

# CHEM / BIOCHEM

Newsletter for Alumni and Friends

Fall 2021

## From the Chair's Desk



*Joseph Aldstadt*

Dear Friends of the Department of Chemistry & Biochemistry,

We hope our biannual newsletter finds you well and enjoying the holiday season. As another busy semester winds down, it's time again to reflect on happenings in the Department over the past half-year.

The campus returned to "normal operations" in September, albeit with mandatory mask-wearing when indoors amongst others.

The construction contract for our New Building was awarded to VJS Construction Services, Inc. of Pewaukee, Wisc. in October, with ground-breaking to occur next month — the timeframe for "The Big Move" is late 2023/early 2024.

We have been busy recruiting faculty this semester for two tenure-track positions (Physical Chemistry and Chemical Education).

We also welcomed five new graduate students this term, bringing our total number to 59, along with 3 post-docs. Our numbers are starting to rebound from the pandemic-induced decrease in applicants.

Dr. Tom Sorenson retired in August after thirteen years of dedicated service to the Department. Tom was a mainstay in our General Chemistry curriculum, and he also expertly managed our computer facility and course scheduling duties. Tom will be sorely missed!

In closing, we appreciate the generous support of our alumni and hope that you continue to keep in touch with us – we are always excited to hear about the myriad accomplishments of our extraordinary alums!



*Tom Sorenson*



# New Graduate Student Welcome

We are happy to welcome five new graduate students: Nick Britt, Michelle Meyer, James Linzel, Cody Beck, and Maija Lee to our program starting in Fall 2021.



*Nick Britt*

Nick Britt earned his undergraduate degree from UW-Whitewater. Throughout Nick's undergraduate career, he earned 500 hours in lab experience. His undergraduate research gave him a firm understanding of how to experimentally test ideas and solve problems. Nick is excited to expand his knowledge of instrumentation that he can apply to future research.

James Linzel earned his undergraduate degree from the College of Charleston. James states: "the research that excites me most is usually at the intersection of physical and analytical chemistry". James is excited to work in the UWM labs, use new tools, learn and improve techniques such as single-molecule trapping, imaging, or neutron diffraction for protein analysis.



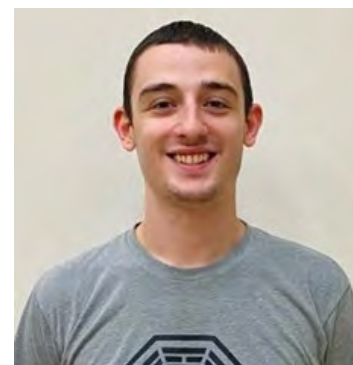
*James Linzel*



*Michelle Meyer*

Michelle Meyer earned her undergraduate degree from UW-Milwaukee. Michelle states that earning her undergraduate degree at UWM compelled her to continue her chemistry education. Michelle has been working in Dr. Arnold's research group since Fall 2020. Her responsibilities are growing with time. Michelle would like to continue her studies working with the Arnold group in graduate school.

Cody Beck earned his undergraduate degree from UW-Oshkosh. Cody states that he had been actively seeking to learn as much as he could through undergraduate research. The research Cody conducted while earning his undergraduate degree involved work in three significant areas of personal interest: chemical education, physical chemistry, and organic chemistry. Cody hopes his graduate career at UW-Milwaukee will allow him to share his experience with others and continue his growth both as an educator and a researcher. Cody is excited to use and improve his teaching skills as a teaching assistant and tutor.



*Cody Beck*



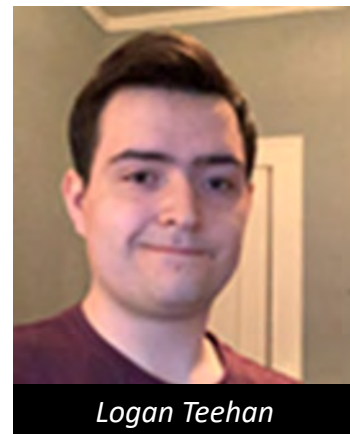
*Maija Lee*

Maija Lee earned her undergraduate degree from UW-Madison. Maija states: "as an undergraduate, I have immersed myself in plant sciences, biochemistry, and organic chemistry, all of which are centered around my fascination of chemistry in living systems. It is thrilling to understand life happening around us in terms of chemistry". Maija says that she is excited to gain experience as a member of a research team.

