



CATALYST

Fall 2019

**Letter from New Chair:
Matthew S. Sigman
Where We've Been &
Where We're Going**

**Alumnus Victor Cee
Director of Research at Amgen
The Golden Age of
Cancer Research**

**Curie Club:
A More Inclusive
Initiative**



Department of Chemistry

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Letter from The Chair

Dr. Matthew S. Sigman

Dear Colleagues, Alumni and Friends of Chemistry,

It's a daunting job to step in where someone else has been both beloved and successful. Cindy Burrows' six years as Chair helped the Department of Chemistry continue to grow into a world-class department--all the while, she enhanced her already exceptional research enterprise, won recognitions including the Rosenblatt Prize, and never lost her sense of humor. Two of Cindy's many accomplishments worth highlighting are her leadership in hiring xx faculty in emerging areas of chemistry and founding XXX of new Endowed positions. Thanks in no small part to her vision and savvy, three new positions were established just last year:

- **Valeria Molinero** as the inaugural *Jack and Peg Simons Endowed Professorship in Theoretical Chemistry*
- **Ryan Looper** as the inaugural *Jon M. Huntsman Presidential Chair in Chemistry*
- **Shelley Minteer** as the inaugural *Dale and Susan Poulter Endowed Chair in Biological Chemistry*

The whole Department benefits from the elevation of our members. Please join me in congratulating these faculty; also join me in looking forward to their success attracting students for all of our faculty to train and provide ever better research opportunities for them.

Speaking of students, I am keenly aware that the lifeblood of the department are our undergraduate and graduate student coworkers. Their success during their time in the department is essential--both in the classroom and throughout their research training. Our department is putting a fresh emphasis on holistic student success. To me, this is the foundation and core mission of a research university. Questions we must investigate include:

- How do we continue to modernize classroom instruction to keep pace with the growing student body and our always-evolving discipline?
- How do we reduce hazards in chemistry laboratories and improve our safety culture?
- How do we increase and sustain financial support for graduate and undergraduate research?
- How do we hire and retain the best faculty in the world?

Funded by the State of Utah, we continue to undergo laboratory renovations in the Henry Eyring Building to improve safe research environments. Along with such construction updates as modern fume hoods and better chemical storage, we are developing new policies so that all colleagues help each other prevent accidents. Towards building financial security for students as they learn to research complex problems, we have had enthusiastic response from alumni and friends of chemistry as we work to fund the Harris Endowed Graduate Scholarship (established in honor of Joel Harris with a generous lead gift from Michael and Sally Hunnicutt) and the Gary E. Keck Fellowship. We get closer and closer to our goals with every donation, no matter how large or small.

I hope you are as inspired as I am by the students, faculty, and alumni in our incredible department. In this issue of The Catalyst, get to know our chemists a little better. It is because of our Department of Chemistry Community that I am so hopeful that my tenure as Chair will be a worthy next chapter.

Matthew S. Sigman, Chair of the Department of Chemistry
Peter J. Christine S. Stang Presidential Endowed Chair of Chemistry

Endowed Chairs

Endowed Chairs give faculty anywhere from two to five years to significantly increase their research efforts and focus. Each endowed chair begins with a generous gift from donors who are inspired by and want to encourage excellent scientific research. If you'd like to contribute to or create an endowment for the department of chemistry...



Scott L. Anderson

**Henry Eyring Presidential
Endowed Chair**

Dr. Scott Anderson currently holds the Henry Eyring Presidential Endowed Chair and is the recipient of many other significant awards since during his time here at the Department of Chemistry since 1983, including the ACS Physical Division Award in Experimental Physical Chemistry, the Robert W. Parry Teaching Award, and the Distinguished Scholarly and Creative Research Award.

Dr. Anderson's research includes four main areas of activity in nanoparticle surface chemistry with a distinct research foci ranging from single nanoparticles isolated in the gas phase, to size-selected catalysts and electrocatalysts, to methods for production and characterization of surface-functionalized high energy density nanoparticles for propellant applications.



