

# Newsletter

June 2021 Issue 7



# DEPARTMENT OF CHEMISTRY

## A Message From the Head



**Matthew Paige**

Dear colleagues and friends, well that was an interesting year!

The Department has just completed a remarkably challenging, exhausting but genuinely inspirational academic year. We have successfully navigated the difficulties of delivering our undergraduate program using remote methods and running our research programs under tight in-person Covid-19 restrictions. In brief summary, the Department has delivered more than 35 classes serving over 3800 students; seen the successful defense of 12 PhD and 2 MSc theses; and published more than 80 research articles in the peer-reviewed scientific literature, all while keeping students, staff, and faculty safe and healthy. We have also welcomed many new graduate students, including international students, despite the challenges of the pandemic. A sampling of some of the exciting stories unfolding in the past year are described in this year's newsletter. At the beginning of this year, I stated that this was the Department's

opportunity to achieve something remarkable that has never been done before, and we rose to the challenge in spectacular fashion. I cannot thank our students, staff, and faculty enough for their efforts. There are too many heroes to list here and identifying just a few would be a disservice to all of those who made tremendous efforts throughout the year. Thank you, everyone.

Moving into the summer, we are still facing a great deal of uncertainty as to how the next academic year will unfold. As of writing, we are anticipating a major increase in on-campus activity and if not quite a full return to normal, then at least the beginning of it. We are looking forward to seeing each other again, in person, but mindful that we need to be flexible and ready for unexpected changes.

We hope you are all well, and welcome all of our alumni to keep in contact with us as the year progresses. Please keep in touch and accept our best wishes for a healthy and successful year.

**BE WHAT THE WORLD NEEDS**

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<https://artsandscience.usask.ca/chemistry/>

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# Faculty Awards



**Tara Kahan**, Canada Research Chair in Environmental Analytical Chemistry, received the College of Arts and Science 2021 New Scientist Research Award. The award is presented annually to faculty members who have had an exceptional impact in their field and received their highest degree less than 10 years ago.



**Lee Wilson** received the Global Institute for Water Security 2021 Water Security Research Excellence Award – Research Staff. This annual award is given in recognition of outstanding excellence in water security research.



**Chris Phenix** received the College of Arts and Science 2020-21 New Teacher Award in BSc Programs. The annual award is presented to a teacher who delivers outstanding for-credit instruction in the College of Arts and Science.

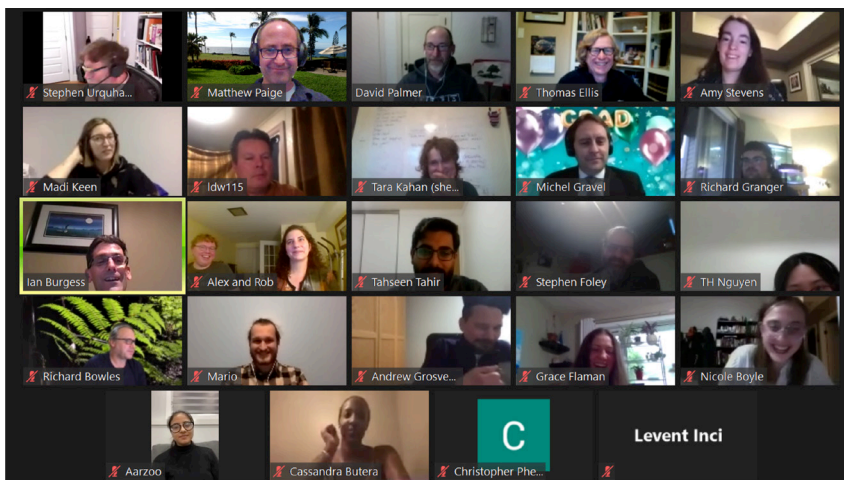


## Department Milestones

As of 2021, **Tim Kelly** (below left) has been with the department for 10 years, and **David Sanders** (below right) for 20 years. Scientific Glassblower **Rick Elvin** (bottom) has been with the department for 35 years!



