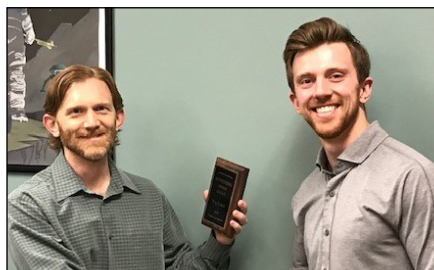
A *heartfelt thank you* to all of you who provided support to our students and the department in the last year, some of you for many years!
 These are a few who benefited from your generosity:

Outstanding Seniors 2018-2019

Pictured with Eric Aston, Professor & Department Chair.



**Alen Korenjic, MSE
 Outstanding Senior**
 Alen has gone on to grad school.



**Kasey Peach, ChE
 Outstanding Senior**
 Kasey is working for a Petroleum company.

Expected to graduate 2019-2020

B.S. Ch.E.

Faisal S. Ageeli
 Ahmed S. Alasiri
 Hassan M. Alghaith
 Clay R. Allred
 Saud A. Almeshari
 Mason S. Anderson
 Lucas E. Arnold
 Addyson L. Barnes
 Kaed M. Benski
 Kymberly M. Bowlby
 Jesse L. Brown

Alathea E. Davies
 John M. Fetzer
 Pierce E. Franklin
 Daryl T. Giglio
 Joseph B. Grover
 Bryan J. Hayden
 Adrien Malinowski
 Melissa D. Marsing
 Jacquelin Martinez-Alvarez
 Connor D. McDonnell
 Amber L. McLenna
 Courtney M. Molvig

Keith C. Murdock
 Erik N. Nelson
 Kyle W. Rigg
 Saugat M. Singh
 Samuel G. Smith
 Simon T. Thomsen
 Sahara M. Waymire
 Aspen N. White
 Fitsum D. Y. Wudneh
 L. Nicole Yu

M.S. Ch.E.

Anthony Giduthuri
 Jonathan Counts
 Alexander L. Schoonen
 Thomas A. Christensen II
 Jared M. Wood

Ph.D. Ch.E

Kevin Lyon
 Meng Shi

B.S. M.S.E.

Mohammed F. Alqatani
 Nicholas L. Ayers
 Sesily G. Stewart
 James M. Zillinger

M.S. M.S.E.

Dallas Roberts
 Anirban Naskar

Ph.D. M.S.E.

Saheed "Paul" Adisa
 Arnab Kundu