

DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY

CHEMIGRAM

2022



*Back on Campus
Masks Optional!*

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Publisher: Jaron Hansen
Managing Editors: Sue Mortensen, Valerie Rees Maker
Assistant Editor & Writer: Xani Eckel
Art Director & Graphic Designer: Julian Palacio
Front cover photo courtesy of Julian Palacio

LETTER FROM THE OUTGOING CHAIR

On my last day as chair of the Department of Chemistry and Biochemistry, I just wanted to say a big “thank you!” It has truly been a privilege to serve and be able

to see a few more of the wonderful things that make this department outstanding. First and foremost, we work with wonderful students, the vast majority of whom are eager to learn and willing to put in the hard work that is essential to push forward the boundaries of knowledge. They are the reason the department exists. Thank you for providing the motivation and inspiration we need! I cannot say enough about the dedicated service of the staff in our department. They work largely behind the scenes and without recognition yet play a crucial role in setting the tone and enabling the department to function smoothly, even through a global pandemic. We have

had considerable turnover among our staff in the last 6 years, but each change has brought needed capabilities and fresh ideas that have helped us to be the best. Thank you for the solid foundation you provide. I am grateful for the support of my faculty colleagues. The outstanding preparation they bring,



combined with their commitment to excellence in the classroom, in the research lab, and in serving the department, the university, and our students

is reflected in strong student ratings, numerous publications in excellent venues, and outside funding that enables us to involve more students in exploring the frontiers of science in an environment where faith plays a crucial role. Thanks for your hard work. I have constantly been amazed at the passionate backing given to the department by alumni, emeriti, and friends. Unsolicited words of encouragement, often accompanied by generous donations, frequently arrive. We have done our best to try and use these resources wisely to bless our students, and in the pages that follow you will see some of the results. Thank you! Finally, a huge thank you to the new leadership of the

department. Thanks for being willing to serve. I know the department will be in good hands. I look forward to the blessings that will come from the enthusiastic application of the new ideas our incoming leaders bring.

Thanks again to all,

A handwritten signature in cursive script that reads "David V. Dearden".

David V. Dearden

LETTER FROM THE CHAIR

I stand all amazed are the opening words of a famous Christian hymn by the same title. It also describes the feeling I have as we say thank you to the previous Chair's Office leadership. David Dearden, Roger Harrison, and Barry Willardson have served

valiantly over the last six years. In addition to the usual challenges that come with leading a world class department, they also were thrown into navigating during a global pandemic. It is impossible to adequately describe all of the ways that their efforts have improved our department, but it needs to be noted that under their leadership our graduate program grew, and 7 new faculty members were hired. In spite of the pandemic, our department continued to publish papers and submit high quality proposals, and teaching evaluations rose. Clearly our department was the recipient of thoughtful, dedicated service from the Chair's Office.

As a result of the generosity of many of you, the College endowment fund has grown substantially. This money is earmarked for student support. The endowment

fund, combined with money budgeted from the University, has allowed our Undergraduate Research Award program to blossom. Currently, 198 undergraduates work in our research labs for 20 hours a week

during fall and winter semesters and 40 hours a week during spring and summer semesters. This program provides a remarkable opportunity for undergraduates to learn and exercise the scientific method. The students working in our labs strengthen their resumes and become stronger candidates for employment, graduate school, and professional schools. Supporting undergraduates with endowment money also allows us to use some of our budgeted University funds to upgrade our instruments and equipment in the Department. This in turn allows our undergraduate and graduate students to work with the most up-to-date instruments. Our department

is blessed to have a strong collaboration between talented staff, faculty, and administrators. I am committed, and I am confident, that working together we will continue the upward trajectory of our department.



A handwritten signature in cursive script that reads "Jaron C. Hansen".

Jaron C. Hansen

DEPARTMENT NEWS



Matt Asplund and Ken Christensen have agreed to serve as associate chairs. Both Matt and Ken have demonstrated their aptitude at mentoring, and research, and have proven track records of committee service to the University, and department. I appreciate their willingness to contribute their talents and abilities, while also sacrificing their own interests, to serve our department.

- Jaron Hansen, chair



In Memory of

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Marion Mangelson, wife of Emeritus faculty Nolan Mangelson, passed away on 3 July 2022. Marian always focused on the needs of her family and friends before herself. Even in her later years, when she was in constant pain, her family could feel her love. In September of 2019 she fulfilled a dream of taking all her children and their significant others on an Alaskan cruise. Even with failing health, she wanted to be sure her family was together and had an amazing experience that they would remember forever.

Taken from the Sundberg-Olpin & Wheeler Mortuary obituary page

Department Advisory Board

With encouragement from our CPMS Dean Grant Jensen, our department chairs David Dearden, Barry Willardson, and Roger Harrison, the new board was formed with 15 initial members pulled from leaders in industry, academia, and the professional community. They met in the spring to explore how to best prepare our majors for further educational opportunities and careers that are relevant to the market and the scientific community.

The group was at once impressed with the direction and quality of the discussion. We anticipate a depth of excellence to come from this advisory board as they collaborate with our new department leadership, who have enthusiastically embraced this opportunity. The support and direction from Paul Jensen, assistant dean over External Relations, in this effort has been invaluable. We are looking forward to our first board meeting in the fall with the expectation that this will be an ongoing and productive venture.

2021 AT-A-GLANCE

CHEMISTRY AND BIOCHEMISTRY

Student-Focused Teaching and Research

DEPARTMENT GOALS

- Identify, recruit, and retain the best faculty who will fulfill the mission of the university and achieve the high standards of the discipline.
- Prepare our students by providing engaging, rigorous classroom instruction.
- Provide our students with opportunities to participate in meaningful research.
- Create a sustainable structure for maintaining and replacing research and teaching instrumentation.

MEANINGFUL RESEARCH

110,936	Total Hours of Undergraduate Research
383	Total Undergraduates
179	Majors From Our College
189	Non-majors
5	Talmage Fellows
10	R.E.U. Fellows (Research Experience for Undergrads, funded by NSF grant)

Thanks to the donors whose gifts and endowment have funded undergraduate research awards

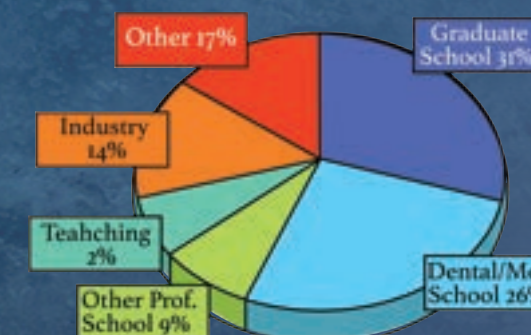
- James A. and Virginia S. Ott Endowment for Undergraduate Research
- D. Clark and Pam Turner Endowment for Undergraduate Research
- Steven Kearnes Gift
- College of Physical and Mathematical Sciences

TEACHING

Students

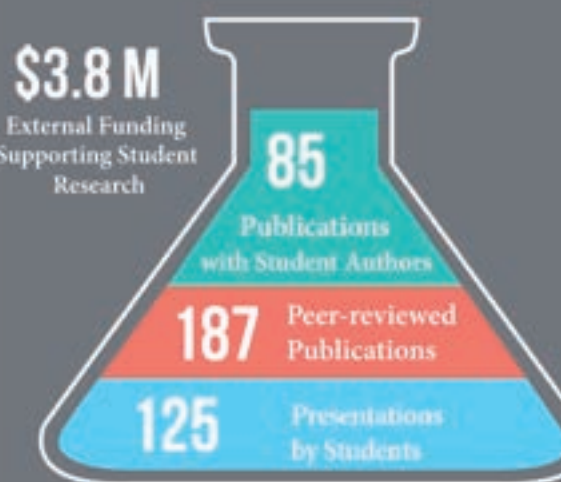
Enrollments 12,089	Graduate students 116
Majors 375	PhD Graduates 15
(38% female, 62% male)	MS Graduates 4
BA or BS graduates 62	

Undergraduate Destinations



STUDENT-CENTERED SCHOLARSHIP

\$3.8 M
External Funding Supporting Student Research



“IT IS GREAT TO BE BACK”

After almost two years of mask-wearing, social distancing and online classes, BYU students returned to campus in full force in fall of 2021. Professors had to greatly adjust their teaching throughout the course of the pandemic, but now that we are back in person, things will never be the same. Class types now include in-person, online, and blended—where students and professors can enjoy a mix of both. Although the pandemic forced us to stretch ourselves, it also enabled us to see the unique capabilities that we have always possessed but didn't take advantage of. Now we can use these to our advantage as we learn how to incorporate them into our “new normal.”