Peter B. Armentrout

**Henry Eyring Presidential
Endowed Chair of Chemistry**

Dr. Peter Armentrout is the Henry Eyring Presidential Endowed Chair of Chemistry. He began his career as a professor at the University of California at Berkeley where he earned many awards before coming to the chemistry department at the University of Utah. He received the Governor's Medal for Science and Technology Award from the State of Utah in 2010, and the Rosenblatt Prize for Excellence from the University of Utah in 2011. In 2011, his teaching was recognized by the R. W. Parry Teaching Award given by the Department of Chemistry, University of Utah.

Dr. Armentrout continues is also a member of the editorial advisory board of the the International Journal of Mass Spectrometry. His research group provides a detailed understanding of thermochemistry, kinetics, and dynamics of simple and complex chemical reactions. The Armentrout Group seeks to understand reactions involved in biological chemistry, hydration, catalysis, organometallic chemistry, plasma chemistry, and heavy element chemistry. Techniques involved include mass spectrometry, ion beams, molecular



Cynthia J. Burrows

**Thatcher Presidential Endowed
Chair of Biological Chemistry**

Dr. Cynthia Burrows has held the Thatcher Presidential Endowed Chair of Biological Chemistry since 2013, and is a member of the U's Huntsman Cancer Institute. Her research investigates how DNA and RNA molecules are chemically altered by oxidation processes, and how those alterations can lead to physiological consequences such as cancer. Her work has implications suggesting that DNA alteration via oxidation may be related to epigenetics, or alterations of gene expression, that may have shaped the course of life on Earth.

Dr. Burrows is not only a prolific researcher and publisher, but she has also won teaching awards.

Her passion for and dedication to excellent Chemistry as a force to change the world for the better have significantly advanced the Department of Chemistry as a leading research institute.



Ryan Looper

**Jon M. Huntsman Presidential
Chair in Chemistry**

Dr. Ryan Looper was awarded the Jon M. Huntsman Presidential Chair just this past summer as one of the newest faculty members to be awarded for excellent research, clinical care, and career progression. His research program focuses on the behavior of small molecules within biological systems, with the aim to develop compounds that can affect cell signals. These signals, in turn, play roles in diseases including arthritis, multiple sclerosis, and cancer.

Looper and his lab are looking to understand the effects of these small molecules in order to expand and improve researchers' biochemical toolbox. In addition, Dr. Looper is also working to develop new classes of antibiotics, desperately needed in our fight against multi-drug resistant infections, and learning more about how molecules bind to bacterial RNA in the process.

Endowed Chairs



Shelley Minter

**Dale and Susan Poulter
Chair of Biological Chemistry**

Dr. Shelly Minter was recently awarded the Dale and Susan Poulter Chair of Biological Chemistry. Minter's career has focused on using nature as an inspiration and solution to chemistry problems. Her work has resulted in 17 issued patents and over 300 peer-reviewed publications in using biology as inspiration for biosensing, energy storage, energy conversion, and electrosynthesis. Dr. Minter's research will directly impact how we are able store wind and solar energy.

The Minter Group researches bioelectrocatalysis, the biological catalysis of electrochemical processes, and are trying to mimic highly efficient processes in nature. They continue to further understand how living organisms consume food and do energy conversion to carry out daily activities. Recently, her research group developed a biofuel cell that employs mitochondria as the anode catalyst which is responsible for oxidizing fuel.



Valeria Molinero

**Jack and Peg Simons Endowed
Professor of Theoretical Chemistry**

As the Jack and Peg Simons Endowed Professor of Theoretical Chemistry, Dr. Valeria Molinero's research has pulled back the curtain on the freezing process, particularly in clouds. The Molinero Group has shown that when water droplets freeze in clouds, the structure of the ice crystal isn't necessarily the classic hexagonal snowflake structure. Rather, a more disordered ice structure forms more easily than hexagonal ice under certain cloud conditions, allowing the water droplets thin clouds to turn to ice more rapidly than previously predicted. This study was published in Nature, and reconciles theoretical models of clouds with observations of freezing rates.

