WE'D LOVE TO HEAR FROM YOU!

Alumni are invited to share updates and news for future newsletters. Photos are always a welcome addition! Please include your program and year of graduation.

UNIVERSITY OF NORTH DAKOTA
CHEMISTRY

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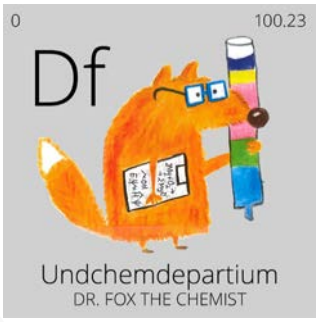
CHEMISTRY

Fall 2023 Newsletter



WELCOME FROM THE CHAIR

Alena Kubátová, Ph.D.

Greetings Chemistry Friends,

I am happy to share the happenings of another special year in the UND Chemistry Department. Three new faculty members, Drs. Weixin Huang, Ayush Asthana and Paul Pansegrau, have joined the department. We will introduce them in the following pages. We are excited to welcome them and are happy that with their expertise and interests, students will have more unique opportunities in research and coursework. While mentioning our faculty, I would like to express my deep appreciation to our Adjunct faculty, some of whom you will also meet in our newsletter.

One facet of students' experiences is a new National Science Foundation REU (Research Experience for Undergraduates) site under the leadership of Professor Guodong Du. The new REU grant provides opportunities to Midwest students, continuing in a long tradition since 2004 of REU sites in collaboration with Chemical Engineering and other STEM departments. These collaborations are also reflected in the research projects currently conducted in the Department, supported through 20+ grants from a variety of agencies (DOE, DOD, NSF, USDA, etc.) and resulting in a number of peer-reviewed papers. In particular, I would like to highlight the newest awards, both from NSF, received by Drs. Sui and Zhao. You will also learn more about these developments in this Newsletter.

Dr. Kubátová with her research group, Summer 2023

Our ongoing goal is to provide a quality experience to students, both within the Department and campus-wide. Last year, we had many fantastic seminar speakers; among them, you will read about our Abbott Lecturer, Dr. Phil S. Baran from the Scripps Research Institute, and Dr. Stephanie Vivod from NASA, Glen Research Center, Cleveland, as well as our Alumni sharing their past experiences during the Homecoming through the Alumni Virtual Panel and lecture by Dr. Sarah Severson Snow.

Our students are fantastic! Their efforts are well reflected in course work, attendance of conferences, awards they have received, and the outreach they have conducted to promote science at the K-12 levels. As part of our Homecoming, we celebrate scholarship awardees whose scholarships are supported by our Alumni, which we leveraged with the funding obtained from the NSF S-STEM Grant award.

Finally, we are happy to share our initial plans for the STEM-Engineering complex, which is proposed to be built next to Abbott Hall, providing new learning facilities for our students as well as expanding our research infrastructure.

Alena Kubátová

WELCOME
NEW FACULTY

Ayush Asthana
Assistant Professor

Dr. Asthana's research efforts aim to develop new methods for computational chemistry using quantum computers. Today, computational chemistry plays an important role in tackling some of the biggest scientific challenges, from developing new-age solar cells to technology for artificial photosynthesis. Asthana aims at advancing the reach of computational chemistry by employing upcoming quantum computers, that make use of quantum properties of entanglement and superposition to simulate quantum systems.

Asthana received his PhD in Chemistry from Johns Hopkins University in 2021 with Prof. Lan Cheng. During this time, he worked on developing electronic structure methods for heavy-element chemistry where relativistic effects start to play a prominent role. After graduation, Asthana moved to the Virginia Tech Quantum Center as a postdoctoral research associate working at the intersection of quantum chemistry and quantum computing. He was advised by Prof. Nick Mayhall and collaborated with Prof. Sophia Economou and Prof. Ed Barnes. Asthana believes that emphasis on good teaching is as important as advancing scientific research, in order to serve the long-term interests of society.

Paul Pansegrau
Teaching Assistant Professor

Dr. Paul D. Pansegrau has recently joined the Department of Chemistry as a Teaching Assistant Professor. Dr. Pansegrau's teaching duties include a variety of undergraduate organic chemistry courses, including Survey of Organic Chemistry, Organic Chemistry I, Survey of Organic Chemistry Laboratory, Organic Chemistry I Lab and Organic Chemistry II Lab. Future courses will include Drug Chemistry and Toxicology, and Spectroscopy and Structure.

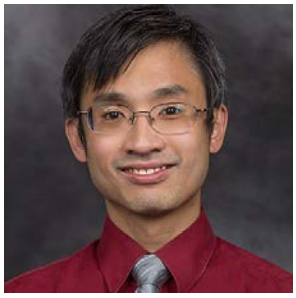
Dr. Pansegrau has a long history with both the University of North Dakota (UND) and Grand Forks. Dr. Pansegrau grew up in Grand Forks, graduating from Red River High School in 1977. Dr. Pansegrau then attended UND from 1977 to 1981, graduating from the same department he is now a faculty member of, with a B.S. in Chemistry (ACS Certified). After a long absence from the area, Dr. Pansegrau joined the Energy & Environmental Research Center (EERC) at UND in 2007 to assist with the Defense Advanced Research Projects Agency (DARPA) Biofuels I and Biofuels II projects.