The feeling of isolation which arose for many during the pandemic is finally starting to dissipate. Dr. Jennifer Nielson noticed this as she has taught throughout the course of the past few years, noting that “During the pandemic, students were more isolated, and they didn't put themselves out there, [and were afraid to] make mistakes in front of others.” She found that this hindered their learning as she had to teach her classes online for a time. Nielson also noticed that oftentimes students wouldn't even turn on their cameras when placed into breakout rooms over zoom.

In light of this, one of the most important lessons that she has learned over the past two years is that, “Students need to learn with others. At least in organic chemistry!” Prior to the pandemic, Nielson frequently

received comments from students that they learned to study effectively with a study group while in organic chemistry.

As we move away from frequent quarantines and isolation from our classmates, BYU still

offers select courses online. Students can also choose to experience a mix of both in-person and online with the blended option. This allows students even more flexibility within their schedules and helps each student to learn in the way that is best suited to them.

Dr. Ryan Kelly shared a similar sentiment to

Nielson while reflecting on the greatest benefits that he has seen thus far while being back to fully in-person classes. “There is currently no good substitute for in-person instruction. It is great to be back,” shared Kelly.

With a newfound appreciation for seeing more of each other's faces than just our eyes, BYU is beginning to move forward.

Throughout the past two years, we have learned to use technology in ways that we didn't realize were

possible. We also had to learn how to adapt to new situations, and quickly. As we incorporate these skills that we have gained into our learning, we can create an even brighter future.

*Written by Xani Eckel
Photos Courtesy of Julian Palacio*



NEW FACES

Chris Tracy, PhD

Chris Tracy joined the department as professional faculty in July. He earned his PhD from BYU in 2014 where he worked in the lab alongside Barry Willardson. Following his time at BYU, he completed three years of postdoctoral work at the University of Utah. Later, he started work at Wake Forest University where he was a Mass Spectrometry Instrumentation Manager and adjunct faculty. He attributes much of his teaching ability to the strong examples of excellent teaching he encountered here at BYU and hopes to model the labs he teaches after those who mentored him while in school.



Valerie Maker

Valerie Maker recently joined as the department secretary, and as a BYU alumna she is excited to be back. She is helping things in the department to run smoothly with all that there is going on. Maker is a friendly face that you can always count on here. She also has experience in many different fields, including work at a residential assisted living facility. While she was a student here at BYU, she earned her degree in Design. During this period she also served a mission in San Diego where she was part of the first set of young sister missionaries to serve at the Mormon Battalion. Throughout her lifetime she has lived in several places, including Concord, California. She now resides in Orem with her family, and has four children. In her free time she enjoys book binding, drawing, and dancing.



RETIREMENT

Bruce J. Jackson

Bruce J. Jackson retired after 40 years of service in the Department of Chemistry and Biochemistry at Brigham Young University. Bruce received his Bachelor of Science degree in Chemistry from BYU, graduating in August 1979, and worked in the Chemistry Central Stockroom for a short while before taking a position at the Freeport Gold Mine, 80 miles north of Elko, Nevada. Bruce, DaraLee, and their young family lived in Spring Creek, Nevada, south of Elko, which was inhabited by more jack rabbits than people, while Bruce spent 14-hour days that included a bus commute from Elko with all of the mine employees. The stay in Spring Creek was brief. Bruce accepted a full-time position with the Chemistry Central Stockroom in 1981, working with Ivan Cook



to create a computer system for the stockroom's inventory. Bruce's skills were put to work managing the NMR facilities and magnets prior to him using his expertise to manage and maintain the mass spec instruments in the department, running data for research faculty and graduate students. When the new double focusing reverse geometry mass spectrometer was ordered, Bruce went to Germany to be trained on the instrument. Bruce was here for the move of the department to the newly constructed Benson Building in 1995. He remembers rooms full of inventory for the stockroom when they made only one annual order for the items needed for an entire academic year, working with wholesale suppliers rather than the middleman, to negotiate a price. He also remembers correcting the reviewer of a graduate student's publication, verifying that the mass-spec data submitted by the student was accurate and the paper was worthy of publication. Bruce also remembers the spontaneous combustion of a shipment of 50% hydrogen peroxide on the BNSN docks—a packaging error of the shipping company. Bruce retired from his position as the Mass Spec Facilities Manager on May 1, 2022. Bruce and DaraLee are the parents of seven children and 25 grandchildren. They plan to spend their retirement enjoying their family and touring the many national parks throughout the United States.

Written by Sue Mortensen

JAMES MOODY

NOVEL PROTEIN CRYSTALLIZATION

James Moody is currently leading a novel protein crystallization project with the goal to make it faster and cheaper to determine the structures of proteins at the atomic scale. In order to see the structure of proteins at this level, he uses X-ray crystallography. Although very effective, this procedure is only useful for proteins that can be induced to form ordered crystals, making up only 30% of all known proteins. “Specifically, we aim to increase the speed and success rate of protein crystallization, which is required for protein X-ray crystallography,” said Moody.

Seeing the structure of proteins at the atomic level helps us to understand how protein dysfunction causes disease, which can lead to the development of new treatments and new protein-based tools. Over the past year, the lab has been testing their protein crystallization technol-

ogy called TELSAM against a large variety of proteins. TELSAM is a multivalent crystallization chaperone that can be described as a “helper protein” that helps another protein to crystallize more easily.

The students in Moody’s lab have played a major role in this project. “Both graduate and undergraduate students carry out nearly every step of the process,” says Moody. “They design the new proteins to be tested, assemble the DNA and reprogram the bacteria, produce and purify the protein, set up the crystallization experiments, collect the X-ray diffraction data, and solve the atomic level protein structures.” Moody and his students are currently working on designing and testing new versions of TELSAM that will work better and for a larger set of protein targets.

Written by Xani Eckel



The TEL-SAM polymer (magenta) fused to lysozyme (cyan) Crystallization

“TEL-SAM HELPS
ANOTHER PROTEIN
TO CRYSTALLIZE MORE
EASILY”



BYU SCIENTISTS DISCOVER A NEW CANCER-DRIVING MECHANISM, DEVELOP NEW DRUG TO TREAT IT

Another important step in the fight against cancer has been enabled thanks in part to research from BYU scientists. Dr. Josh Andersen, who heads the university's Fritz B. Burns Cancer Research Laboratory, discovered the mechanism by which a gene, called TNK1, becomes an oncogenic driver in cancer. TNK1 is present in all cells, but when mutated, it becomes dangerous and able to convert normal cells into cancer cells. This puts TNK1 in a select category of cancer driver genes. "Targeted therapy is the goal here," said Andersen. "Being able to offer a cancer therapy that only targets the cancer driver—the engine making cancer grow—is going to help people live longer, healthier lives free from cancer.

Targeted therapy holds the promise of being far more effective with fewer side effects than traditional chemotherapy and is revolutionizing cancer treatment." But developing drugs that target cancer tumors isn't easy to do; in fact, it might be the toughest task scientists face, especially in an academic setting. That didn't discourage Andersen or his students. Andersen contacted Dr. Steve Warner, Senior Vice President and Head of US Research at SDP Oncology—an

international company that discovers and develops cancer remedies with a branch in Lehi, Utah—and asked him to help develop a drug to target TNK1.