# Undergraduate Student Spotlight

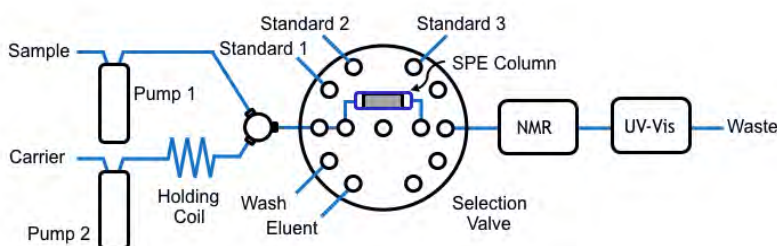
Logan Teehan

Our Undergraduate Spotlight falls upon Logan Teehan, who is completing his BS in Biochemistry along with obtaining the Certificate in Forensic Science. Logan has been conducting research in the Aldstadt Lab for the past two years. Logan hails from Manitowoc, Wisc. and will be graduated at the end of the Spring 2022 semester.

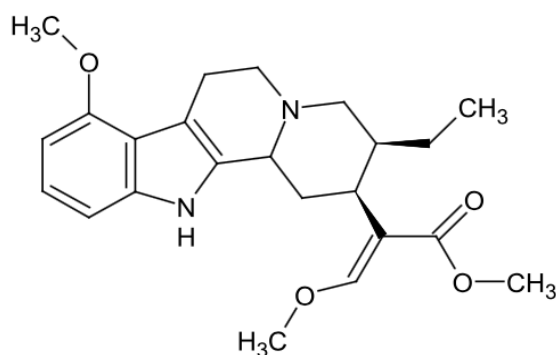


In the lab, Logan has been developing a novel analytical method for amphetamines. This project began several years ago in collaboration with ThermoFisher, Inc. and the Wisconsin State Crime Lab in Milwaukee, with support from the Research Growth Initiative at UWM. The focus of his research is to employ Sequential Injection Analysis (SIA) integrated to UV Molecular Absorbance and Proton NMR. SIA is used to isolate and pre-concentrate the analytes from complex mixtures using solid-phase extraction, while quantitative and qualitative information is provided by UV absorbance and NMR, respectively.

Logan's work has focused on building upon previous SIA-UV-NMR work (Talanta 2021, 231, 122355) for Cathinones (aka "Bath Salts"). Logan has explored approaches for isolating simulants of Mitragynine, the active ingredient in an amphetamine of growing concern also known as Kratom (below).



Various stationary phase resins, column geometries, and loading/elution conditions are being examined. Interestingly, the first enantiospecific total synthesis of Mitragynine was published a decade ago, by none other than our very own Distinguished Professor *emeritus* Jim Cook! Small world, indeed. Logan's research has been supported for several semesters by the Office of Undergraduate Research (OUR), and he presented "A Novel Sequential Injection Solid-Phase Extraction Method for Determination of Amphetamines" at the annual OUR Symposium in April 2021.



Of his experience as an undergraduate in the Chemistry Department, Logan says: "I'm very glad to have been given the opportunity to apply the concepts I've learned in my courses to my lab work". In his spare time, Logan enjoys reading fiction as well as science-related topics and playing with & exercising his dog, Penny.

# Graduate Student Spotlight

## Jawad Belayet

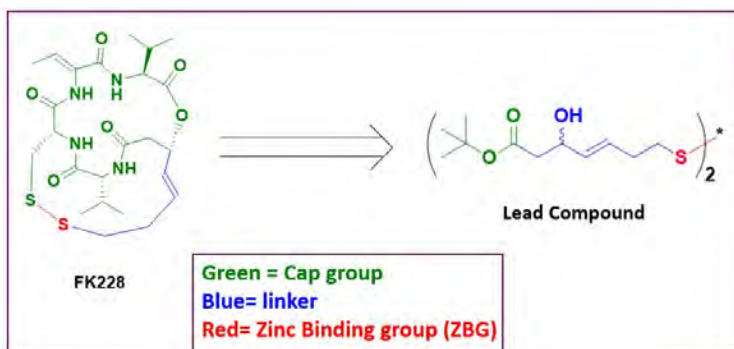
Drug design and discovery have been a major strength of UWM for a long time. This unmatched component of UWM has created interest in medicinal chemistry for many students. No exception for Jawad, who upon being graduated in Chemistry from Dhaka University in Bangladesh was fascinated by medicinal chemistry, which triggered him to chase his dreams at UWM.