Throughout her career, Dr. Molinero has received awards for her research and teaching, such as the Extraordinary Faculty Achievement Award, the Camille Dreyfus Teacher-Scholar Award, and the College of Science Myriad Faculty Award for Research Excellence.



Matthew S. Sigman

**Peter J. Christine S. Stang Presidential
Endowed Chair of Chemistry**

Dr. Matthew Sigman has been the Peter J. Christine S. Stang Presidential Endowed Chair of Chemistry since 2012. His research group focuses on the discovery of new practical catalytic reactions with broad substrate scope, excellent chemoselectivity, and high stereoselectivity to access novel medicinally relevant architectures. They are currently engaged in several collaborative projects to evaluate their compound collections for various cancer types at the Huntsman Cancer Institute.

Recently, in a new Nature publication, Dr. Sigman and a postdoc from his group, Jolene Reid, show how analyzing previously published chemical reaction data can predict how hypothetical reactions may proceed, narrowing the range of conditions chemists need to explore. Their algorithmic prediction process, which includes aspects of machine learning, can save valuable time and resources in chemical research.



**Widtsoe Presidential Endowed
Chair in Chemistry**

On the same day that Dr. Henry White stepped down after eleven years of service as the Department Chair and the Dean of the College of Science, it was announced that he received the Widtsoe Presidential Endowed Chair in Chemistry. Back to teaching and research, Dr. White continues to pioneer groundbreaking work in nano-electrochemistry, ultramicro-electrodes, electroactive films, glass nanopores and nanobubbles.

Among many honors, he was the inaugural recipient of the A.S. Bard Award of the Electrochemical Society and a winner of the Governor's Medal for Science and Technology. He is a member of the American Academy of Arts and Sciences, a fellow of the AAAS and of the ACS, and he served as editor for JACS for more than a decade.

K-12 Outreach Inspiring Future Scientists

**American
Chemical
Society
Student
Chapter**



**Organize
100+
Events**

**Reach
2000+
Students**





Kaitlin Marler, ACSSC Vice President

Project Youth Demonstrations



Kaitlin joined the ACSSC her freshman year as a volunteer, and this year, as a sophomore, she is the VP of Outreach. She works with schools who want to either bring their students to campus or who want university students to come visit their schools to learn about chemistry through exciting and hands-on demonstrations.