While it's never an easy process to develop a drug, the years of research and data Andersen shared with SDP Oncology gave their researchers a great place to start. SDP Oncology scientists started designing compounds that would target TNK1 in cancer cells. Through computer modeling and structure-based rational design, they continued to test and then optimize how this compound would react. "We didn't just design one drug and say, 'Here it is!'" said Warner. "Through trial and error, we would design and synthesize 20 or 30 potential candidate drugs and then evaluate those with different experiments in the lab.

The results from those studies helped us understand how to improve the drug's interaction with TNK1 and how to balance the need to retain other properties required for a viable drug. We went through these iterative rounds of optimization until we identified a drug that we could move forward with." The pre-clinical results for the drug, called TP-5801,

are extremely promising and have both Andersen and Warner optimistic about future development. "We were very surprised how quickly we were able to find and optimize a development candidate for TNK1, which was enabled by the research Dr. Andersen had already done," said Warner. "The pre-clinical data show that the drug is very promising with profound activity in models of cancer driven by TNK1." The compound has passed FDA-required steps and is now ready for what's called a first-in-human study or phase 1 clinical trial.

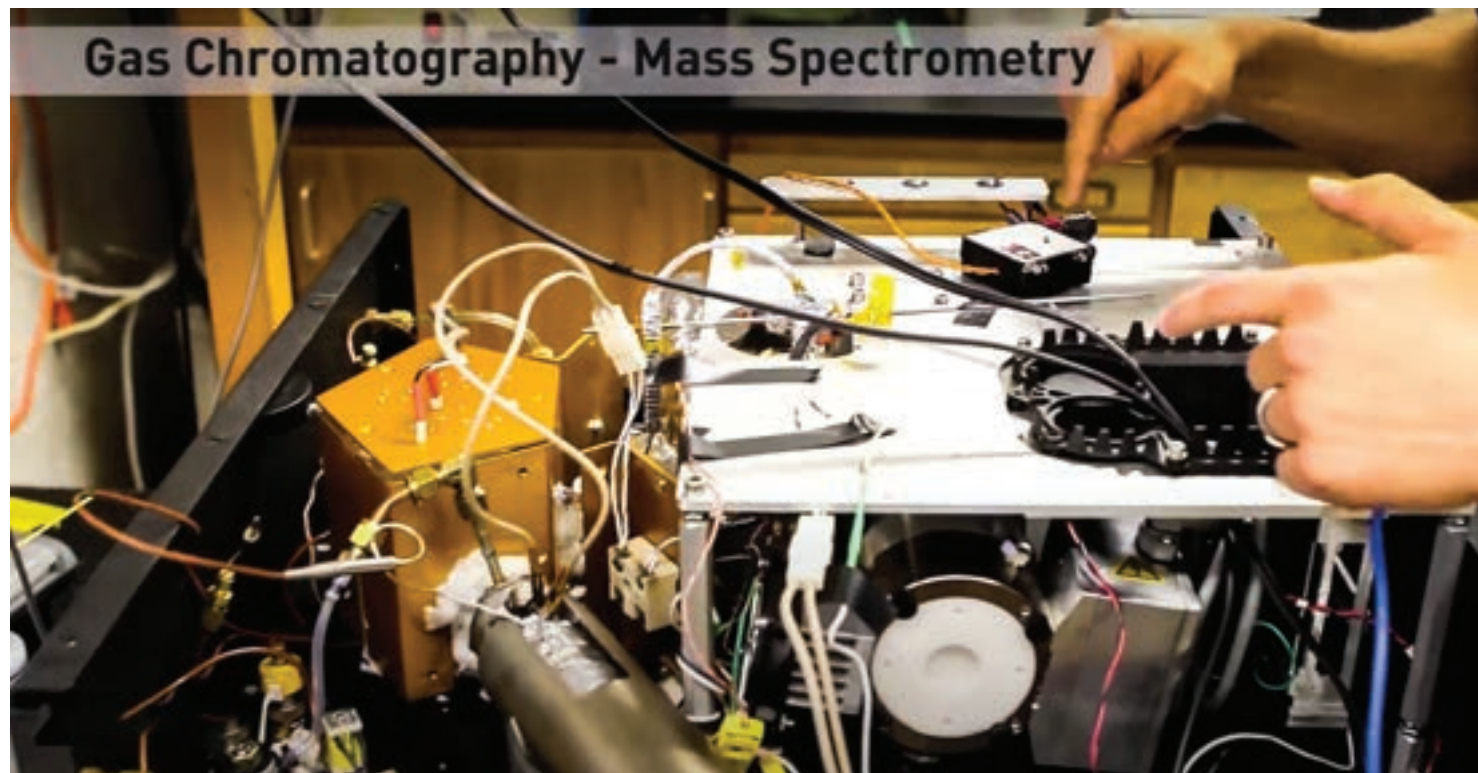
Current BYU PhD student Chrissy Egbert and PhD graduate, Dr. Tsz-Yin Chan, as well as a team of undergraduate researchers, worked on TNK1 alongside Andersen for the past six years and are thrilled to see their hard work published. "I started working on this project six years ago," said Chan. "We almost gave up on this project after the first two years because we kept hitting dead ends. I'm so glad we tried some creative experiments and made a breakthrough."

Written by Tyler Stahle & Photos courtesy of the Y News



COUNTING JARON HANSEN CARCINOGENS

Picture courtesy of fairgaze.com



The Hansen Group is currently focusing their research on improving the understanding of atmospheric and environmental chemical processes through focused laboratory, field, and computational studies. One of their recent endeavors involved a study to understand the sources of high concentrations of formaldehyde and dichloromethane in the air in the Bountiful, Utah region. They worked in collaboration with researchers from the University of Utah and Snow College.

The city of Bountiful has served as one of the urban monitoring sites for the U.S. Environmental Protection Agency since 2003. Dr. Jaron Hansen said that “Starting in 2013, the mean concentration of HCHO measured in Bountiful, Utah exceeded the non-cancer risk threshold and the 1 in 1 million cancer risk threshold. In addition, the measured concentrations

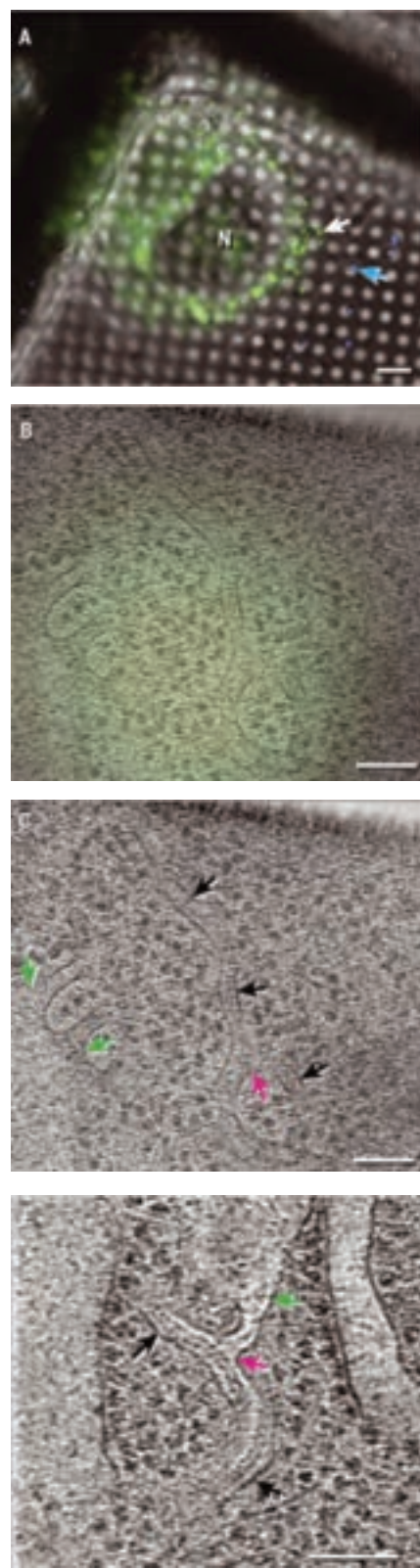
were more than double those found at surrounding locations in Utah.” They were able to measure the concentrations of formaldehyde and dichloromethane through the use of novel instrumentation alongside other universities and the Utah Department of Air Quality. Of these novel instruments, one was the Broadband Cavity Enhanced Absorption Spectrometer, used to measure the concentration of formaldehyde. In collaboration with Dr. Ryan Thalman from Snow College, they “obtained funding from NSF to design, build, and test a new instrument to measure ambient concentrations of hydroxyl radical (OH),” says Hansen. “Our current research efforts are focused on optimizing and automating the operation of this new instrument that will allow detection of OH radical down to 0.05 ppt (parts per trillion).”