# Graduation Celebration



In-person convocation ceremonies were cancelled for 2020-2021 due to the pandemic, and the department realized that for many students, their last experience with USask would be an examination, rather than a celebration. So, on June 10, 2021, the Department held a Chemistry Graduation Celebration for our 3-year, 4-year, and Honours B.Sc. graduates. **David Palmer** was the organizer and host for a live-remote evening attended by most of the faculty, instructors, and graduates.

Each student attending was asked about the reason they chose Chemistry, their favourite memory from their time in our program, and their future plans. In addition, the research supervisor for each student offered a brief reminiscence. **Stephen Urquhart** spoke about the Association of the Chemistry Profession of Saskatchewan, and department head **Matthew Paige** addressed the graduates to wish them all the best in the future. Some of the fondest memories from the students included research lab experiences, favourite courses, late-night study sessions, and a particularly memorable karaoke night! There was plenty of laughter as everyone celebrated the success of our students through this most challenging year.

## Department News

Two faculty received new 2021 NSERC grants this year. **Amy Stevens'** Discovery Grant (Shining a New Light on Biexcitonic Processes: Novel Molecules and DNA Origami) will allow her group to create bespoke DNA origami structures for a range of applications. The primary goal is to create a scaffold structure that will precisely position a new class of conjugated molecules, such that their photoenergy can be directed along new exotic de-excitation pathways. This will enable the creation of new materials with enhanced solar energy absorption and transport, and better understanding of the photophysical principles underlying these energy-transfer processes.

**Lee Wilson's** Discovery Grant (Development of Advanced Functional Biopolymer Composites with Tunable Physicochemical Properties) has an overall goal to develop biomaterial-based nanocomposites with tunable properties and to gain a greater understanding of the structure-function relationships related to their

heterogeneous sorption properties in aqueous media. Research will contribute new fundamental knowledge to the field of nanocomposite materials and technological solutions for diverse sorption-based applications relevant to food and water security, environmental remediation, and sustainable materials for Canada's future.

**Chris Phenix** was awarded US\$150,000 by the Michael J. Fox Foundation to develop diagnostic radiotracers for early detection of Parkinson's Disease. The Saskatchewan Health Research Foundation contributed \$40,000 in matching support for the project.

**Matthew Macsymic** joined the department on February 1 as Storekeeper in Chemistry Stores. Matthew previously worked in the aviation industry. Chemistry Stores was also staffed this year by **Natasha Vetter** (PhD student, Palmer Group), **Bipin Unni** (PhD student, Burgess Group), and **Tracy Lee**.

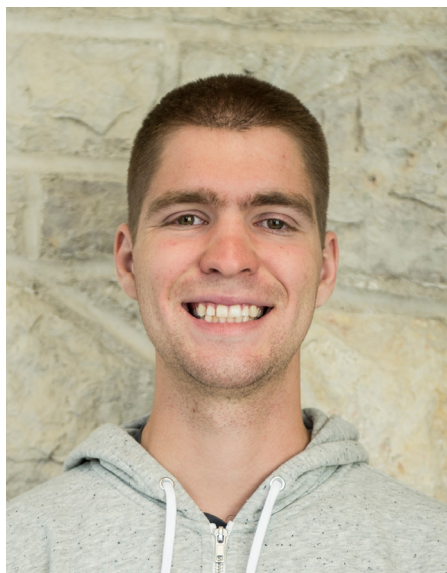
Normal outreach activities were not

possible this year due to the pandemic; however, **Amy Stevens** spoke to high school students at the sci-fi camp DiscoverSTEM in May about pulsed lasers in research and bioluminescence in nature.



Matthew Macsymic

# Taube Medal



## 2021 Taube Medallist

Dr. Arthur Situm

The 2021 Taube Medal was awarded to **Arthur Situm** who recently completed his Ph.D. degree under the supervision of **Andrew Grosvenor**. Arthur's development of methods to analyse heterogenous materials using advanced synchrotron-radiation techniques to aid Saskatchewan mining companies address issues related to safety and environmental sustainability has resulted in several achievements. This research theme can be further broken down into two specific projects: (1) Developing X-ray microprobe and X-ray absorption near-edge spectroscopy (XANES) methods to study the corrosion of polymer-coated steel rebar at the polymer/steel interface and (2) Developing X-ray microprobe and XANES methods to identify and quantify the Ca and U speciation of solid tailings from a uranium milling operation.