The continuous endeavor of Dr. Hossain's lab in discovering drugs for cancer and neurodegenerative disease matched perfectly with Jawad's interest to study drug design and development.

In the race for discovering drugs against neurological disease, especially to improve memory enhancement, many attempts have been made globally. In this endeavor, researchers discovered that histone acetylation is a vital epigenetic form impacting long-term memory. This exciting finding made histone deacetylase inhibitor (HDACi) a potential candidate for memory enhancement which added a new dimension to neurological research and therapy.

Initially, the first series of HDACi's were designed based on the scaffold of the FDA-approved HDACi FK228. With Jawad joining Dr. Hossain's lab, he started synthesis as well as biological analysis to determine the lead compound. The lead compound rapidly crosses the blood-brain barrier and enhances hippocampus-dependent spatial memory consolidation in mice, which represents a potential lead for further optimization as a



therapeutic strategy for neurodegenerative diseases. As a continuation, Jawad designed and synthesized a new series of different analogs to study structure-activity relationships (SAR). Moreover, his expertise in multiple disciplines led him to explore their potency by performing biological assays at the Medical College of Wisconsin (MCW), where he is currently working on investigating the biological mechanism of action of these analogs. Jawad's research depends intensely upon cutting-edge facilities (various LC-MS instruments) at the Shimadzu Laboratory, where he continues working on characterization, purification, metabolic stability, and pharmacokinetic studies.

Although memory dysfunction is a common symptom of aging and neurodegenerative disorders, truly effective treatments for memory loss do not yet exist. We hope that the exhilarating outcomes in Jawad's research will add a new dimension to the discovery of drugs for Alzheimer's disease.

Jawad collaborates in his research with the Biosciences (Doug Steeber's Lab) and Psychology (Karyn Frick's Lab) departments, as well as with the David Frick Lab and MCW (Imig's Lab). This project was funded by the UWM Research Foundation and TAP grant (Therapeutic Acceleration Program) from MCW.

Associate Professor **Nick Silvaggi** received an Office of Research/UWM Foundation Research award this fall. This award recognizes UWM assistant and associate professors who have shown the ability to achieve distinction in their academic disciplines through scholarship, creative activity, and the dissemination of knowledge.

Professor **Andy Pacheco** and Assistant Professor **Jarett Wilcoxon** have been awarded a grant of \$486,000 from the National Science Foundation for the period September 1<sup>st</sup>, 2021, through August 31<sup>st</sup>, 2024. The goal of their research is to better understand the chemistry of biologically driven ammonia-nitrite inter-conversion, a process of high ecological importance.

Professor **David Frick** received a \$442,896 grant from the National Institute of General Medical Sciences. Undergraduate and graduate students will focus on RNA-Coupled Coenzymes and how enzymes interact with unusual, recently discovered caps present on a subset of cellular RNA molecules.

**Neal Korfhage** was featured in Discovery Magazine discussing his unique and essential work as a scientific glass blower. Click here to view the full article <https://www.discovermagazine.com/the-sciences/scientists-still-need-glassblowers>

## Graduate Degrees Conferred in Summer 2021

### Doctor of Philosophy

**Farjana Rashid:** "Design and Synthesis of Achiral and Chiral Benzodiazepines & Imidazodiazepines to Modulate the Activity of GABAA Receptors for The Treatment of Cancer, CNS Disorders and Pain"

**Major Professor:** James Cook

## The American Chemical Society (ACS) Milwaukee Section Poster Winners

The ACS Milwaukee Local Section gathered for a poster session in October and several UWM Chemistry & Biochemistry Graduate and Undergraduate students participated in the event. Click here for the full article <https://acsmilwaukee.org/2021/10/28/congratulations-poster-session-winners/>. We extend our congratulations to the following students for their achievements:

### Undergraduate Student

**Taylor Wilcox** received a 2<sup>nd</sup> place poster award. Taylor is also a SURF student working with Prof. Leggy Arnold.