Written by Xani Eckel

BYU Dean Captures Never Before Seen Images Inside Living Cells With Innovative Microscopy Method

For as long as he can remember, Grant Jensen has been fascinated by cells. Tiny cells form the basic structures of all living things — each with their own specialized function and operation. But getting a clear picture of a cell isn't easy. "Cells are messy. They are complex and difficult to understand," said Jensen, dean of the College of Physical and Mathematical Sciences at BYU. "Advances in biology are usually punctuated by developments in microscopy. Every time a new or more powerful microscope is developed, we're able to get a clearer view of what's going on inside a cell." Now, thanks to the work of Jensen and his students, scientists are learning much more about the structure and function of cells. Some of his research, recently published in the academic journal *Science*, has produced more detailed images of a cell than ever seen before. To capture such images, Jensen and his team genetically fused their target of interest to a fluorescent protein and then imaged a

cell in a light microscope. The fluorescent proteins revealed where in the cell his target of interest was. After freezing the cell, members of Jensen's lab placed it in an electron microscope to get a more detailed look. They further rotated the cell in the microscope to take pictures of it from different angles. These pictures were then merged to create a 3D reconstruction of the cell. The images revealed thin tubes within the endoplasmic reticulum that hadn't been observed before by scientists. Within the tubes, Jensen found a left-handed double helix — something he wasn't expecting to see. "This was one of the first times that anyone has been able to follow a fluorescent signal into a cell and see the structure the individual proteins formed," said Jensen. "This hasn't been possible before. We've never been able to get images like this within a cell when its structures are in a normal state. Cryo-EM allows us to freeze a cell and then look right at it like never before."



Written by Tyler Stahle & Lab Photos courtesy of Stephen Carter



Rural Education Gets Revamped

Dr. Rebecca Sansom recently received a grant from the National Science Foundation as part of their Discovery Research K-12 program. The grant totals \$3 million over the next four years which will aid the program in its dual focus of research and practical impacts on teaching and learning in K-12 settings.

The state of Utah has recently adopted new science standards that are significantly different from those prior, so teachers in more rural parts of the state need access to professional learning opportunities to be able to teach in



this new way. Sansom explained that the project includes “researching the social networks of Utah’s rural science teachers, and working to understand how their participation in our professional development program impacts both their professional networks and their classroom practice.”

Sansom also shared that they have three main goals to accomplish throughout the course of this project, the first being, “to build capacity for great science teaching among our rural science teachers.” The hope is that these teachers will be able to impact the next generation of scientists in the more rural areas of the state. This will also help the scientific field to progress as it allows for a wider variety of perspectives to influence the work.

The second goal for this project is, “to create a library of science lesson plans that are aligned to the new state standards, and that are responsive to the lives and experiences of rural and indigenous Utah students,” Sansom said. They plan to have the teachers who are participating in the program create the lesson plans that will be available to teachers all over the state.

The third major goal that they hope to achieve is, “to understand the principles or key factors that influence the efficacy of professional development for rural teachers.”

Throughout this process they will be studying the impacts on the teachers from their participation in the professional development. The impacts will be measured in two main categories: both how their practice changes and how their professional networks change as well.

To Sansom this grant brings great validation and “represents the beginning of what [she] hopes will be a long tradition of chemistry education research and STEM education research within the department.” She hopes to greatly improve the science education provided to schools throughout the state to inspire the next generation of scientists.

Written by Xani Eckel

Castle’s Traveling Sabbatical

Steven Castle is the director of the Simmons Center for Cancer Research, which is currently conducting research to find more effective methods to prevent, treat, diagnose and cure cancer. At the beginning of 2022 Dr. Castle started his sabbatical, where he has had the opportunity to continue this research in several countries throughout the world.

Castle and his wife began their journey in Singapore, then made their way to Australia—visiting Melbourne, Brisbane and Sydney. He explained that “Singapore and Australia both endured lengthy border closures during the pandemic, and as a result each of the six universities I have visited so far has not had international visitors in approximately two years. As a result, they have been very gracious hosts and enthusiastically welcomed me.” After interacting with these professors, Castle noted one of the most impactful experiences on his sabbatical thus far was realizing the importance of face-to-face interactions to scientists.

Much of Castle’s research involves the synthesis of peptides and exploring ways to make them more suitable as drugs by hindering their degradation in the body. “Australian chemists have traditionally been on the cutting edge of peptide science—due, in part, to the number of animals here that produce venomous peptides.

Their initial focus on these naturally occurring peptide venoms has expanded into peptide synthesis,” explained Castle. This will allow him to improve his ability to synthesize bioactive peptides.

He also had the opportunity to meet with professors in Singapore who are experts in using catalysis to develop new and improved methods of synthesizing organic compounds. One of his other research areas is organic synthesis, which helps these organic compounds be used as potential anti-cancer agents. “These compounds could be natural products produced by various types of organisms (everything from bacteria to marine sponges) that are too scarce to be harvested in sufficient quantities, or they could be synthetic analogs of natural anticancer agents,” said Castle. The compounds are synthesized in their lab, then scanned for anticancer activity by collaborators.

There are many research projects in progress at the Simmons Center for Cancer Research that cover a range of cancer areas. With the gained knowledge obtained while on sabbatical, Castle hopes to apply it to the diverse research areas that they are currently working on.

Written by Xani Eckel Photos courtesy of Steven Castle



Dr. Castle in Australia



Dr. Castle in Singapore

ANNUAL LECTURESHIPS

IZATT-CHRISTENSEN INVITED LECTURER

The 14th annual Izatt-Christensen Lecture, held in honor of Reed Izatt and James Christensen, was held on March 23rd and 24th. The guest lecturer, Richard Smith, presented two lectures on mass spectrometry. His lecture was entitled: "Separations Combined with Mass Spectrometry: A Continuing Journey." Throughout the lectures, Dr. Smith shared stories from some of his past experiences from the beginning stages of his work in this field and discussed the challenges of large ion dissociation. He also touched on the new opportunities that are arising from capabilities from ion manipulations.



ROSSITER MEMORIAL LECTURE

The Rossiter Memorial Lecture Series was originally scheduled to take place in 2020, but was postponed until November of 2021 due to COVID-19. The guest lecturer was Jillian Dempsey from the University of North Carolina, Chapel Hill. Her public lecture was entitled: "Driving the Production of Chemical Fuels from Sunlight." She explained how our planet is on the brink of a climate catastrophe and how we as a society need to do things in order to decrease the amount of change that is taking place within our climate. Dempsey specifically mentioned wanting to transition to using new fuels in the transportation sector, as well as in our production industries. Her technical lecture which followed was called: "Elucidating Proton-Coupled Electron Transfer Mechanisms Underpinning the Catalytic Generation of Renewable Fuels." In this presentation, Dempsey discussed her research into solar energy and understanding the proton-coupled electron transfer reactions that underpin fuel production and elucidating electron transfer processes across materials interfaces.