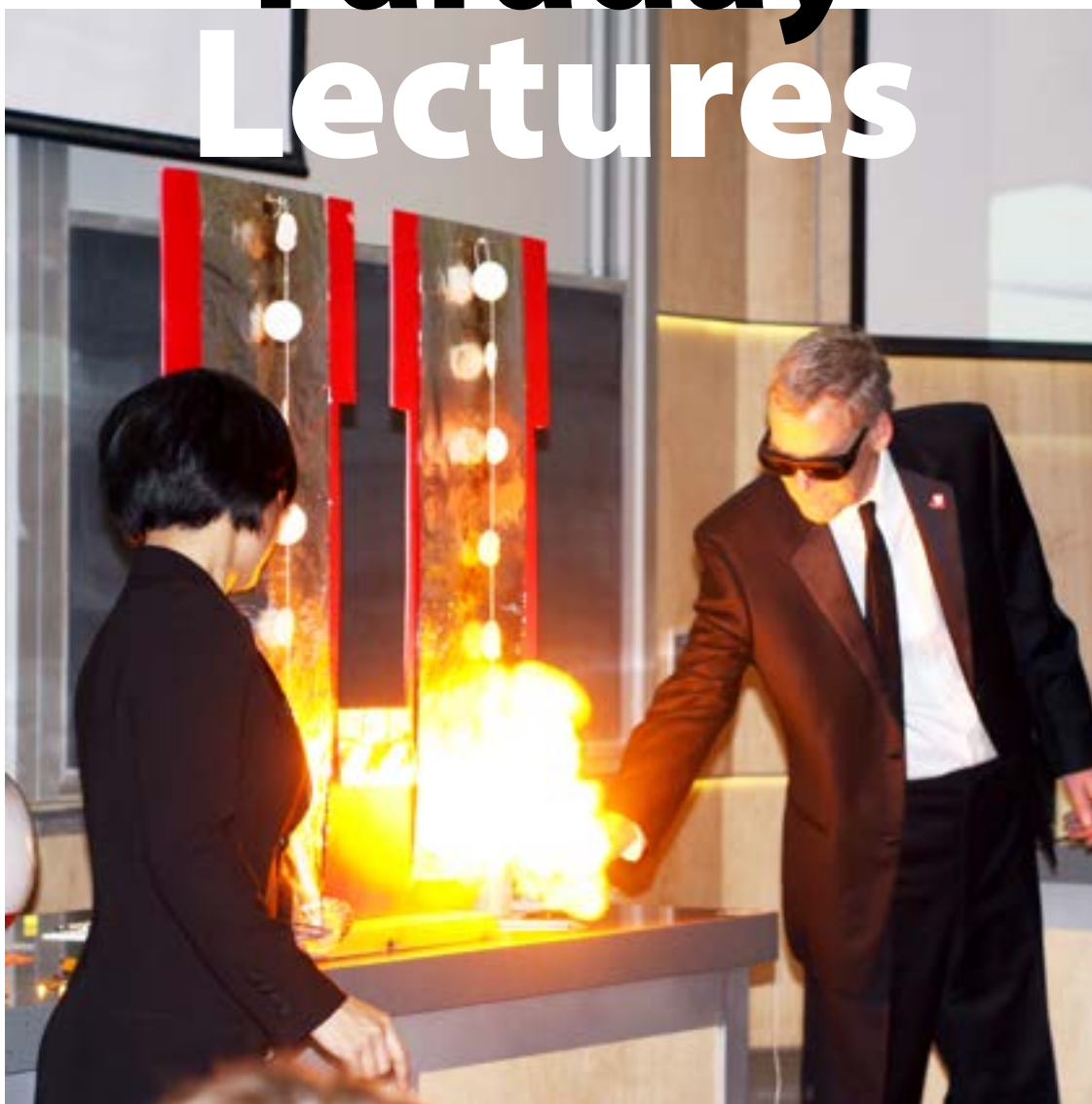
Being an executive officer gives Kaitlin the opportunities she's looking for as she carves her path towards becoming a professor. She loves the excitement of a classic chemistry demonstration, and is currently in Professor Tom Richmond's research group researching a safe way to do flame tests. Over the summer she organized two full days of 90-minute demonstrations at Granger High School.

Originally from Aurora, Colorado, Kaitlin was drawn to the U for its R1 research school rating, and she had an immediate sense of being at home the very first time she visited campus. Here at the U, she feels she's getting a good foundation for chemical education research.

The ACSSC is co-advised by Holly Sebahar and Tom Richmond. Sebahar has been co-advising the group for eight years, and though the student outreach events can be stressful to organize it's worth all the effort when she sees the kids arrive and their eyes light up when they see what hands-on science looks like. It's also a great way for her to get to know her students better as they manage the many different sides of organizing outreach events. They basically have to learn how to run a small business and figure out how to maximize profits and become more efficient.

Students really believe in the mission of ACSSC, and they bring their all as they improve the structure of the chapter and change the group for the better. Their contributions play a big role in the letters of recommendation they receive as they apply to medical, graduate, and law school. The biggest benefit of all, says Sebahar, is that they create life-long friendships with each other.

Faraday Lectures



This year tickets for the annual Faraday Lectures “sold out” within one week. This tradition is free and open to the public as Professors Janis Louie and Thomas Richmond inspire hundreds of kids with the wonders of chemistry.

Friday, December 6th, 2019 at 7:00 p.m.
Thursday, December 12th, 2019 at 7:00 p.m.
Friday, December 13th, 2019 at 7:00 p.m.