Project (1) was performed in collaboration with the **Ian Burgess** research group and three potash mining companies (Nutrien, BHP, Mosaic) as well as the International Minerals Innovation Institute. The corrosion of rebar imbedded in concrete results in significant resources having to be devoted to repairing concrete infrastructure as concrete spalling can lead to safety issues. This type of corrosion (i.e., concrete corrosion) is particularly prevalent in potash mining/milling facilities owing to the presence of high concentrations of chloride ions, which accelerates the process. One way to mitigate this issue is to use polymer coated rebar to restrict chloride ions diffusing through the concrete to the rebar surface. One issue with studying the effectiveness of polymer coated rebar to mitigate corrosion is that most techniques require the removal of the polymer coating to study the corroded steel surface, which limits the ability to perform long-term testing. Arthur's research demonstrated spectromicroscopy methods that allow for the detection of corrosion of polymer coated rebar materials without removal of the polymer layer. This methodology first involves collection of X-ray microprobe maps at specific excitation energies to locate corroded regions at the polymer/steel interface followed by collecting XANES spectra to identify corrosion products. This method will enable long-term corrosion testing to be completed on samples non-destructively so as to help develop materials (including coatings) to mitigate concrete corrosion.

Project (2) focussed on improving spectromicroscopy methods to study Ca- and U-bearing phases in tailings from the tailings management facility (TMF) operated by Orano Canada at McClean Lake, SK. Tailings are the solid waste that results from the extraction of uranium

oxide from the ore. The tailings are held in the TMF and Orano is required to study these materials to understand how they change over the long term to ensure that solid state endpoints form that are insoluble in the pore water so that elements of concern do not leach out into the surrounding environment. Arthur's research resulted in the development of a detailed understanding of the Ca-bearing species present in the tailings and as well as the development of methods that allow for the collection of high-quality U X-ray microprobe maps. (A press release that describes Arthur's studies on the U chemistry in the tailings was sent to various media organizations by the Canadian Light Source ([https://www.lightsource.ca/news/details/protecting\\_saskatchewan\\_lakes\\_from\\_contamination](https://www.lightsource.ca/news/details/protecting_saskatchewan_lakes_from_contamination)!)) Arthur's findings have provided Orano with the tools to monitor how the tailings change over time. Arthur's thesis research led to the publication of seven articles for which Arthur was the first author of four of them.

## New Graduate Student Awards

Two new awards for Chemistry graduate students have been established. The Sahtout Graduate Scholarship for Students with Disabilities was created from a gift by **Naheda Sahtout** (PhD'21) and family to recognize the academic performance of graduate students with a disability studying in Chemistry in the College of Arts and Science. The annual award has a value of \$1,000, and is open to graduate students who are studying in a masters or doctoral program in the Department of Chemistry and are registered with Access and Equity Services (AES) with a disability. If in any given year there are no eligible graduate students in Chemistry, thesis-based graduate students in Biology, Computer Science, Geological Sciences or Physics and Engineering Physics who are registered with a disability with AES will be eligible based on academic achievement.

The Ian J. Burgess/Jackfish SEC Award in Spectroelectrochemistry recognizes the research achievements of trainees in the Department of Chemistry, with a very strong preference given to students studying, in this order, spectroelectrochemistry, vibrational spectroscopy, and/or electrochemistry. The award is a gift from **Ian Burgess** and is initially valued at \$5,000 for at least the first two years. The award is open to graduate students, undergraduate students, or post-doctoral fellows working in a research laboratory within the Department of Chemistry. Selection will be based on academic achievement. The first recipient will be awarded later this year.