IZATT-CHRISTENSEN FACULTY EXCELLENCE IN RESEARCH

The Izatt-Christensen Faculty Excellence in Research Lecture for 2022 was given by John Harb. His lecture was entitled: "Electrochemical Engineering for a Sustainable Future." Throughout his lecture, he talked about energy storage and batteries for things such as electric vehicles. He explained how the environmental impact of the cars depends on the source of the electricity that it gets its power from. He also touched on the topic of earthworks, which are abstract and formalistic artworks made to blur the boundaries between art and nature's handiwork. He further elaborated that many of the current earthworks are used for the purpose of promoting environmentalism and creating a more sustainable future.



IN MEMORIAM - BYRON WILSON

FEBRUARY 2ND, 1931 - FEBRUARY 12TH, 2022

BYU Department of Chemistry and Biochemistry emeritus faculty member Byron J. Wilson passed away on February 12, 2022 at the age of 91.

He is survived by his wife Elizabeth and his seven children: Lee, Bruce, Ross, Kathleen, Kevin, Reed, and Jennifer. Dr. Wilson received his Bachelor of Science in chemistry from Idaho State College, then went on to receive his Master of Science from Southern Illinois University.

While in Illinois, he met Elizabeth Rauback and they got married in the summer of 1958. They later moved to Seattle where he received a PhD in inorganic chemistry from the University of Washington in 1961. Following his education, he accepted a teaching position at Vanderbilt University where he worked until receiving an offer to teach at BYU in 1965.

He worked at BYU for 31 years until retiring in 1996.

In his time at BYU, Wilson had a heavy teaching load and spent three years teaching the majors course.

While teaching this course, Wilson worked hard to become current on the physical chemistry topics that he would be teaching.

Due to his hard work, he received his highest scores yet on student evaluations, competing with the scores received by popular religion instructors. He also served on the committee with the architects to design the new chemistry building, where he was put in charge of the teaching labs and lecture halls.

In light of his wonderful career at BYU, Wilson set up the Byron J. Wilson Endowed Scholarship which has helped over 26 students to date. He also funded a scholarship to help his grandchildren attend

the college or trade school of their choice. Wilson had a strong testimony of the Gospel of Jesus Christ. He belonged to the Church of Jesus Christ of Latter-day Saints where he happily served in numerous church positions. He especially enjoyed teaching the gospel.

He is loved and missed by all who knew him.



FACULTY AWARDS

ADAM WOOLLEY

Dr. Adam Woolley was awarded the 2021 Outstanding Chemist award by the Utah sections of the American Chemical Society. Woolley was given this award for his contributions in the area of microfluidics and nanofabrication, leadership, mentorship, and service to the ACS. The award is intended to recognize those individuals who have demonstrated outstanding leadership, creativity, and scientific or educational impact in the chemical sciences. Due to COVID-19, Woolley was recognized at a virtual awards ceremony in November of 2021 where he delivered the keynote address.



SCOTT BURT

Dr. Scott Burt received the 2021 Utah Chemistry Professional Award from the Central Utah Chapter of the American Chemical Society. Burt was given this award to recognize his service over the past thirteen years. During this time period he has worked as the NMR facility manager in the Department of Chemistry and Biochemistry, where he has planned and installed the helium recovery system. He has also had the opportunity to take part in mentoring both as a faculty advisor for the local student ACS section as well as working with students in the NMR facility. In addition, Burt has served in leadership in the local section for the past six years.



ANNUAL UNIVERSITY CONFERENCE AWARDS

PAUL SAVAGE

Paul B. Savage was the recipient of the Karl G. Maeser Distinguished Faculty Lecturer Award this year. This is the most prestigious award that a BYU faculty member can receive. Not only is he a great teacher, but he is also working on world-renowned research centered on strategies for the prevention and treatment of infectious disease. There are a considerable number of biomedical products currently in late-stage clinical trials based on his work. He has authored over 230 peer-reviewed publications, has been cited more than 20,000 times, and has received 50 patents, leading to multiple spin-off companies.



ANNA KENNINGTON

Anna Kennington received the President's Appreciation Award this year. She is always attentive to the needs of the department and is a great help to all those who come in contact with her. This includes students, colleagues, seminar speakers and more. She is constantly trying to improve the world around her and make sure that things in the department are running smoothly. Kennington is also a great mentor to students and employees and a friend to all—her work in the department does not go unnoticed.



RICHARD WATT

Richard Watt has received the General Education Professorship Award for this year. He has many years of experience teaching chemistry here at BYU. He is very mindful of his Chemistry 101 students and does everything that he can to help his beginning students to succeed. Watt has worked with over 1,300 students in his time at the university and has received overwhelmingly positive feedback from those that he has taught. He has given great service not only to his students but to those around him.



BYU Graduates Work Alongside Nobel Prizewinner

BYU graduates Spencer Jones (BS '06) and Bryon Simmons (BS '02) had the opportunity to be involved in the research that won the Nobel Prize for Chemistry in 2021. They worked as PhD graduate students alongside Dr. David MacMillan in the early 2000's in his Princeton University lab developing a tool that revolutionized the construction of molecules: organocatalysis. MacMillan received the Nobel Prize for his work in October of 2021. He discovered that organic catalysts have proved more effective and reliable than the metal catalysts that have been used in the past. The discovery of organocatalysis is making chemistry greener and has streamlined the process of creating asymmetric molecules.

Jones and Simmons were well prepared to work under the direction of MacMillan and pursued careers in the pharmaceutical industry after receiving their undergraduate degrees at BYU.

While attending BYU, Jones had the opportunity to work closely with Dr. Steven Castle (BS '95) in his lab. "During the two years I conducted research with him, I was able to work alongside masters and PhD students and drive a real project with potential impact to the scientific community," said Jones.

Simmons had a similar experience while obtaining his undergraduate degree as he worked in the lab of Dr. Merrit Andrus (BS '86). "I didn't realize how unique and special that training was until later when I was interviewing for graduate school with another Nobel laureate professor named Barry Sharpless. When I showed Professor Sharpless what I had done as an undergraduate at BYU, he chuckled and told me that he had seen PhDs in synthetic chemistry awarded for much less. That same synthetic chemistry training I obtained at BYU got me my first pharmaceutical chemistry job at Merck," said Simmons.

MacMillan shares a mutual respect and admiration for BYU's undergraduate education programs. "When Spencer and Bryon arrived at Princeton they were trained at the highest level I have observed of any undergraduates moving to a graduate program," said MacMillan. "I would be delighted to work with more BYU'ers in the future and I hope to get the chance to interact with the next generation of students trained at this exceptional level." After receiving their PhDs and completing their work with MacMillan, both Simmons and Jones have



Left to right: Anthony Mastracchio (co-author on 2011 paper), Spencer Jones, Bryon Simmons with MacMillan's Nobel Prize after a MacMillan group celebration at Princeton University

gone on to work in the pharmaceutical industry where they get to use science for good. Simmons is working for a company that produces the nano lipids for the Moderna vaccine, and Jones is currently working at Eli Lilly and Company.

In Jones' current position, he is the director of discovery chemistry at Eli Lilly. He is heavily involved in drug discovery research as Jones explained, which allows him to "use science to try to make life better for patients around the world." They are able to accomplish this through their research and development of different medicines that are later distributed throughout the world. They are currently working to improve public health for people who are living in areas with limited resources.

Simmons is currently working for CordenPharma as a process chemistry group leader. Their company has recently been focused on producing the lipids that are necessary for the COVID-19 vaccine.



Left to right: Spencer Jones, David MacMillan and Bryon Simmons

They have been working on generating sufficient quantities of lipids to create 100 to 200 million doses of the vaccine every month. Regarding his current position Simmons said: "I find great satisfaction working in the pharmaceutical industry and seeing the direct impact of my daily work improve the lives of so many around me."