To get on an email reminder list for next year’s Faraday Lectures or to make a contribution to the department to support more student and community outreach send an email to anne.vivienne@utah.edu

Curie Club

Historically Under-Represented Scientists



Celebrating Inclusivity

The Curie Club was founded to help ensure that all historically under-represented scientists are given the opportunity to help shape the future for breakthroughs in medicine, the environment, new materials, and other discoveries critical to addressing our greatest global challenges.

- Envision & Organize multiple events a year for historically under-represented scientists.
Lectures • Panels • Community Outreach
- Create Partnerships with alumni, academics, industry leaders, and educational institutions.

**If you'd like more information or to get involved,
send an email to
anne.vivienne@utah.edu**

Each member of the Club is asked to make an annual tax-deductible contribution of at least \$500 to support and sustain the work of under-represented individuals in science. Undergraduate and graduate students enjoy free membership.

Students in Chemistry



Justis Aderibigbe
Undergrad, Junior
Dr. Janis Louie Research Group
Chemistry & Film Double-Major
REU Scholar
Ragsdale Scholarship Recipient

Justis is a double-major undergraduate in chemistry and film who is passionate about how art can bond with science to tell stories that motivate people to face the often overwhelming environmental crisis. He grew up in the Carribean where he was influenced by nature and his connection to it. Thanks to the guidance of Dr. Janis Louie, he understands the power of a well-crafted and rigorously researched scientific narrative. His passion is making sure the stories of science inspire people to take action to restore a healthy environment.

Justis has the opportunity to be part of a research lab as a Research Education Undergraduate (REU) scholar which also provides him with a stipend. As a member of Dr. Louie's research group, Justis has access to a deep well of scientific, research, and strategic knowledge. He is grateful for the opportunity he has to experience first-hand what it's like to work in a research lab and make deliberate choices about further schooling and his career. Not only is Justis an REU scholar, but he received a Ragsdale Scholarship as well.

Both of these opportunities allow him to pursue the education and career path of his dreams. Although he sometimes feels the pressure to decide exactly which path he'll follow, he more often feels the excitement of living out his childhood dreams: "Oh my gosh! I'm going to be a scientist!" Justis wants to give back as he works diligently to contribute to a well of community knowledge that can help restore and sustain a healthy environment for all.



Rong Cai, PhD
Minteer Group
Postdoctoral Position UC-Berkeley

Rong Cai started a postdoctoral position this fall at the University of California-Berkeley after she completed her PhD here in Dr. Shelley Minteer's group just this past summer. She arrived at the University of Utah after doing an undergraduate and master's degree in China at the Chinese Academy of Science.

She was drawn to the chemistry department at the U for its high-ranking and her love of Salt Lake City. Rong found a natural home in Minteer's group who uses nature as an inspiration for chemistry solutions. She admires how nature's catalysts work so efficiently, and wants to learn how they work to create solutions that are even more efficient.

Her research while at the U investigated the kinetics of isolated nitrogenase and the thermodynamics of its cofactors under catalytically relevant conditions. By employing a pyrene-modified linear poly(ethylenimine) hydrogel to immobilize the catalytic protein of nitrogenase onto an electrode surface. The resulting electroenzymatic interface enabled direct measurement of reduction potentials associated with each metallocofactor of the nitrogenase complex, illuminating the role of nitrogenase reductase in altering the potential landscape in the active site of nitrogenase and revealing the endergonic nature of electron transfer steps associated with the conversion of N_2 to NH_3 under physiological conditions.

Chemistry Alumnus Victor Cee

Director of Research, Amgen

"We're really seeking to cure cancer."



Gary Keck and Victor Cee

As Director of Research at Amgen, Victor Cee and his researchers are creating medicinal therapies to treat and cure cancer patients. They recently created a potential therapy for a gene that is mutated frequently in cancer. His extraordinary work now can be clearly traced back to his love of chemistry and his desire to pursue a medical career as a high school student.