### Graduate Students

**Daniel Webb** received a 1<sup>st</sup> place poster award. Daniel is working under the supervision of Prof. Leggy Arnold.

**Kamal Pandey** received a 3<sup>rd</sup> place poster award. Kamal is working under the supervision of Dr. James Cook.

# Support for Undergraduate Research Fellows (SURF)

The Department of Chemistry & Biochemistry continues the longstanding tradition of having SURF students. The SURF program is made possible by the Office of Undergraduate Research and is designed to foster faculty-student research collaborations, and, as such, students have the opportunity to engage in thoughtful and progressively sophisticated work central to the overall research program of the principal investigator.

**Taylor Wilcox** received a SURF award for both Summer and Fall of 2021 to work with **Prof. Leggy Arnold** on investigating the change of inflammation mediated by microglia in the presence of new compounds for the development of new non-sedative treatments for neuropathic pain based on imidazodiazepines.



*Taylor Wilcox*



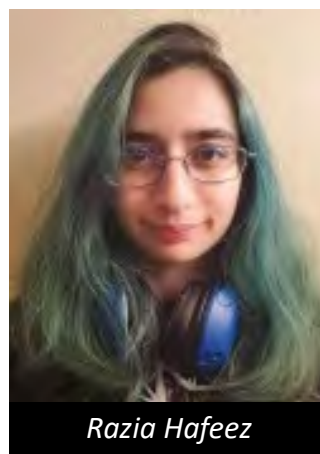
*Logan Teehan*

**Logan Teehan** received a SURF award for Summer of 2021 to work with **Prof. Joseph Aldstadt** on novel flow-based automated methods to determine amphetamines using Sequential Injection Analysis.

**Jermarcus Lewis** received a SURF award for Fall of 2021 to work with **Prof. Shama Mirza** on quantification of ceramides & sphingosine-1-phosphate levels in vitro in U87MG cells after administration of ASAH1 inhibitors using high-performance liquid chromatography mass spectrometry (HPLC-MS) to establish acid ceramidase inhibitors as efficient therapeutic options for Glioblastoma, the most common and aggressive brain tumor.



*Jermarcus Lewis*

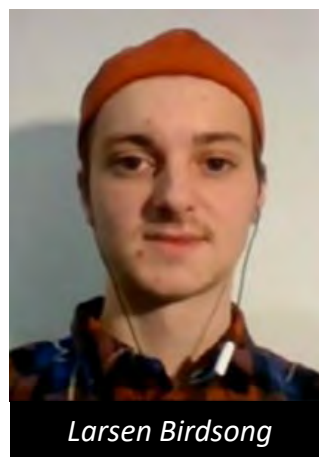


*Razia Hafeez*

**Razia Hafeez** received a SURF award for Fall of 2021 to work with **Prof. Jorg Woehl** on corral trapping of nanoscale objects and biomolecules in their native solution environment through the use of electric fields generated by applying a voltage to a patterned electrode surface.

**Larsen Birdsong** received a SURF award for Fall of 2021 to work with **Prof. Andy Pacheco** on the

spectroscopic properties of the metalloenzyme cytochrome c nitrite reductase.



*Larsen Birdsong*

Undergraduate students can learn more about this opportunity on campus at the following link: <https://uwm.edu/our/programs/support-for-undergraduate-research-fellows-surf/>

# Meet Our Lecturers



*Gloria Freschl*

Gloria Freschl has taught at UWM for over 40 years. She began her work as a part-time instructor, while raising her three children. Gloria has been a full time instructor for 15 years. For 10 years, Gloria taught Chem 341, 343, and 345. For 20 years, she taught Chem 100, 101, and 103. Currently, Gloria teaches all sections of Chem 101, an introductory chemistry course required for all UWM Nursing Students and Chem 103, Survey of Biochemistry.