Both were well prepared for the work that they are doing today. "I credit a lot of the success I have had in my academic and professional career to the foundation of research I obtained while doing undergraduate research at BYU," said Jones.

Due to the unique environment at BYU where students get to be heavily involved in high quality research, there are many graduates who are currently experiencing great success in their respective fields. Jones and Simmons are an example of this and are a great inspiration to our current students.



Written by Xani Eckel Photos courtesy of Spencer Jones

Alumni News

Creating Antiviral Treatments for COVID-19



After receiving his PhD from BYU in 2019, Michael Kinghorn accepted a position as a research scientist at Gilead Sciences. He started at this new position just months before the COVID-19 pandemic hit, which led to him spending the majority of his first two years working on the first antiviral treatment to be FDA-approved for treating the virus. Currently, he supports pharmaceutical programs ranging from early phase to late stage clinical trials while focusing on impurity content and product stability. Kinghorn explained that when a new impurity is observed in a sample, he uses a combination of UPLC, LC/MS and NMR techniques to identify the impurity structure and propose a control strategy. Kinghorn feels fulfilled in his position as he gets to see the real-world impacts of his efforts. When describing Gilead, he shared, "There is a sense of community and common goals. Nearly everyone I interact with are experts in at least one area, which makes for some great conversations. It's a fantastic environment for learning, development, and collaboration."

Keeping Up With Cody

Cody Cushman (PhD '19) spent his graduate education in the lab of Dr. Matthew Linford where he became an expert in thin film deposition, microfabrication, and surface analysis. Together, they started a research collaboration with Corning where Cushman later got a job as a research assistant. His current position is in the microscopy and surface analysis division where he specializes in an analytical technique called time-of-flight secondary mass spectrometry.

Cushman enjoys his work at Corning where he interacts with many subject matter experts who specialize in fields other than his own. These include microscopy, X-ray photoelectron spectrometry, optical spectrometry, mechanical properties experts, and more.

Corning manufactures countless products that have had a profound impact on the world, such as "the coverglass and display glass in smartphones, tablets and televisions; fiber optic cable and connectors; glass for auto interior applications; and ceramic supports for things like catalytic converters and diesel particulate filters." Cushman is proud of his company and all that they are able to accomplish. "Though I am only one of thousands working on these products, I know that my analytical efforts ultimately contribute to making things that people use and that make the world a better place."



BYU Connect

Share your expertise by mentoring a BYU Chemistry Student. Join BYUConnect today!



STUDENT NEWS

JOSH YOUNGS



Josh Youngs recently won the ASBMB Undergraduate Poster Competition in the cellular biology category. His research involved a cellular pathway called autophagy, which cells use to recycle waste into basic materials. He worked closely with graduate students Daniel Poole and Ashari Kannan-gara in the lab of Dr. Joshua Andersen, where he offered significant contributions to this research. After working in this lab for three and a half years, Youngs has developed crucial skills that helped him to win this award.

3MT COMPETITION WINNERS

Alex Farnsworth, Radhya Gamage, and Yujin Kwon all advanced from the department level Three-Minute Thesis competition to the college level. Farnsworth won at the department level and Gamage won at both the college and university levels. Her thesis was entitled: "Ion Trap Mass Spectrometer: A Portable Laboratory." While sharing her thesis, Gamage explained the use of mass spectrometers in being able to determine the chemical identity of something. This new portable technology will allow for greater advances in fields such as medicine, and in the studies of other planets.



NAOMI FLINDT



Naomi Flindt received the Outstanding Graduate Award from the ACS in 2021. This award recognizes the research, mentorship, leadership, and public outreach of an outstanding chemistry graduate student. Flindt has been involved in many activities to expand her horizons and help those around her. She is a co-founder of the Women in Chemistry Club and also has served on the Chemistry Graduate Student Committee. In addition, Flindt worked with Career Services to start building new relationships with companies specifically to recruit chemists and biochemists.

- Congratulations to Behnam Moeini for his award from the Society of Vacuum Coaters Foundation. Moeini gave an oral presentation on his research: understanding the morphology/ evolution of thin, porous silicon films deposited by PVD using electron microscopy.
- Congratulations to Peter Mpaata for winning the Etter Student Lecturer Award.

BYU Dominates Student Award Presentations at ASMS Conference



Pictured in the above photo is Liang, Gamage, and Gustafson together at the conference.

BYU was well represented at the American Society for Mass Spectrometry conference in November 2021, with three graduate students receiving awards. In fact, this was the university's best showing yet.

One of the award recipients, Elaura Gustafson, received recognition for a project that she has been working on for the four-and-a-half year span of her graduate career. She presented research about the continuing development of a printed circuit board detection mass spectrometer engineered to analyze atmospheric Mars dust. She was given the Graduate Student Travel award for 2020, but due to COVID-19 her travel was postponed until this last November.

Gustafson applied for this award in the first place because of an important lesson she had learned just one year prior. "I learned the importance of just going for it. Back in 2019 a visiting female professor said to the Women in Chemistry club, 'Apply for the travel support. If you won't, who will?'" Through this experience, Gustafson became determined to do whatever necessary to attend the

conference. "I am the first BYU student to have received an ASMS conference award, graduate or undergraduate student, but I am obviously not the last," said Gustafson.

Another award winner, Radhya Gamage, submitted her first paper written as a graduate student and was awarded "Best Fundamental Student Paper" by the International Journal of Mass Spectrometry. She, like Gustafson, received this award in 2020 but was invited to this year's in-person conference. On top of receiving the award for her paper, she was given the opportunity to give an oral presentation at the conference. "I presented my research on the simplified coaxial ion trap mass analyzer. This is a new dual mass analyzer still in its early stages of development," said Gamage. Attending this conference for the third time, Gamage took advantage of the networking opportunities and was able to learn about "the latest focus areas in mass spectrometry and the efforts being made to improve their performance."

The third award recipient from BYU, Yiran Liang, received the Graduate Student Travel Award alongside Gustafson.

She was chosen to present at the conference as well and had the opportunity to share the work that she has been doing in conjunction with Dr. Kelly in their lab that focuses on single-cell proteomics. Liang described the work they have been doing as "a method that can improve the throughput based on the Nanodroplet Processing in One Pot for Trace Samples platform developed in our lab."

Usually when the digested proteins from a single cell are being analyzed using liquid chromatography-mass spectrometry, it can take anywhere from two to three hours. The method that Liang presented at the conference was able to expedite this process as she explained: "[the method] uses a series of isobaric chemical labels and metabolic labeling to improve the throughput of the LC-MS analysis up to 34 times... That means, 34 times the amount of cells can be analyzed using the same MS time, which can save cost and allow better statistical analysis of single-cell proteomics."

After she presented, she got to speak with a lot of researchers who were interested in possible collaboration. In regards to BYU's showing at the conference, Liang said that she "saw attendees recognize BYU much better in the field."

BYU students hope to be able to attend the next ASMS conference and continue to gain more recognition amongst others in the field. Dr. Daniel Austin has been attending this conference for 20 years. He said: "I've never seen students from our department pick up so many awards at the conference. Usually we get one if we are lucky. Most years none." With this year's record three student award winners, perhaps November's conference is the start of something great for the university.

Written by Xani Eckel Photos courtesy of Elaura Gustafson



Pictured are Gustafson, Dr. Austin, and Gamage (left to right) after the students received their awards.



Pictured in the above photo is Gustafson and Gamage together at the conference.

Olivia Fisher

Barry Goldwater Scholarship

BYU student Olivia Fisher was recently named a Barry M. Goldwater Scholar for the 2022-2023 academic year. The scholarship awards up to \$7,500 to students intending to pursue careers in the natural science, or engineering and mathematics fields. Fisher, a junior from Holly Springs, North Carolina, is a biochemistry major and intends to pursue a PhD in computational biology. She hopes to use her education to work in industry for drug discovery, targeted therapeutics and disease pathway prediction.