His love for chemistry took root here on campus when he was a high school student participating in the summer programs that continue today here at the U's chemistry department. He has long been interested in building molecules

with his hands, and now he's leading research in cutting-edge oncological therapy during what he refers to as, "a golden age of understanding of the molecular drivers of cancer."

Victor spent two high school summers here not only doing hands-on research, but also observing the university students and professors. He decided he wanted to be like all of these people: doing really exciting research and contributing to society in a way that truly helps people. Victor continued his research experience as an undergraduate in Gary Keck's group, and went on to complete his PhD at Harvard University.

Recently, Professor Ryan Loper invited Victor back to the U's chemistry department to deliver a seminar about the discovery of AMG 510, a first-in-human covalent inhibitor of KRASG12C for the treatment of solid tumors.

In preclinical tumor models, when AMG 510 was seen to be capable of inducing tumor regression when dosed orally once daily as a single agent. AMG 510 is currently in a Phase I clinical trial evaluating safety, tolerability, PK, and efficacy in subjects with solid tumors with the KRASp.G12C mutation.

The Noble Friends of Chemistry

*Thank you for all of your generous gifts to the Department of Chemistry this year!
The following list represents gifts made from January 1, 2019 to October 1, 2019.*

Rn

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\$10,000+**

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Deborah L. Burney-Sigman
David P. Sorensen
Feng Wang

Community of Giving



Joel Harris and Mike Hunnicutt

Last spring we announced the establishment of the *Harris Endowed Graduate Scholarship* that was established with a generous \$100,000 lead gift by Mike and Sally Hunnicutt. They've also pledged to match an additional \$100,000 of your generous donations.

As of October 15, 2019, we are getting close to reaching our goal with \$73,993 thanks to so many generous friends and alumni of the Department of Chemistry. With the help of more generous gifts at this time of year, we'll be able to reach the \$100,000 match offered by the Hunnicutts.

Scholarships will go to graduate students in analytical chemistry.

To make a contribution online, visit:

www.umarket.utah.edu/ugive/index.php?gift_id=3324

Or call Anne Vivienne 801-585-7896

Want to leave a legacy of your own?