Dr. Pansegrau earned a Ph.D. in Organic Chemistry from Colorado State University in 1985. He then conducted post-Doctoral research at Ohio State University. He began an industrial career with Monsanto Agricultural Company in St. Louis in 1987. His industrial career spanned 30 years, including research and managerial positions with Bristol-Myers Squibb Company, Dakota Gasification Company, Ecology & Environment Inc., and Golder Associates Inc. He began a teaching career in 2017 with United Tribes Technical College in Bismarck, North Dakota.

In 2020, Dr. Pansegrau began retirement. During retirement he learned to cultivate wildflowers native to the Western Plains, enjoyed outdoor activities, and eventually decided retirement was not for him. Dr. Pansegrau is very pleased to be "unretired" and a member of the Department of Chemistry at UND!

SPOTLIGHT
ON ADJUNCT PROFESSORS

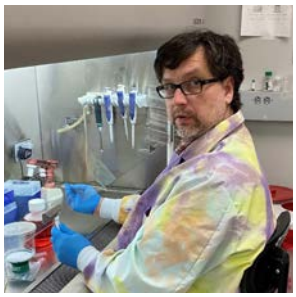
Dr. Alexander Azenkeng is Assistant Director for Critical Materials at UND Energy & Environmental Research Center and Adjunct Faculty at UND Chemistry Department. Dr. Azenkeng's current research interests include development of approaches for making high-value carbon products (graphene and graphite) from coal, critical mineral research for REEs and PGMs, carbon capture technologies for coal combustion and gasification systems, and carbon storage/sequestration in geologic sinks.



Dr. Yen Lee Loh is an Associate Professor of Physics at UND. He obtained his undergrad degrees and Ph.D. from Cambridge University and did postdoctoral research at Purdue and Ohio State. Dr. Loh's research areas include condensed matter theory, machine learning, and systems biology. Condensed matter theorists are especially interested in "emergence" – how many simple objects may collectively exhibit complex behavior; for example, although there are only 92 naturally occurring types of atoms, they may combine in an infinite number of ways to form molecules or materials with new properties. Chemistry has always been Dr. Loh's favorite science after physics; as an adjunct professor in Chemistry since 2018, he shares, "I am glad for the opportunity to interact with Chemistry students and faculty, especially now that interdisciplinary research is more important than ever." Fun facts about Dr. Loh: when he took the 'A' Level examinations (equivalent to Year 13) he scored a few points higher in Chemistry than he did in Physics; and he can recite the periodic table from elements 1-118 within 60 seconds (in Mandarin, where each element is one syllable)!

Dr. Deniz Cakir is an Associate Professor of Physics at UND. He earned his PhD in computational physics from Bilkent University, and prior to joining UND, conducted research at the University of Twente, the University of Antwerp, and the Okinawa Institute of Science and Technology. His research expertise includes the first-principle simulations of functional materials for various applications, where he has contributed to advancing our understanding of cutting-edge materials and their potential impact on diverse fields.

Dr. Nuri Oncel is a Professor of Physics at UND. He received his Ph.D. in Applied Physics from the University of Twente in the Netherlands. After working as a post-doctoral research associate in the Department of Chemistry at Princeton University for two years, he joined the Department of Physics and Astrophysics at UND. His research interests include surfaces and interfaces, nanomaterials, and devices. Currently, he is a full professor in the Physics and Astrophysics Department and serving as an Interim Director of UND's Nanofoundry.



Dr. Sergei Nechaev The Nechaev laboratory investigates gene transcription and its regulation. By combining classic biochemical and state-of-the-art genomics techniques, we aim to determine how thousands of individual genes that are active in the human cell organize into networks to enable the same DNA genome to form multiple distinct cell types. We recently discovered that rapid, minute-scale responses of cells to stimuli such as heat shock may have long-term epigenetic effects, possibly uncovering the principles behind cell differentiation as well as diseases including cancer. Our present work focuses on the inner workings of gene networks by exploring novel, recently discovered activities of the gene transcription machinery across the human genome.

Dr. Archana Dhasarathy is an Associate Professor in the Biomedical Sciences. Her laboratory aims to understand the role of epigenetics in regulating expression of genes involved in cell state transitions that are important in cancer metastasis. Her work combines biochemistry, molecular biology, cell biology, genomics, and computational methods. She has helped train many Chemistry undergraduates through research projects that address fundamental questions using cutting-edge techniques.

Dr. Audrey LaVallie is currently working at Nueta Hidatsa Sahnish College as a chemistry instructor and grant director since 2021. In 2021 she directed an EPSCoR grant which involved lignin research in conjunction with her former advisor, Dr. Alena Kubatova and students from NHS College. She works also with Dr. Kerry Hartman, also at NHS College, on various projects including water quality, juneberry growth, mercury in local fish and soil chemical parameters near flare sites. She continues to work with Dr. Kubatova on various aspects of lignin characterization and applications, including analysis of samples via pyroprobe-gas chromatography-mass spectrometry, thermal carbon analysis and gel permeation chromatography.

Dr. Jamie Foster from the Department of Biomedical Sciences has worked with Chemistry students in a variety of ways performing research in his laboratory which is focused on monoamine (dopamine, serotonin, and norepinephrine) neurotransmitter signaling and control of the levels of these neurotransmitters by their corresponding transporter protein via phosphorylation and palmitoylation. He has mentored students with their Chemistry Capstone projects as well as students enrolled in BIMD 494 (Undergraduate Research) to fulfill their biochemistry laboratory research component of their biochemistry emphasis for the chemistry major. In addition, Dr. Foster has mentored a Master's student in the Chemistry Department's 4+1 program. Dr. Foster also mentors undergraduate students in the US MASTERS and MARC U-RISE programs at UND.