## Recent Graduates

### Fall 2020

#### Doctor of Philosophy

Soumya Kundu  
Theerawat Prasertanan  
Sajna Simon  
Arthur Situm  
Sudheesh Veeranmaril

### Spring 2021

#### Bachelor of Science Honours

Manahil Arshad  
Nicole Boyle  
Chidiebere (David) Chukwu  
Grace Flaman  
Richard Granger  
Liam Newman  
Mario Proulx

### Spring 2021

#### Bachelor of Science 3 Year

Jesse Parenteau  
Kristina Rance  
Brenden Zatorski

#### Master of Science

Whitney Shannon  
Alfred Yeboah

#### Bachelor of Science 4 Year

Aarzo Aarzo  
Madison Anderson-Keen  
Cassandra Butera  
Satinderpal Kaur  
Andy Luu  
Thu Hien (Helen) Nguyen  
Calum Petersen  
Muhammad Tahseen Tahir  
Zexian Zhou

#### Doctor of Philosophy

Henry Agbovi  
Mohadeseh Majdi Yazdi  
Richard Pettipas  
Jeveria Rehman  
Naheda Sahtout  
Sadegh Shokatian  
David Sowah-Kuma  
Kelly Summers  
Nataliya Zalatar

## Student Awards

Harold Ross Saddington Award (\$7,000 each)

Grace Flaman (BSc Hon'21)

Bernd Steiger (PhD student, Wilson Group)

Annastacia Stubbs (PhD student, Kahan Group)

Robert A. Fuller Award (\$6,000)

Mario Proulx (BSc Hon'21)

Herzberg Fellowship (\$5,000)

Chase Radford (PhD student, Kelly Group)

Patricia Currie Award (\$1,000)

Manahil Arshad (BSc Hon'21)

Sahtout Award (\$1,000)

Arthur Situm (PhD'20, Grosvenor Group)

Thorvaldson Scholarship (\$800)

Shaoyan Wang (BSc Hon student)

Dr. O. Kenneth Johansson Scholarship (\$500)

Paul Aigbogun (PhD student, Krol/Phenix Group)

William Barrett (MSc'20, Scott Group)

Satavisha Bhattacharya (PhD student, Mueller Group)

Moralba Dominguez Garcia (PhD student, Price/Phenix Group)

Annastacia Stubbs (PhD student, Kahan Group)

2021 Graduate Students' Association Award for Excellence in Community Service

Amara Zuhaib (PhD student, Urquhart Group)

2021 Graduate Students' Association Award for Research Excellence in Interdisciplinary Studies

Henry Agbovi (PhD'21, Wilson Group)

Dean's Most Outstanding Graduate in Chemistry

Grace Flaman (BSc Hon'21)

## Alumni Updates

**Raymond Bennett** (MSc'20) is working as a Research Scientist at Coloursmith Labs, Inc.

**Soumya Kundu** (PhD'20) is a post-doctoral fellow at the University of Victoria.

**Rick Pettipas** (PhD'21) is a post-doctoral fellow at the University of Calgary.

**Arthur Situm** (PhD'20) was awarded an NSERC post-doctoral fellowship and is in the Department of Chemistry, University of Western Ontario.

**Henry Agbovi** (PhD'21) is working as Assay and Water Treatment Laboratory Supervisor, SSR Mining Inc., Seabee Gold

Operations in Saskatoon.

**Dawn Pratt** (MSc'11) founded Askenootow STEM Enterprise Inc., and works as a consultant for the Federation of Sovereign Indigenous Nations.

**Sudheesh Veeranmaril** (PhD'20) is a post-doctoral fellow in Chemical Engineering at McMaster University.

**Brandon Chivers** (MSc'20) is working as Lead Analyst at Zyus Life Sciences in Saskatoon.

**William Barrett** (MSc'20) is a regional sales representative for K'(Prime) Technologies.

# Remote Labs

If we could sum up our experience in remote learning into one word, it would be: **PIVOT**. At every turn of teaching chemistry this past year, we had to adjust to new teaching methods, new ways to evaluate work, new ideas to turn in-person laboratories into a socially distant experience. Laboratory staff were tasked with creating and editing videos and online content, utilizing a completely new learning management system, and teaching TAs how to run labs via videoconferencing software. The challenges required teamwork, creativity and intense problem solving as each part was implemented.