Majoring in biochemistry wasn't always a part of her plan. "I was born with chronic liver disease and my first semester at BYU I went into liver failure and was placed on the transplant list. Through a variety of miracles I was able to keep going to school and I took Chem 105 with Dr. Wood," Fisher shared. "I loved the class and went to talk to him one day about switching my major from French Horn performance."

Fisher then started work in the lab of Dr. Richard Watt a mere week after her decision to switch her major to biochemistry. Watt allowed her to start a project studying liver fibrosis, which was very personal to Fisher. It helped her to learn about the power of science to change lives—even her own. Watt has since become her greatest mentor.

Receiving the Goldwater scholarship was not just about the financial benefits or being able to put the title on her resume for Fisher. "For me, being selected was like kicking a life's worth of built-up imposter syndrome in the face! It told me that I was capable and gave me confidence to keep going," she explained. Receiving this recognition was especially meaningful for Fisher as a woman in STEM. "Being selected as a Goldwater Scholar was like a confirmation of everything I worked hard to achieve, and a reminder to myself to not let anyone set limits for me."

Written by Xami Eckel



Chandler Miller

Mentor - Merritt Andrus

Turner Undergraduate Research Award Recipient

Forming Chiral Polycyclic Core

Every semester I work in the lab, I better understand the profound impact that this opportunity has on who I am. This semester I have noticed how working in a laboratory is able to bridge the gap between college education and cutting-edge research. The laboratory experience has enriched my education by allowing me to work with the tools about which I have spent years learning. For these reasons I am grateful for the opportunity to work in a laboratory under the Undergraduate Research Award. To the generous donors who have helped make this possible: I appreciate your faith in students like me. Because of your donations, my job is building upon and enriching my education and I can continue my pursuit of knowledge and happiness here at Brigham Young University.

Our research is focused on optimizing a stereoselective Intramolecular Styryl Diels-Alder (ISDA) reaction. Our lab recently synthesized deoxypodophyllotoxin (DPT) using the ISDA reaction, but the reaction was not stereoselective. This semester we have been able to optimize several of the reactions that we performed last semester. This included performing the ISDA reaction on different substrates using various solvents, and discovering which solvents allowed for the highest yields. We also experimented with reaction times to find the least amount of time required to give us desirable yields. Our research can help scientists better understand the optimal conditions for a stereospecific ISDA reaction, offering an efficient synthetic pathway for various lignans that might be difficult to find in nature. This can aid in the synthesis of disease-treating drugs, such as DPT and Etoposide.



Allison Prue

Mentor - Kara Stowers

Ott Undergraduate Research Award Recipient

Metal Organic Framework Films

Mentored research has continued to be an incredibly vital opportunity for my future. This semester I changed my major from Chemistry Education to a BS in Chemistry with plans to attend graduate school. I've discussed my plans with my faculty advisor Dr. Stowers, and she helped me to make a plan for graduate school. I have also received support from the graduate student that I work for, Hans, along with other students in my lab. This semester I've been given the opportunity to deepen my understanding of the project through preparing for the Student Research Conference. I would have never imagined doing those things without doing mentored research.

Metal Organic Frameworks (MOFs) are highly porous materials made from metal ions and organic ligand compounds, characteristic for their high surface area. Our group is interested in taking MOFs and decomposing them, resulting in metal nanoparticles. One problem with MOFs is that they are often grown in powders, which can be both expensive and difficult to upscale to an industrial application. We grow our MOFs as a thin film on a substrate through a simple method called Liquid Phase Epitaxy (LPE). LPE synthesis allows for layer-by-layer growth using microliter amounts of solution to produce MOFs in a matter of minutes. By using this method on a substrate, we hope to bring these exciting catalytic opportunities out of the lab and into industry. We have also synthesized alloy metal nanoparticles, and are in the process of fine tuning their synthesis and finding specific applications for their use.



Sydney McFarland

Mentor - Wally Paxton

Kearns Undergraduate Research Award Recipient

Polymer Terminating Modification

My experience working in a lab has greatly helped me in all aspects of my schooling. Oftentimes the topics that I research in the lab are mentioned in my other classes, and I am better able to understand the concepts due to the practical examples that I have seen in the lab. While in my first lab class at BYU, I didn't feel confident in executing the procedures required for each experiment. After starting in the Paxton lab, I have taken more lab classes and my confidence and skills have grown. This opportunity to work in a lab has made my education more complete.

Polymer vesicles can be absorbed to surfaces and become bilayers. Depending on the properties of the polymer, these bilayers can interact with different solutions. We hope to create a biomimetic device that uses specific polymers to detect various biomolecules. Currently we are exploring a polymer terminating modification that causes the neutral end (an OH group) to become positively charged. These reactions had been previously performed on polyethylene oxide poly butadiene (PEO-PBD) polymers with poor isolation yields. Through NMR spectra it was determined that these reactions worked, and that the PEO-PBD polymers had other contaminants that caused the poor isolated yields. The success of the PEG polymer positive termination shows that it is possible to modify properties of the polymer which moves us one step closer to building a biomimetic instrument.



Addalyn Burningham

Mentor - Adam Woolley

College Undergraduate Research Award Recipient

Preterm Birth Microfluidics

This mentored experience has greatly impacted my education. One of the major skills that I have learned from this experience is problem solving and troubleshooting. The lab has also allowed me to solidify my knowledge of things that I have learned in my classes. One of the other benefits that has come from my experience is watching my group members present their scientific findings. This has helped me learn presentation skills and etiquette. It has also been a pleasure to work with a faculty member who cares about my progression and learning. To those who have helped fund this research, thank you for giving me the opportunity to better myself and solidify my knowledge.

Esplin et. al have identified nine biomarkers that predict preterm birth with ~90% sensitivity and over 80% specificity. The objective of our project is to create 3D printed microfluidic devices that will separate and allow for quantification of these nine biomarkers. This will be done through: immunoaffinity, solid phase extraction, and fluorescent labeling on a 3D printed device. So far, I have been able to use solid phase extraction monoliths (a continuous polymer) to detect fluorescently labeled ferritin, one of the biomarkers. I am now going to be working on learning how to make immunoaffinity monoliths. Once I am able to combine this with immunoaffinity, my group will be able to combine all three analyses techniques. This will get us closer to our goal of having cheap, clinical tests for preterm birth.



Claire Rader

Mentor - Jeremy Johnson

College Undergraduate Research Award Recipient

Characterization of THz crystals

Mentored research has provided me with a scientific environment in which to learn and explore. This school year has been unique because my courses align better than ever with the research I perform. The material covered in class enhances and enriches my understanding of my research; however my research has also made these classes more meaningful and relatable. Performing mentored research has given me another way to discuss and understand the material I learn in class, greatly enhancing my enjoyment and comprehension in the courses. I also enjoy seeing the real-life application of the things I learn in class. Mentored research is one of my favorite things about being at BYU.

This semester I worked mostly on preparing manuscripts for publication. There were three main manuscripts I wrote and edited, two on terahertz (THz) generation crystals and one on combining THz pulses. Each of these manuscripts has a high impact on the THz spectroscopy field, offering unprecedented electric-field strengths and broadband spectra. Although each manuscript does have a similar message, they each have unique and beneficial properties making each important and applicable in different areas in this field. One generation crystal is commercially available while the other exhibits excellent phase matching properties, and the combined pulse set-up minimizes absorptions in the resulting spectrum. We plan to have these manuscripts published by the end of the summer.