Chemistry Adjunct Professors also include: Dr. Derek Bussan, Research Chemist Manager, USDA; Dr. Hallie Chelmo, Assistant Professor, UND Mechanical Engeering; Dr. Timothy Dudley, Associate Professor, UMC Math, Science and Technology, UMN Crookston; Dr. Keith Henry, Associate Professor, UND Biomedical Sciences; Dr. Khwaja Hossain, Professor of Biology, Mayville State University; and Dr. Matthew Picklo, Research Physiologist, USDA.

FACULTY SUCCESS
PUBLICATIONS

Quianli Chu, Ph.D., Associate Professor

Mabin, M.; Elliott, Q.; Wang, Z.; Ugrinov, A.; Azizov, D.; Chu, Q. R. A Biorenewable Cyclobutane-Containing Building Block Synthesized from Sorbic Acid Using Photoenergy. iScience, 2022, 25, 105020. https://doi.org/10.1016/j.isci.2022.105020

Guodong Du, Ph.D., Professor

Altumairi, N., Vijjamarri, S., Du, G. Manganese Salan Complexes as Catalysts for Hydrosilylation of Aldehydes and Ketones. Catalysts, 2023, 13, 665. doi: 10.3390/catal13040665 https://www.mdpi.com/2073-4344/13/4/665

Guodong Du, Ph.D., Professor, and Julia Zhao, Ph.D., Chester Fritz Distinguished Professor

Sun, D., Wu, X., Martin, J. P., Tayutivutikul, K., Du, G., Combs, C., Darland, D., Zhao, X. Streamlined Synthesis of Potential Dual-Emissive Fluorescent Silicon Quantum Dots (SiQDs) for Cell Imaging. RSC Advances, 2023, 13(38), 26392–26405. doi: 10.1039/d3ra03669c https://pubs.rsc.org/en/content/articlehtml/2023/ra/d3ra03669c

Mark Hoffmann, Ph.D., Chester Fritz Distinguished Professor & Associate Dean

Sepehri, A.; Li, R. R.; Hoffmann, M. R. Riemannian Trust Region Method for Minimization of Fourth Central Moment for Localized Molecular Orbitals, J. Phys. Chem. A. 2023, 127, 5231–5251. https://pubs.acs.org/doi/10.1021/acs.jpca.3c01295

Mark Hoffmann, Ph.D., Chester Fritz Distinguished Professor & Associate Dean, and Dr. Binglin Sui, Ph.D., Assistant Professor

Elayyan, M.; Hoffmann, M. R.; Sui, B. Perspective on the Role of Quantum Mechanical Calculations on Cellular Molecular Interactions, Frontiers in Computational Chemistry, 2023, Vol. 7, 1/0

Evguenii Kozliak, Ph.D., Professor

Karpovych, V.; Kozliak, E.; Haiduk, N.; Sulkes, M. Short timescale high temperature pyrolysis products of hydroxyl-terminated polybutadiene. Fuel 2023, 343, 127655. https://doi.org/10.1016/j.fuel.2023.127655

Alena Kubatova, Ph.D., Chester Fritz Distinguished Professor & Department Chair

Alinezhad, A.; Hao, H.; Litvanova, K., Sun, R.; Kubatova, A.; Zhang, W.; Li, Y.; Xiao, F. Mechanistic Investigations of Thermal Decomposition of Perfluoroalkyl Ether Carboxylic Acids and Short-Chain Perfluoroalkyl Carboxylic Acids. Environmental Science & Technology. 2023 57, 23, 8796–8807 https://doi.org/10.1021/acs.est.3c00294

David Pierce, Ph.D., Professor

Saleem, M.; Sens, D. A.; Somji, S.; Pierce, D.; Wang, Y.; Leopold, A.; Haque, M. E.; Garrett, S. H. Contamination Assessment and Potential Human Health Risks of Heavy Metals in Urban Soils from Grand Forks, North Dakota, USA. Toxics 2023, 11 (2), 132. https://doi.org/10.3390/toxics11020132

Lothar Stahl, Ph.D., Professor Emeritus

Musongong, J. T.; Otang, M. E.; Mash, B. L.; Zeller, M.; Stahl, L. Subtraction by Addition: Chalcogen-Oxidation Induced NC Bond Scissions in Bis(Amido)Cyclodiphosphazane Chelates of the Group 15 Elements. Polyhedron 2023, 235, 116361. https://doi.org/10.1016/j.poly.2023.116361

David Pierce, Ph.D., Professor, and Julia Zhao, Ph.D., Chester Fritz Distinguished Professor

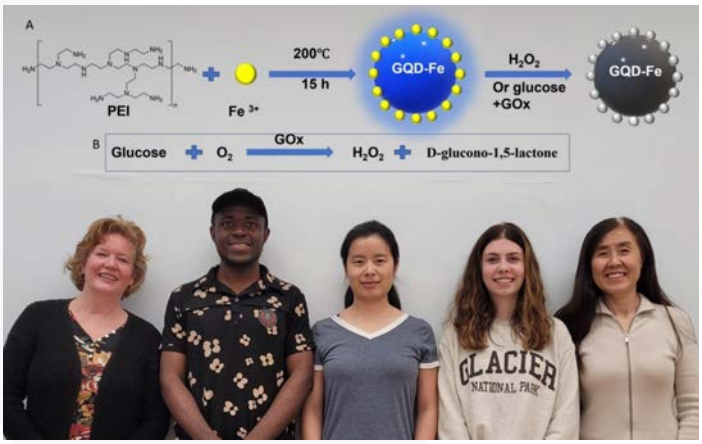
Sun, W., Pierce, D., Aulich, T., Zhao, X. (2022). One-pot Synthesis of Ruthenium Nanocatalyst Using Reduced Graphene Oxide as Matrix for Electrochemical Synthesis of Ammonia. ACS Applied Materials and Interface, 15(1), 1115-1128. https://doi.org/10.1021/acsami.2c18413