Students were able to interact with TAs and each other from various parts of the world and watch demonstrations during live, online lab sessions. They had the opportunity to chat, answer poll questions, write and submit reports online, make their own videos, complete group work and even participate in breakout escape-room style labs. We are so proud of what we were able to accomplish in such a short time, and incredibly proud of our students and TAs for their ability to adapt to learning remotely.

We are looking forward to a return to in-person laboratories soon. We've missed the sound of hundreds of pieces of glassware on bench tops! Can you imagine that?



Teaching Assistant **Andrew Ansah** preparing a CHEM 115 lab



One of the Chemistry video studios



Editing and sound recording booth, a.k.a. an office



Lab Manager **Alex Bartole-Scott** in a remote demo on Instagram

# Lab Refurbishment

Thorvaldson 207 has been refurbished and is open for business as **Amy Stevens'** research lab. The lab was formerly a chemical synthesis lab run by Pharmacy professor emeritus Jonathan Dimmock for over 40 years. The refurbishment planning began in March 2020 with Colleen Funk of Facilities Management as the project manager. The pandemic and closing of campus put this on pause, however, but planning resumed in July, a budget was outlined by September, and in early February 2021, Dunmac Contractors began demolition. A new fume hood, solvent-resistant countertops (tested for tetrahydrofuran resistance), and a fresh coat of paint followed, and the Stevens Group moved into the lab on June 1, 2021. The lab's reincarnation is as a general dye and DNA sample preparation area and the future home of various biochemical and optical-characterization techniques.



## Chemistry Course Council (CCC)

Due to the pandemic, aside from the election of a new executive, the CCC did not embark upon any activities this year. The CCC Executive in 2020-21 was comprised of:

**Alfred Yeboah** (President)

**Ahmad Salehi** and **Srikant Singh** (Secretary)

**Maryam Alyari** (Treasurer)

**Claudia De Avila Braga** (Public Relations)

**Doug Fansher** (Department Meeting Rep)

**Iyanu Kumayon** (Graduate Students' Assoc. Rep)

**Ruhisha** (Safety Committee Rep)

**Stephen Awuku** (Graduate Affairs Committee Rep)

**Hillary Mehlhorn** (Women in Chemistry Rep)

## Chemistry Students' Society (CS2)

The CS2 experienced a year of unprecedented challenges. However, several events were held aimed at retaining the comradery and community that has been the longstanding priority of the CS2. Yet another successful Research Night was held, as well as several games nights, including a chemistry-themed Jeopardy! night wherein members and faculty alike were given the chance to socialize in this weird year. The CS2 would like to wish the best for 2021 graduates, and looks forward to seeing everyone on campus next year!

The CS2 Executive in 2020-21 was comprised of:

**Liam Newman** (President)

**David Chukwu** (VP Internal)

**Abby Unrau** (VP Finance)

**Grace Flaman** and **Manahil Arshad** (VPs External)

**Mario Proulx** (VP Academic)

**Nicole Boyle** (4th Year Rep)

**Cindy Li** (3rd Year Rep)

**Richard Granger** (Member at Large)

## Women in Chemistry

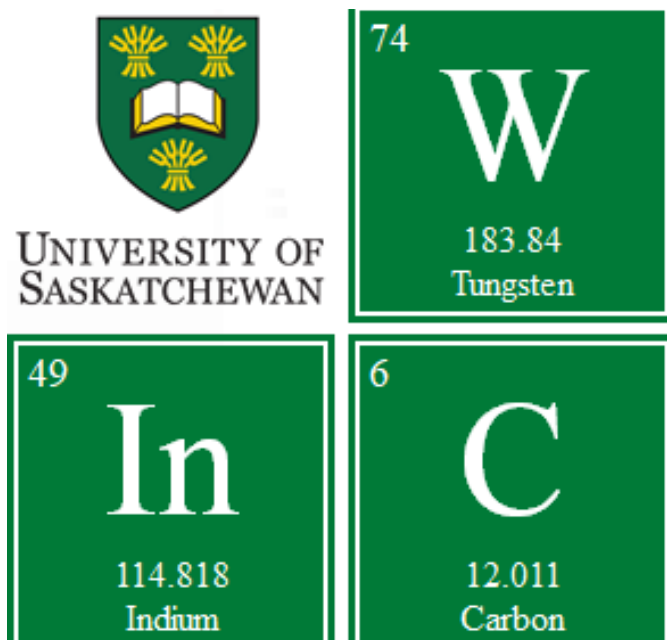
The University of Saskatchewan-Women in Chemistry (USask-WIC) group remains dedicated in its efforts in advocacy to support women and underrepresented groups studying or working in science, technology, engineering and math (STEM) fields, even during unprecedented times.