Spencer Ashworth

Mentor - Joshua Andersen

College Undergraduate Research Award Recipient

TNK1 Domains and Stability

Performing experiments in the lab and being able to work with a research team has taught me how real science and collaboration should look. I have been learning a lot, not only the science behind cells, proteins, chemicals, etc., but also the process behind progressing science—posing questions, forming hypotheses, designing experiments, evaluating results, and so on. My time in the lab has influenced my career pathway as well. Before starting in the lab, I was convinced that I would go to medical school. Working in the lab has motivated me to instead pursue a PhD and hopefully teach at a collegiate level. I'd like to thank those who have generously donated to the chemistry department to help me have a genuinely life changing experience in the lab. I will always be grateful for your benevolence and hope to someday have the means which I can share with others.

This URA period, I primarily focused on how different domains of gene TNK1 affect its stability in cells. Understanding which components of TNK1 influence TNK1 stability may give insight as to how TNK1 operates and why certain mutations can disrupt or enhance TNK1 activity. Previous reports suggest that the Ubiquitin Association (UBA) domain may be responsible for TNK1 degradation. In recent pulse-chase experiments I performed with truncated versions of TNK1, it appears that Wild Type (WT) TNK1 is very stable as well as the UBA-deleted version. However, we are currently varying pulse-chase experiments to validate these somewhat premature findings. If we can successfully observe how different domains affect TNK1 stability, this may help us improve our current model of TNK1 activity and degradation.



Photos Courtesy of Julian Palacio

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Many thanks to our donors whose gifts make it possible for us to bless the lives of students and assist them in their academic pursuits. Every dollar of your gift is used for student aid – scholarships, fellowships, undergraduate research, to name a few. We have received thank-you notes from many students this year who expressed how meaningful these gifts were. We want to pass their thanks to you, along with ours. Your expression of confidence in the upcoming generation is represented in the dollars you give . . . and every dollar makes a difference. You have changed lives, boosted a student struggling financially, and celebrated learning. Our heartfelt thanks to each and every one of you.

Paul Jensen has joined the College of Physical and Mathematical Science as the assistant dean with responsibility for external relations. He joined the college in October 2021 and has much to offer, bringing 30 years of industry development experience across Finance, Sales, Marketing, and Business Development. We have witnessed and been the beneficiary of his amazing skills and ability. Please reach out to Paul as you consider meaningful ways to share the resources you have been blessed with. He looks forward to answering questions and assisting you in your philanthropic endeavors.



When you consider giving opportunities, we hope you will keep us in mind. It will make a difference in the lives of students . . . and in you. Please contact us with any questions you may have regarding your philanthropic gift.

CONTACT US:

The Department of Chemistry & Biochemistry
 Jaron C. Hansen, Chair
 Chemistry & Biochemistry
 C-100 BNSN
 Brigham Young University
 Provo, UT 84602-1030
 801-422-4066
 jhansen@chem.byu.edu

Paul Jensen, Assistant Dean
 Physical and Mathematical Sciences
 N-181J ESC
 Brigham Young University
 Provo, UT 84602-1030
 801-422-3495
 Paul.jensen@byu.edu

BYU Philanthropies
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CPMS STUDENT RESEARCH CONFERENCE AWARDS

Session Winners

First Place

Callum Flowerday
Yesman Akuoko
Kaitlynn Mitchel
Madi Johnston
Anna Vasquez
Ashley Chang
David Parkinson

Jonathan Spallino
Lucas Wang
Jonard Valdoz
Lindsey Alder
Preston Smith
Jaden Barfuss
Kimberlee Stern

Sam Mansfield
Liahona Angelie
Margaret Granger
Aldair Alejandro
Natalie Green
Zac Jones
Kate Hales

Aaron Zaugg
Nathan Morgan
Alexa Urrea
Lilly Stillwell

Second Place

James Holladay
Jamir Shrestha
Lindsay Reid
Nathan Pringle
Rob Roden
Roshan Balasoorriyage
Christian Arnold

Joshua Wright
Riley Eastmond
Spencer Ashworth
Caleb Tinsley
Ali Prue
Ben Bohman
Peter Mpaata

Joel Christopherson
Tanner Heaton
Coby Davis
Megan Nielson
Daisy Harmon
Nate McMurray
Parker Nasman

Jacob Nielsen
Austin Jarrett
Josh Wheeler
Lorenzo Martinez

GRADUATE AWARDS

Charles E. & Margaret P. Maw Fellowship

Aldair Alejandro

Daniel L. Simmons Fellowship

Yujin Kwon

Keith P. Anderson Outstanding Graduating PhD

Yiran Liang

Roland K. Robins Fellowship

Chloe Chan
Behnam Moeini
Adam Wayment
Jacob Nielsen
Jatinder Singh
Keith Willes
Parag Gajjar

J. Rex & Marcia A. Goates Research Fellowship

Elaura Gustafson

Garth L. Lee Award

Michael Davenport

Loren & Maurine F. Bryner Fellowship

Thy Truong

Jennie R. Swensen Fellowship

Conner Nelson

Bradshaw Organic Chemistry Fellowship

Aaron Zaugg

UNDERGRAD FELLOWSHIPS

James A. and Virginia S. Ott Research Fellows

Allison Prue
Bryce Tolman
Lily Pita

D. Clark and Pam Turner Research Fellows

Rowan Berry
Chandler Miller
Nathan Pringle
Jeffrey Malmrose

Steven Kearnes Research Fellows

Sydney Johnson-McFarland
Spencer Shumway

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Ida Tanner Hamblin Scholarships

Claire Rader
Sophie Nelson

Kenneth W. Brighton Scholarships

Spencer Jones
Benjamin Jones
Jacob Averett
Kylie Guymon

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Alieta Christiansen
Noah Earls

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Laurel Smith

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Hiram and Permelia Dayton Scholarships

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Spencer Shumway
Cade Nordhagen
Anna Edmunds

Dennis V. and Shirley J. Knudson Scholarships

Gabriel Smith
Minhee Cho
Lauryn Jacobs

Parley Nels and Parley Leroi Nelson Scholarships

Nicholas Dalley

Richard L. Snow Family Scholarship

Kayla Holland
Lily Pita

Edward G. Paul Scholarship

Gregory Bacon
Elli Edelmann
Rowan Berry
Manuel Larrea

Lawrence Mark Lee Memorial Scholarship

Daniel Bradford

UNDERGRADUATE AWARDS

Keith P. Anderson Outstanding Graduating BA/BS Student

Kaitlynn Mitchel - Biochemistry
Gabriel Pinto - Chemistry

Eliot A. Butler Service Award

Savannah Porter

Ida Tanner Hamblin Outstanding Female in Chemistry

Daisy Harmon

Outstanding General Chemistry Major

Caleb Potter

Outstanding General Chemistry Non-major

Alyssa Merrill

ACS Outstanding Analytical Chemistry Major

Jared Xia

ACS Outstanding Organic Chemistry Major

Beth Hammond

Outstanding Organic Chemistry Non-Major

Harlan Stevens
Ryan Van Slooten

Chemistry Literature Award

Mathew Clark

ACS Outstanding Physical Chemistry Major

Alex Daum

Outstanding Biochemistry Sophomore Major

Meg Granger

Outstanding Biochemistry Major

Riley Eastmond
David Parkinson

Outstanding Biochemistry Non-major

Terry Leonard

ACS Outstanding Inorganic Chemistry Major

Jack Sultan

Outstanding Analytical Chemistry Senior

Josh Daum

Outstanding Biochemistry Lab Major

Spencer Ashworth

Thank you to our donors whose endowed gifts have funded these scholarships, fellowships, and awards



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ACTIVITIES

Homecoming Dinner

Friday, October 14

Reception: 6:00 p.m.

Dinner: 6:30 p.m.

Location: W170 BNSN

RSVP by September 23rd

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CPMS Alumni Achievement Lecture

Speakers: Donald & Geremy Mustard,
Founders of ChAIR Entertainment Group

Lecture: Thursday, October 13, 11:00 a.m.

Location: TBA