RESEARCH CORNER

NIH COBRE Pilot Grant

Dr. Binglin Sui received a pilot grant of the NIH COBRE for Epigenomics of Development and Disease, with the project title "Nanotechnology-Facilitated Study of Transcriptional and Epigenetic Mechanisms for Combined Gemcitabine and Triptolide against Pancreatic Cancer". The central goal of this project is to take advantage of the synergistic therapeutic effects of two anticancer drugs gemcitabine and triptolide to seek advanced techniques for the treatment of malignant pancreatic cancer. By means of the new nanoparticulate agent delivery strategy that has been successfully developed in the Sui Lab, the research team is making efforts to address a series of challenges such as the solubility issues of the drugs, the desired capability of triptolide in fighting against the gemcitabine-resistance of cancerous cells, the concurrent intracellular delivery of the two drugs, the enhanced therapeutic potency against various pancreatic cancer cells, and the transcriptional and epigenetic mechanisms of the synergistic therapy between gemcitabine and triptolide, with the support of this grant starting from November 1, 2022.

Research team of the Sui Lab



Main Nanozyme Group 2023: Diane Darland, Herbert Che Mughe, Yingfen Wu, Reagan Gaukler, and Julia Zhao

**Yingfen Wu is a Chemistry Ph.D. student advised by Zhao (primary) and Darland (co-advisor) and she initiated this project as part of her thesis work. The background schematic was generated by Yingfen Wu.*

NSF Grant: Graphene/Polymer-based Fluorescent nanozymes for Sensitive Detection of Metabolic Biotargets

With support from the Chemical Measurement and Imaging Program in the Division of Chemistry, and co-funding from the Established Program to Stimulate Competitive Research (EPSCoR), the Chemical Structures, Dynamics, and Mechanisms – B program in the Chemistry Division, and the Biosensing Program in the Division of Chemical, Bioengineering, Environmental, and Transport Systems (CBET), Dr. Julia Zhao and Dr. Diane Darland and their respective research groups at the University of North Dakota are devising a new approach toward nanomaterial-based sensors ("nanozymes") for detection and quantitation of key metabolic biomolecules, such as glucose. They seek to create sensors usable in a range of environments and characterized by high sensitivity, easy synthesis, and good biocompatibility. The goal is to develop these nanozyme sensors to detect biotargets that can shift in metabolic distress, such as diabetes and neurodegenerative disease. In conjunction with this work, Drs. Zhao and Darland are reaching out to engage Tribal High Schools and Colleges as well as other Universities in the North Dakota University System, to encourage students from groups underrepresented in STEM to consider science as a career option. Additional efforts target development of hands-on advanced science lessons which seek to help middle- and/or high-school students connect concepts from atoms to ecosystems with nanomaterials and cells.

2022 HOMECOMING ALUMNI LECTURE

Sarah Severson Snow, Ph.D.
Assistant Professor of Chemistry
Carthage College, Kenosha, WI

Sarah Severson Snow is a Grand Forks native who completed her B.S. in Chemistry at UND and then obtained a Ph.D. in Inorganic Chemistry at the University of Utah. She is a professional chemist with experience in academia as well as the chemical, health care, and material science industries, with proven abilities in research, product development, commercialization, technical training & development, and university grant evaluation.

Currently, she is an Assistant Professor of Chemistry at Carthage College and enjoys teaching and mentoring young adults as well as completing occasional external technical writing, editing, or regulatory contract assignments.

Before coming to Carthage, Dr. Snow worked in the Health Care Industry for Clorox Professional Products in Midland, MI specializing in understanding, interpreting, and communicating Healthcare Industry requirements and providing information and expertise customized to meet internal and customer needs. Prior to that she was the site Research & Development and Technical Service Manager, coordinating research and development teams as they developed and tested new and improved products.

Dr. Snow visits with Dr. Hoffmann and Chemistry graduate students.

Dr. Snow with Yingfen Wu, recipient of the Dr. Roland G. Severson Graduate Scholarship.

Additionally, Dr. Snow has worked in the Health Care Industry at Caltech Industries (Midland, MI), the Chemical and Material Science Industry at Dow Corning Corporation (Midland, MI), and as an instructor and external evaluator at Saginaw Valley State University. She has authored over 50 technical reports, 21 published articles, 13 external presentations and has 2 patents.

Sarah is married to a fellow chemist, Steve Snow, and they live on the shore of Lake Michigan in Kenosha, WI. They have four adult children who live in Utah, Tennessee, Texas and Michigan. Sarah is a violist in the Waukegan Symphony Orchestra and is learning to play bagpipes with the Kenosha Area Pipe and Drums Association and the Milwaukee Scottish Pipe Band. She loves music, nature, camping, boating, swimming, skiing, gardening, reading etc., etc.

2022 HOMECOMING

ALUMNI VIRTUAL PANEL

Thank you for your participation and for sharing your experience with our students!