Despite the difficulties brought about by last year's events, WIC strives to stay connected and reach the community virtually to spark interest and start discussions about uplifting women and underrepresented groups and the importance of equity, diversity and inclusion, while also raising awareness about opportunities in STEM fields to our community. To facilitate these discussions, WIC implemented a novel Coffee Over Zoom series, organized by Co-Chair **Hillary Mehlhorn** (MSc student, Price Group), during which remarkable professionals of various scientific backgrounds were invited to shed light on their experiences working in STEM fields. Invited guests included **Jacque Cawthray** (Research Associate, Price Group), **Rahin Sifat** (MSc'18) (Hillberg & Berk Product Testing and Quality Assurance Coordinator), and **Upasana Das Adhikari** (a postdoctoral fellow in the Kwon lab at Harvard University), all of whom delighted us with powerful stories and offered great advice.

WIC hosted events to highlight the importance of mental health in February with Mental Health Awareness Month, which ended with a virtual yoga event. WIC also hosted Science Trivia Night and several holiday events, and plans to host many more in the new school year.

USask-WIC is undergoing a turnover and calling for nominations

for the executive team. If you are interested in joining USask-WIC as an executive member, please contact [womeninchemsask@gmail.com](mailto:womeninchemsask@gmail.com) for more information.



# Thorvaldson Bond Project

During the pandemic, much needed deferred maintenance work funded by the *Thorvaldson RenewUS Bond Project* was able to move forward. Project Manager, Colleen Funk, was able to coordinate a number of external contractors and Facilities staff to work safely on significant repairs, replacements, and upgrades.

Some highlights that have been completed or are in-progress:

Electrical – upgraded two transformers in the 1966 wing

Plumbing – replaced isolation valves throughout the 1966 wing; and replaced water-cooled air conditioners

HVAC – rebuilding the four main building ventilation fans for the 1966 wing; rebuilding several fume hood fans; and updating the controls to the 1966, 1924, and Annex wings

The following are some highlighted items that will be undertaken in the coming months:

Plumbing – replace the hot water heater; insulated the building's main water service; replace sump pumps; and replace radiant heat valves

Architectural – repair coping stone on parapet; and adjust grading around building exterior

The work undertaken will extend the life of the building systems, provide better access for renovations and repairs, and preemptively repaired equipment that was on the verge of failure. Although much of the work cannot be seen as it was done behind walls or in mechanical rooms, the impact to the building systems will be noticed for years to come.



**Existing hot water tank to be removed and new tanks ready for installation**



**Approximately 160 domestic water valves and 80 heating valves have been abated and replaced**



**One of four rebuilt main building ventilation fans**



**Installation of new water meter and water feed**



# First Year Engineering Chemistry Courses

Many students at the University of Saskatchewan will experience the Department of Chemistry while taking a first-year class. A particularly important cohort of students comes from the College of Engineering, and the CHEM 114 course was specifically tailored for these students. Recently, the College of Engineering decided to completely reimagine its first-year program, starting with a blank slate, and asking themselves “What would we do if we could do anything?”. The RE-ENGINEERED first-year program is bold and innovative. In their own words: “You won’t find another program like it anywhere”. (See <https://engineering.usask.ca/documents/students/re-engineered-student-handbook-2021-2022.pdf> for further details).