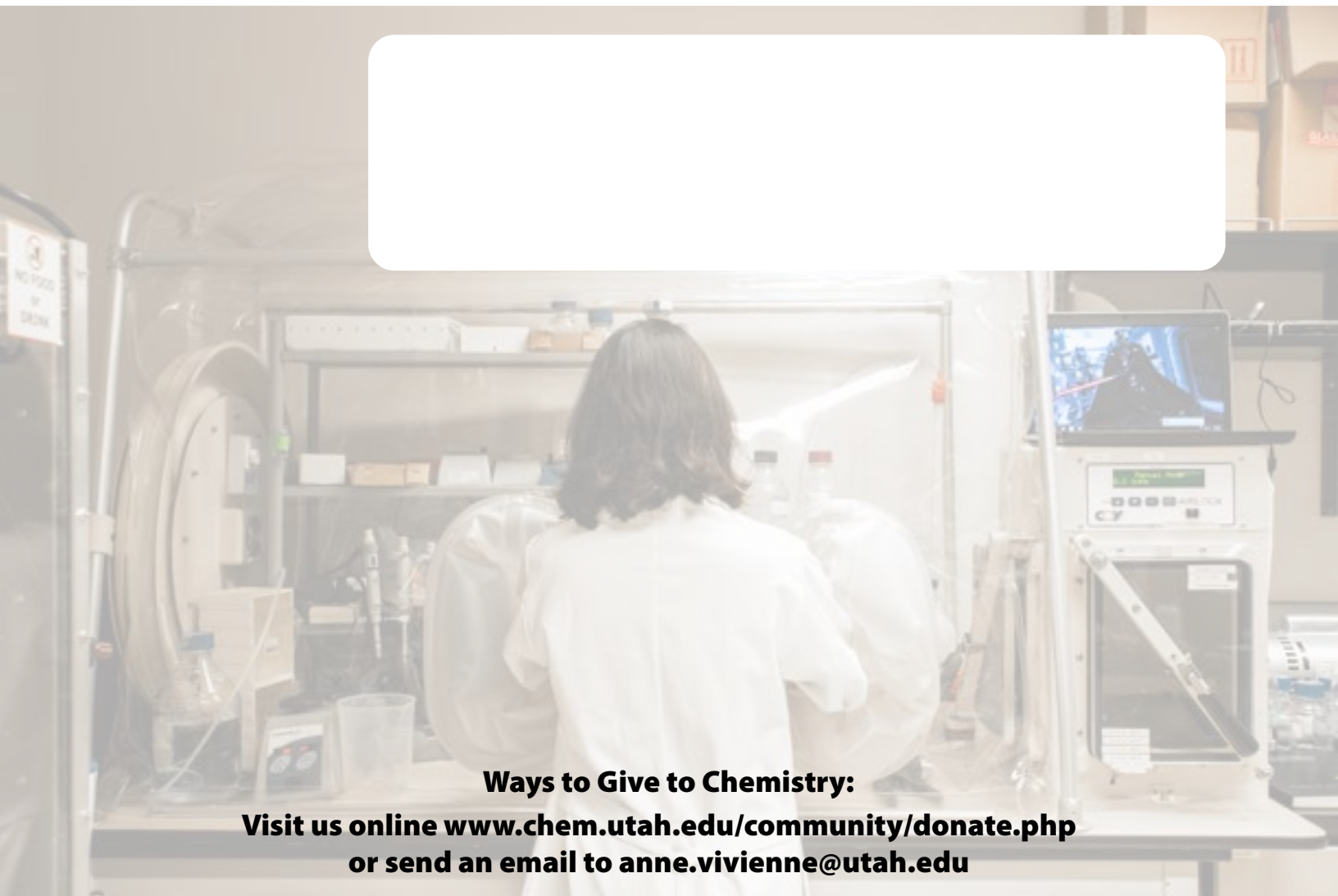
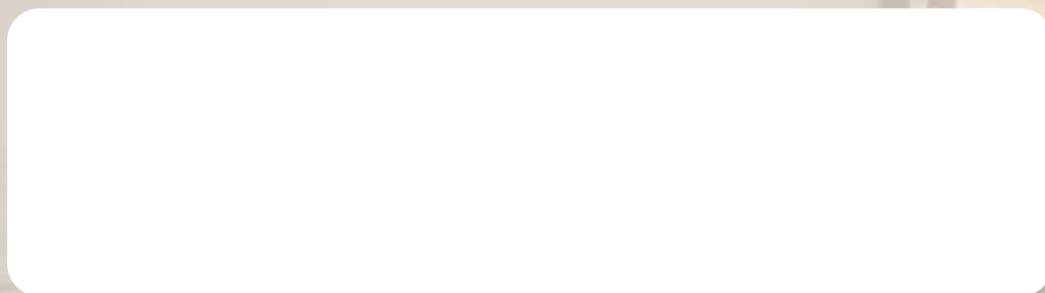
You can donate to the Department of Chemistry and leave your own legacy that will impact hundreds of current and future chemists who are committed to making the world a better place.

Contact Anne Vivienne at (801) 585-7896 or anne.vivienne@utah.edu

You can also make a donation on our website: www.chem.utah.edu/community/donate.php

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Jack & Peg Simons Endowed Professorship

Critical in attracting and retaining world-class researchers to our department, and will provide resources beyond conventional federal and state funding.

Undergraduate Scholarships

Scholarships enable us to offset tuition costs, reward high-achieving students, and improve students' quality of education.

Gary E. Keck Endowed Graduate Fellowship

This fellowship will provide financial support to one graduate student pursuing a PhD in Chemistry each year.

Curie Club

The Curie Club provides travel awards, workshops, regular community events, and networking opportunities for historically under-represented individuals in chemistry.