Dr. Jana Rousova Hepner ‘17

Senior Application Scientist at Restek

Dr. Jason Hicks ‘18

Principal Systems Engineer at Northrop Grumman Corporation

Dr. Yuhui Jin (Victor) ‘09

Sr. Development Associate, Corning Inc.

Dr. Run “Rain” Li ‘17

Research Faculty at Florida State University

Dr. Sandra Hazelton Pratt ‘09

Chemist at Pacific Northwest National Laboratory

CALLING ALL UND CHEMISTRY ALUMNI

We’re working on something BIG – establishing a new Advisory Board!

SHAPE THE FUTURE: Your experiences can help guide the direction of our department – from academic programs to groundbreaking research.

NETWORK & CONNECT: Forge connections with fellow alumni, as well as UND Chemistry faculty, and students.

BOOST DEPARTMENTAL VISIBILITY: Your success is our success! By being on the board, you enhance the reputation of our beloved UND Chemistry Department.

STAY INFORMED: Stay connected with updates on achievements, research breakthroughs, and upcoming events.

GIVE BACK: Make a lasting impact by giving back to the department that played a vital role in your journey. Inspire and empower current and future students.

Please reach out to us if you would be interested in joining the board or helping us with our program development in other ways. Let’s make a difference together!

Email alena.kubatova@UND.edu for more information.

SPRING VISITING LECTURES

Dr. Phil S. Baran, Professor, Department of Chemistry, The Scripps Research Institute presented two lectures in March 2023 as the featured speaker for the **Abbott Lectureship**. The lectures were titled "Simplifying Synthesis" and Electrifying Synthesis."

The Baran laboratory is committed to identifying areas of chemical synthesis that can have a dramatic impact on the rate of drug discovery and development. This is achieved both through the development of practical total syntheses of complex natural products (such as terpenes, alkaloids, peptides, and oligonucleotides) and by inventing reactions which can dramatically simplify retrosynthesis.

Dr. Baran received his B.S. in chemistry from NYU in 1997, his Ph.D. from The Scripps Research Institute in 2001, and from 2001-2003 he was an NIH-postdoctoral fellow at Harvard. His independent career began at Scripps in the summer of 2003. He has published over 250 scientific articles, several patents, and has been the recipient of several and international distinctions such as the Hirata Gold Medal and Mukaiyama Prize (Japan), the RSC award in Synthesis (UK), the Sackler Prize (Israel), and the Janssen Prize (Belgium). In 2013 Baran was named a MacArthur Foundation Fellow and in 2015 was elected to the American Academy of Arts and Sciences. In 2017 he was elected to the National Academy of Sciences, USA.

He has delivered hundreds of lectures around the world and consults for numerous companies such as Bristol-Myers Squibb and Gilead. He currently serves as a scientific advisory board member for Eisai, Alkermes, Nutcracker, Quanta and AsymChem. From 2016-2020 he served as an Associate Editor for the Journal of the American Chemical Society. He co-founded Sirenas Marine Discovery, Vividion Therapeutics, Elsie Biotechnologies, and Elima Therapeutics. In 2013 he co-authored The Portable Chemist's Consultant, an interactive book published on the iBooks store along with his graduate class in Heterocyclic Chemistry (viewable on YouTube).

Dr. Stephanie Vivod joined us on campus on March 3rd for a seminar entitled, "Polymer Aerogels for Aeronautic and Aerospace Applications."

Dr. Stephanie Vivod is a Research Chemical Engineer for the National Aeronautics and Space Administration (NASA), specializing in advanced polymeric materials for extreme environments. Stephanie has worked for NASA Glenn Research Center (GRC) in Cleveland, Ohio for 17 years in the Materials Chemistry and Physics Branch within the Structures and Materials Division. Dr. Vivod received her Ph.D. in Polymer Science from The University of Akron in Akron, Ohio and is a subject matter expert in the area of light weight, nano-porous polymeric materials; specifically, organic, inorganic and hybrid aerogels.

Dr. Vivod has received multiple Tech Brief, Space Act, and Group Achievement Awards. She is the recipient of a NASA Silver Achievement Medal, Dr. Martin Luther King Jr. Equality Recognition Award, and 2 NASA Honor Awards. Stephanie has served as an alternate councilor for the ACS Cleveland local section, is a member of the American Chemical Society (ACS)- Polymer Division (POLY) /Polymeric Materials Science and Engineering Division (PMSE), Materials Research Society (MRS), American Society of Mechanical Engineers (ASME), National Association of Professional Women (NAPW), Iota Sigma Pi (Women in Chemistry), Golden Key International Honour Society, Society for Women Engineers (SWE), NASA GRC Women's Advisory Group (WAG), and was honored as a Women@Glenn award recipient.

Dr. Vivod with UND Chemistry grad students.

CGSA
CHEMISTRY GRADUATE STUDENT ASSOCIATION

The Chemistry Graduate Student Association, abbreviated as CGSA, is a student organization comprised from students of the chemistry department in the Graduate program, whether Master's or Doctoral programs, and undergraduates in the accelerated BS/MS from the different fields of chemistry: synthetic, theoretical and analytical fields. Thus, the main goal of the CGSA is to develop a platform for students to interconnect with each other; creating a more connected department between the various departmental research groups led by our amazing faculty. Furthermore, the CGSA is indifferentiable to student home countries, faith and sexuality; hence, the neutrality of all events being conducted. The CGSA is always recruiting driven soon-to-be chemists and is currently made of the following members: Mason Clobes (President), Jude Musongong (Vice-President), Md. Abdur Rahim (Treasurer), Chiranthi Mahadurage (Secretary), Solmaz Asadi, Amrit Regmi and Diane Tangmi (Officers).