For the past three years, the Department of Chemistry has been collaborating with the College of Engineering to reimagine chemistry courses in their new program. It has been at times challenging (for example, their first-year schedule is unlike anything in the College of Arts and Science), but it has also created opportunities to think about how we teach and assess our students. Starting in Fall 2021, engineering students will initially take CHEM 142: “The Global

Impact of Chemistry for Engineering”, a 1 CU course with lectures and labs. It is integrated into the Natural Science Series, along with similar courses in biology, geological sciences and physics. This will be followed in Term 2 by CHEM 146: “General Chemistry for Engineering”, a 3 CU course with lectures and labs that combines content from CHEM 112 and CHEM 115. Throughout both courses, goals are achieved and exemplified using an overarching theme of the role of carbon dioxide in the global climate change crisis.

Many people, up to the Deans of the two colleges, have been working many hours to make all of this happen. This includes Professors **Ian Burgess**, **Tom Ellis**, and **Matthew Paige** and Lab Managers **Alex Bartole-Scott** and **Adrian Clark** from the Department of Chemistry, along with Professors Evitts, Frey, Huang, Maw, and Meda from the College of Engineering. Both colleges have invested new resources, and as a result, the department has been able to acquire and equip additional lab space (Thorvaldson 212) for the CHEM 142 and 146 labs. Much work remains to be done, but we look forward to welcoming the first group of students later this year.

# Herzberg Nobel Prize 50th Anniversary



Gerhard Herzberg

As part of a national initiative to mark the 50th anniversary of **Gerhard Herzberg's** Nobel Prize in Chemistry, the University of Saskatchewan is partnering with heritage education organization Defining Moments Canada, Canadian Heritage, and the National Research Council of Canada (NRC) on a major digital project that will showcase Herzberg's life and achievements to a wide public audience including high school students.

Led by Defining Moments Canada with funding and other support from Canadian Heritage and the NRC, Herzberg50 will highlight Herzberg's life and his longstanding impact on science and science policy.

An interactive website targeted at youth and teachers will include innovative digital mapping created by Esri Canada.

The project will also be supported by archival and historical research at USask, Herzberg's academic home for 10 research-intensive years after he was brought to Canada from Germany in 1935, through efforts led by USask's first president Walter Murray.

Herzberg50 will inaugurate a larger commemoration project—NobelCanadian—honouring all Canada's Nobel Laureates which will get underway in 2022-2023. USask has two Nobel Laureates, both in chemistry: Herzberg and **Henry Taube**.



## Wilson and Florence Quail Fund in Chemistry



**Wilson Quail** was a faculty member in the Department of Chemistry for 39 years before retiring in 2003. He enjoyed this long career as an inorganic chemist and crystallographer, studying everything from metal fluorides to proteins. He

continued to work as an emeritus professor in the Saskatchewan Structural Sciences Centre for over a decade, collaborating with researchers in the department. He and his wife Florence sent all their children to USask, cementing a strong relationship between the University and the Quail family. In 2017, Wilson and Florence agreed to a generous gift to the department, with the goal of helping new faculty with their research. In 2021, the funding committee awarded \$10,000 to **Tara Kahan** for graduate student stipend support; \$10,000 to **Eric Price** for vacuum pumps; and \$20,000 to **Amy Stevens** for graduate student stipend support and research consumables. The department asks everyone to join us in thanking the Quails for their generosity and support of Chemistry.

For information on how you can support research, teaching and student experience in the Department of Chemistry, please contact the Department Head.

## Retirement Goals



Retired Professor **Steve Reid** has been enjoying his retirement gift from the department during the past year! Pictured here is his campsite at Southend Campground, Kingsmere Lake, Prince Albert National Park in November 2020.



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We're always interested in knowing what our alumni are up to! Please send updates to [chem.dept@usask.ca](mailto:chem.dept@usask.ca).

Make sure we have your current contact information to receive your college magazine or newsletter, the Green & White alumni magazine, event invitations, and information on special University of Saskatchewan alumni programs and offers. Go to <https://alumni.usask.ca/contact-us/update-information.php> to update your contact information.

We acknowledge that we live and work on Treaty 6 Territory and the Homeland of the Métis. We pay our respect to the First Nations and Métis ancestors of this place and reaffirm our relationship with one another.