Gloria's favorite part of teaching happens when her students: "suddenly 'see the light' on some concept!!" She says that they will even e-mail her when they have a "light bulb" moment. One of Gloria's unforgettable moments happened years ago on the last day of the semester. With five minutes left of class, all the students' phones started ringing. It turns out the students coordinated the calls as an end-of-semester prank. Gloria says it was hysterical. In her free time, Gloria enjoys making photo albums of her children and grandchildren.



*Maria Shtyenbuk*

Maria Shtyenbuk earned her PhD in Chemistry from UW-Milwaukee in 2014 in Prof. Hossein's lab. During that time, Maria was a teaching assistant. Before Maria became a full-time lecturer at UWM, she worked at MSOE for five years. At UWM Maria has taught Chem 100, 105, and 343.

Christine Carlson has been teaching for nine years at UWM. She earned her undergraduate degree at Mount Mary University and her masters and PhD at UW-Milwaukee in Prof. Woehl's lab. Christine mostly teaches Chem 100, 102, and 104. She has also taught 500-level courses. Christine's favorite parts of teaching are watching her students succeed. She

says that she also learns something new every semester. In her free time Christine enjoys gardening.



*Christine Carlson*

## Upcoming Events

UWM will be hosting the MIDD (Milwaukee Institute for Drug Discovery) Symposium on January 18<sup>th</sup>, 2022. The purpose of this event is to further the communication within the MIDD and to initiate new collaborations. Furthermore, we will invite UWM students to present their work to give all scientists the opportunity to discuss their research in detail. For more information, please visit: <https://uwm.edu/drug-discovery/category/news/>

Chancellor Mone will be hosting a groundbreaking ceremony for the new Chemistry Building on Wednesday, January 26 from noon to 1:00 pm in the KIRC lobby.

# Length of Service at UWM

Chemistry & Biochemistry employees were honored at the 2021 Length of Service Ceremony on November 17, 2021:

- 5 years – Laboratory Supervisor, Morgan Smith
- 10 years – Lecturer, Christine Carlson
- 15 years – Scientific Glassblower, Neal Korfhage
- 15 years – Lecturer, Gloria Freschl
- 25 years – Professor, Alan Schwabacher
- 35 years – Graduate Coordinator, Elise Nicks

Congratulations to all – and especially to Elise! As Elise notes that: When I joined the Department of Chemistry in August of 1986, manual typewriters were used to type proposals for grants, prepare exams and type letters. IBM and Apple introduced personal computers, which included floppy disks, drop-down menus, and color monitors, which at that time was a God's given. Mimeograph was the old-fashioned copy machine used when making photocopies and completing job tasks.

Over the years, as I advanced in modern technology, I see its impact on my life and people worldwide; it's unbelievable. For the 35 years I have served in the Department of Chemistry and Biochemistry, I've fond memories of the many supervisors and co-workers that I have worked with. It has also been a pleasure to work with all the undergraduate and graduate students, academic staff, and faculty, and has been an experience I will never forget. I will forever have great memories.

Thank you for reading my story!



*Elise Nicks*

*Elise Nicks*

## Friends of Chemistry

Your contributions enhance the educational experience of our students and strengthen the research and development of our faculty and staff. Please join us in thanking our friends. The gifts that were received from June 2021 to date were:

### *Chemistry General Fund*

- Mrs. Johanna Vanselow
- Michael J. Martin
- Dr. Gene A. Hiegel
- Jay Wrobel
- Mr. Todd E. Specher
- Mr Michael J. McLaughlin
- John Stodola

### *George Keulks Memorial Fund*

- James W. Espy

### *Durward C. Layde Memorial Scholarship Fund*

- Margaret Layde
- Peter Layde
- Angela Carollo

### *Chemistry Scholarship Fund*

- Mr. Carl E. Wolff
- John and Daina Kinlen
- MilliporeSigma

### *Polyquinanes & Medicinal Chemistry Fund*

- Dr. Qi Huang
- Dr. Hui Cao
- Jay Wrobel
- Dr. Weijang Zhang
- Dr. Scott G. Van Ornum

For more information on becoming a Friend of Chemistry and Biochemistry, please see the pledge form on the back, visit our website [www.uwm.edu/chemistry/give](http://www.uwm.edu/chemistry/give), or contact Leslie Horn at [lahorn@uwm.edu](mailto:lahorn@uwm.edu).



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