Staff Appreciation Day hosted by CGSA and the Chemistry Department

The CGSA is not exclusive to only departmental connectivity; rather, the CGSA conducts various outreach programs and activities for communities and educational institutions despite the distance, as well as supports all graduates in the Chemistry department for research-related activities, i.e. conference traveling, and acting on the concerns of these graduates. Furthermore, the CGSA enables extra-curricular opportunities to undergraduates interested in the Chemistry department, such as research opportunities with esteemed faculty members, and leisurely activities in the form of holiday parties and outdoor gatherings.

Lastly, the CGSA provides support to the department by taking on extra responsibilities for the faculty and staff needs, i.e., proctoring for tests, substituting for Teaching Assistants in Labs, etc. The CGSA's greatest accomplishment the past year was hosting the Chemistry Department's first Staff Appreciation Day – to be on April 4th of each year – where staff members of the Chemistry department were given awards and authentic certificates – made by former president, Mouhmad "Moe" Elayyan and his administration. For more information, please visit the University of North Dakota's directory of Student Organizations as the CGSA is listed there.

GRADUATE STUDENT SUMMER INTERNSHIP

By Nafisa Bala

A Summer to Remember - UND and Beyond!

UND plans and hosts Career Expos in the Spring and Fall semesters, and Chemistry students are encouraged to attend. These events are a good medium of learning about different options students can explore to get internships and most importantly are said to be the gateway to our future employment. I had engaging conversations and shared my resume with several companies that attended the Spring 2023 UND Career Expo in late January, and on May 15th, I was on my way to Fargo to begin my internship with Elinor Coatings.

Elinor Coatings is a coatings company situated in the NDSU Research Park. It produces high-quality chromate-free coating products for use in the military and commercial applications. They specialize in research in galvanic corrosion and the creation of anti-corrosion surface protection solutions. Elinor Coatings was one of the participants of the 2023 ND EPSCoR STTAR Program, and I was one of the 3 Summer 2023 STTAR interns who had the exciting opportunity to gain and share our scientific knowledge in the Elinor labs. STTAR stands for Students in Technology Transfer And Research.

During my time at Elinor, despite having very little background in coatings, I had the opportunity to work closely with the Elinor scientists in general after being trained on all the tests being done and the equipment being used in the laboratory space. The training began with cybersecurity, followed by lab safety, and then concluded with respirator testing. As a research assistant, I worked closely with my research mentor and the lab supervisors and part of my responsibilities was assisting with preparing panels, making formulations, and mechanical characterization of polymer thin film coatings. Part of my daily routine involved formulation, and panel characterization such as hardness testing, water, and solvent resistance testing, pinhole tests, gloss tests, dry film thickness tests, cross hatch adhesion, impact resistance testing, etc. in accordance with the military specifications of the project. In addition to the laboratory hands-on experience, we also got training in coatings science and general life skills. At Elinor, it was not all work and no play; we had some time to meet outside of the lab with our research mentors and sometimes with the company executives.

My favorite in-lab activity was making formulations, and my favorite outside-lab activity was our visit to the Fargo Jet Center in July. The internship ended on August 18th, and a week prior, an intern appreciation day was held in our honor to celebrate our accomplishments and presentation of certificates.

continued

GRADUATE STUDENT
SUMMER INTERNSHIP

This internship was a great opportunity for me to explore and expand my potential as a scientist as well as share the knowledge and skills I acquired through my years in UND Chemistry. It also helped me create more connections and gave me an idea of the US industry setting.

I would not have been able to make use of this opportunity without the encouragement and support of my mentor and research advisor, Dr. Alena Kubatova. My special appreciation also goes to my other mentor Dr. Evguenii Kozliak for his contribution to my success. The amazing Chemistry faculty and staff I have the privilege of learning and interacting with have made a huge impact on my academic career and made me worthy of being considered for opportunities like this internship.

I would like to finally appreciate the UND School of Graduate Studies for their efforts in creating programs that help us improve our skills as graduate students such as the A2i workshops. The UND Career Services was a part of my success story for helping me upgrade my resume and polish my interview skills after learning about them from my seminar class, (CHEM 509 I).

After returning to UND, I am continuing to work on my research and working towards writing my paper for publication as well as contributing the little I can to continue to make UND Chemistry the best place to be.

Long live UND Chemistry!

THANK YOU

The Chemistry Department greatly appreciates donations that help us educate students and award outstanding graduate and undergraduate students with scholarships and funding support.

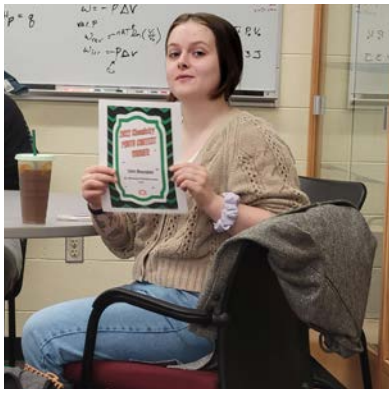
Please consider making a gift to the department and be a difference-maker for students in Chemistry programs at the University of North Dakota. Your gift will help provide a great learning environment and a distinctive student experience at an affordable cost for our students.

Gifts are welcomed online at go.alumni.org/chemistry-department or checks can be made payable to the UND Foundation and sent to the following address: UND Foundation, 3501 University Ave, Stop 8157, Grand Forks, ND 58202-8157.

Questions about gifts to the Department may be directed to Department Chair, Dr. Alena Kubátová at 701.777.0348.

CHEMISTRY PHOTO CONTEST

To share the excitement in science and chemistry with our community, we have launched a new tradition: The Chemistry Photo Contest. We announced our second winners in March 2023. A new contest is now open for submissions, with a deadline of **March 24, 2024**. Visit the link below to learn more and submit your photo! https://arts-sciences.und.edu/academics/chemistry/photo-contest



Yuliet Monatukwa

Fall 2022 Winner

Autumn Landwehr

Spring 2023 1st Place

Katerina Litvanova

Spring 2023 2nd Place

UNDERGRADUATE STUDENT EXPERIENCES

Kate Kesler

My name is Kate Kesler, and I am a junior majoring in Chemistry at UND. I interned at NASA this summer, working remotely under the Earth Sciences Division (ESD) out of NASA Headquarters in Washington, DC. I conducted my own project, "Evaluating ESD Success Through Publications." I wanted to look at the rate of publications for ESD in a systematic way to understand the variation in publication rates per award. I specifically asked, "What is the average number of publications per ESD award?" I also asked, "Do ASP and R&A differ?" These two areas of ESD differ in their objectives, with R&A focusing more on science results, so I wanted to examine if this impacts publication and citation rates. I am currently interning for a second time at NASA and continuing my work on this project.

Andrew Simons

My name is Andrew Simons, and I was fortunate enough to be able to be the chemistry instructor for the Indians into Medicine program hosted here at UND over the summer. It was a great opportunity to work on my teaching skills, and I was able to put many of the chemistry concepts I learned during my degree into practice. I very much enjoyed working with the students and providing them with chemistry knowledge they can hopefully apply in future courses!

Kirati Tayutivutikul

I was a Yale Summer Enrichment Research Experience (YSERE) intern where I had an opportunity to expand my research experience in the biomedical field. My project involved the study of HIV, specifically identifying the DNA enhancer(s) CCR5 (a well-known HIV co-receptor). I thoroughly enjoyed my time at the internship, and it was really inspiring to learn from faculty and other students. My chemistry knowledge helped me learn techniques in the lab, which I will be able to apply to future projects.

CHEMISTRY SUMMER REU PROGRAM RENEWED

The chemistry Interdisciplinary Renewable and Environmental Collaborative (IREC) REU program, supported by National Science Foundation, has been renewed for another three-year cycle (2023-2026).

Jointly hosted with the departments of chemical engineering and atmosphere science, the program provides research and professional training opportunities, targeting first generation college students, underrepresented minority students, and students from tribal colleges and other primarily undergraduate institutions.

This year ten REU students selected were from California, Arizona, Nebraska, North Dakota, Minnesota, Virginia, and Puerto Rico, and they spent ten weeks on campus working alongside UND faculty and students on interdisciplinary research projects at the intersection of chemistry, chemical engineering, and atmospheric sciences. Participants also visited various research facilities on campus including the UND Space Studies, Energy and Environmental Research Center (the photo was taken in front of EERC), UND Artificial Intelligence and Virtual Reality Lab, and USDA Human Nutrition Research Center. In the end, students had a joint poster session with other on-campus REU programs in UND School of Medicine.

UNDERGRADUATE & GRADUATE STUDENT AWARDS

Dr. Ernest & Jennie Coon Scholarship
Yingfen Wu, Wen Sun, Di Sun, Mouhmad Elayyan, Kendra Borcherding, Erica Nguon, Annabelle Jundt, Kirati Tayutivutikul

Dr. Ben G. Gustafson Scholarship
Kirati Tayutivutikul, Abby Fisel

Dr. C.A. Wardner Memorial Scholarship
Kate Kesler

Drs. Haldean & Bonnie Dalzell Scholarship
Mouhmad Elayyan, Matilda Treat-Frost, Reet Goyal, Kailee Thompson, Margaret Grimm, Erica Nguon

US MASTER Scholarship—Chemistry
Jordan Naslund, Andrew Simons

Dr. Walter H. Moran Memorial Scholarship
Emmie Told, Olivia Theesfeld, Cole Guttormson, Parker Hopfauf, Laura Eichhorst, Anders Alm, Spencer Meeker, Emma Nissen, Olivia Schoepp, Kayla Hanson, Andrew Simons, Annabelle Jundt, Abby Fisel

Dr. Richard Frank and Mary Margaret French Scholarship
Andrew Simons

Dr. Roland G. Severson Graduate Scholarship in Research
Joseph Robertson, Di Sun

Dr. Roland G. Severson Graduate Scholarship in Teaching
Wen Sun

Dr. Kathryn Amber Thomasson Scholarship
Nafisa Bala

Roy and Ann Multhaup Memorial Scholarship
Annabelle Jundt

Dr. Robert A. Howard Scholarship
Kate Kesler, Kendra Borcherding

Dr. Tao Yu Memorial Scholarship
Mouhmad Elayyan

Albert and Kathryn Weber Memorial Fund
Autumn Landwehr, Elisabeth Starosta

Kirati Tayutivitikul, Erica Nguon, and Annabelle Jundt at the department scholarship ceremony

Shaina Mattingly presents Di Sun with the Dr. Ernest and Jennie Coon Award

Mason Clobes took **first place** in Natural Sciences during the UND Graduate Research Achievement Day Event, March 2-3, 2023.

Chiranthi Mahadurage earned f**irst place in the Graduate Student Poster Competition** on March 29, 2023, at the ND EPSCoR State Conference

Wen Sun won the **Outstanding Graduate Student Poster Award** at the ACS Red River Local section annual meeting in Fargo-Moorhead in January 2023. She also earned the **first place Graduate Communications Award** through the North Dakota Academy of Science on April 15, 2023

Yingfen Wu won the **Outstanding Graduate Student Oral Presentation Award** at the ACS Red River Local section annual meeting in Fargo-Moorhead in January, 2023. She also earned the **Barbara Ann Earwicker Award** for Graduate Student Oral Presentation through the North Dakota Academy of Science on April 15, 2023.

OUTREACH ACTIVITIES

Article was prepared by teaching Associate Professor Shaina Mattingly, the Undergraduate Chemistry Club faculty advisor.

The Chemistry Department and Undergraduate Chemistry Club was very busy in AY 2022 – 2023 and hosted several outreach events. Events included Science Day at the Grand Forks Public Library, Haunted University with Girl Scouts in Abbott Hall, Zero Waste Week on UND Campus, and Exploring Chemistry Summer Camp. Outreach events hosted fun, hands-on activities for elementary through middle school aged children.

Science Day at the Grand Forks Public Library is held every October around National Chemistry Week. This event is aimed at elementary students. In October 2022, over 60 students attended the event and learned about polymers, acid-base indicators, and vacuum applications.

Haunted University is held on Halloween weekend every year. For this event, the Undergraduate Chemistry Club hosts local Girl Scouts troops. This year, 70 Girl Scouts aged 7 to 12 attended and made bouncy balls, created an articulated skeleton hand, and did other hands- on activities to learn about acid-base reactions and indicators, polymerization, and gas forming reactions that build up pressure. At the end of the event, the Undergraduate Chemistry Club members perform spooky-themed demonstrations including a self-carving jack-o-lantern and witches brew (aka elephant toothpaste), among many others.

Members of UND Undergraduate and Graduate Chemistry Clubs

From left to right: Erica Nguon, Ian Lin, Kirati Tayutivutikul, Dr. Wei Zhang

Zero Waste Week that began in Spring 2022, had its second year hosted by the Undergraduate Chemistry Club. Zero Waste Week was held the week preceding Earth Day in April 2023 and was open to any students, faculty, and staff from UND. There was an activity for each day of the week that focused on the environment, sustainability, and upcycling materials. The event also featured an Earth Day Seminar by Dr. Wei Zhang University of Massachusetts – Boston.

In Summer 2023 the Chemistry Department hosted a four-day summer camp called **Exploring Chemistry Summer Camp** for children entering 5th through 8th grade. This year 24 campers attended. Each day had a different chemistry theme with several activities for the students to explore. Themes included identifying chemical reactions, making paper, pigments, and dyes, batteries, and polymers. One highlight of the event was creating a lemon battery with over 50 lemons!

The club also hosted activities at a high school robotics competition pizza party and social held at the UND Memorial Union.

Overall, the Undergraduate Chemistry Club was busy planning and hosting events all year. The club members were thrilled to be able to spread the love and appreciation for chemistry to so many children and others in the Grand Forks Community.

CONGRATULATIONS

STAFF AWARDS

Aleta Krack, Chemistry Office Assistant, was the UND UShine Award Winner in April 2023

David Knittel, Chemistry Stockroom Manager, was named UND's Work Well Ambassador of the Month for October 2023.

CONGRATULATIONS

NEW CHEMISTRY ALUMNI

Fall 2022

- Zachary Wenzel, B.S.
- Aliakbar Sepehri, Ph.D.

Spring 2023

- Jack Erdahl, B.S.
- Becker Lindner, B.S.
- Yuliet Monatukwa, BSCHEM
- Evan Sczepanski, B.S.
- Mya Shorter, BSCHEM
- Md Sultan Mahmud, M.S.
- Tess Sether, M.S.

Summer 2023

- Jessica Emond, M.S.
- Muneer Shaik, Ph.D.

ENHANCING COLLABORATION, TEACHING & INNOVATION
STEM COMPLEX

The University of North Dakota is embarking on an initiative to build a state-of-the-art STEM complex.

The integrated facility for science, engineering, and math education and research will provide an optimized environment to train the next generation of leaders in STEM-related fields. This game-changing project will prepare our graduates to drive technological breakthroughs, fuel economic growth, and address global challenges. While existing buildings have served UND well in the past, there is an urgent need for a modern facility to inspire the science, math, and engineering leaders of the future. UND's College of Engineering and Mines and College of Arts and Sciences together serve over 3300 students in engineering, physics, math, chemistry, biology, geology, and computing.

The two colleges have also seen a rapid increase in externally funded research. In addition to supporting UND's Grand Challenges in energy, big data, autonomy, and national security, they have also established areas of research excellence in transportation, artificial intelligence, cybersecurity, and advanced materials.

The new STEM Complex is an opportunity to transform the environment for learning and discovery at UND. Interdisciplinary collaborations are essential to the creation of new knowledge and the development of new solutions. The UND STEM Complex will be designed to bring engineers, scientists, and mathematicians together in a way that our current facilities cannot. Rather than being housed in separate buildings, programs like Chemistry and Chemical Engineering will be in close proximity to one another, encouraging collaborations between faculty and students. The STEM Complex will also be designed to facilitate external collaborations. Dedicated spaces in the complex will be available to our corporate partners who want to work closely with our faculty and students on design and research projects. This allows companies to fully utilize the intellectual resources at UND, while giving our students and faculty the opportunity to work on real-world problems and address the most critical needs of our state and region.