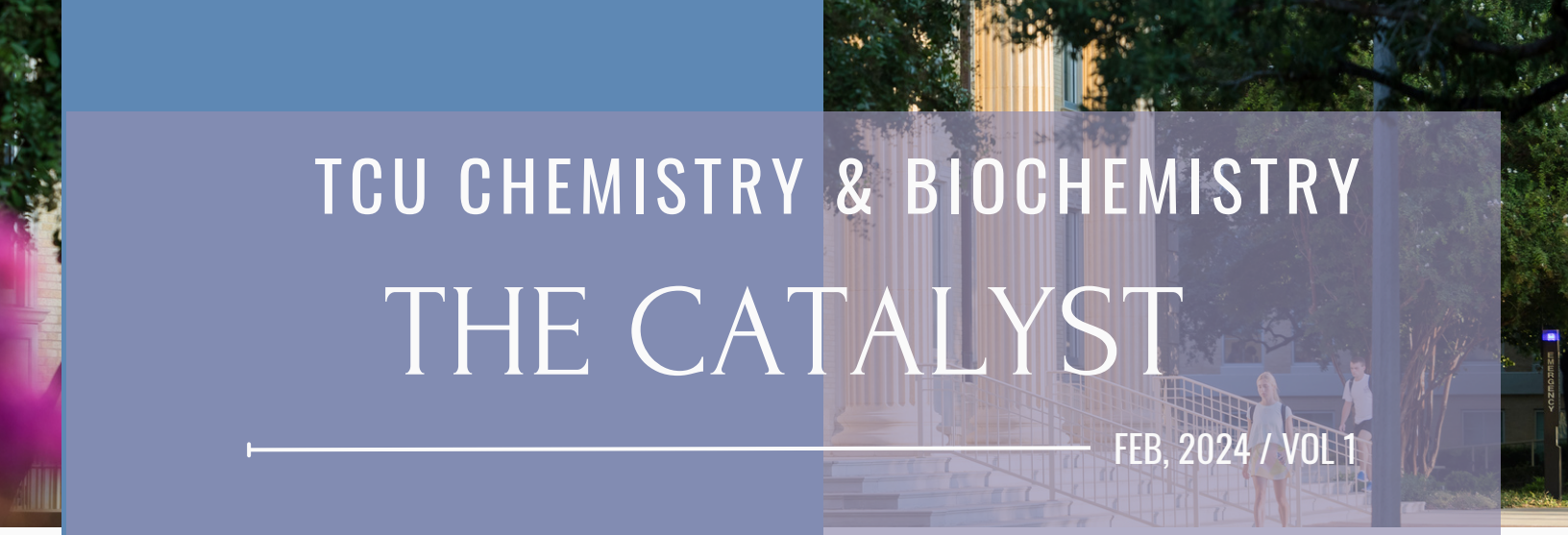


TCU CHEMISTRY & BIOCHEMISTRY

THE CATALYST

FEB, 2024 / VOL 1

DEPARTMENT HAPPENINGS

Undergraduate and Graduate students (18 total) will attend the ACS National Meeting in New Orleans this March to present their research findings. Chemistry Club will be recognized as an Outstanding Organization by ACS.

We are happy to welcome our new Technician, Nick Carpenter, who will be taking over the role that Jerry Katchinska has filled for many years. We are very grateful to Jerry and are excited to hear about his adventures in full-retirement. Congrats Jerry!

TCU McCracken Student Research Symposium will be held in April to highlight the results of undergraduate and graduate projects across the College of Science and Engineering.

Congratulations to Undergraduate Tatum Harvey for receiving the ACS Student Leadership Award. Tatum attended a leadership summit in January with other awardees.

Professor Kayla Green was a finalist for the Chancellor's Award for Distinguished Achievement as a Creative Teacher and Scholar.

DEPARTMENT CHAIR, DR. BENJAMIN JANESKO

It is an exciting time to be a chemist at TCU! Our students and faculty continue to engage in internationally recognized research. As of 2023, our BS Chemistry and Biochemistry majors score above the 80th percentile of chemistry students nationwide, per American Chemical Society exams, building strong foundations for their futures. We look forward to building on our tradition of excellence in scholarship, research, and student success. We hope you enjoy our first newsletter and encourage you to stay in touch!

A MESSAGE FROM DR. MINTER

Undergraduate research in our department is at an all-time high. There are 32 undergraduate researchers in our labs this semester, which is the most in my memory. This hands-on experience is invaluable and will undoubtedly translate to a record number of poster presentations this spring when our researchers will have the opportunity to present their results at our annual Student Research Symposium (SRS). Please consider attending the SRS on April 19, especially if you are local. As always, I hope to see you in Schollmaier Arena cheering on our Frogs!

FROG FINDINGS: EXAMPLES OF RECENT PUBLICATIONS

A new, powerful functional from the Janesko Group gives more accurate energy and structural data than those currently available and has strong implications to better drug design. J. Chem. Theory Comput. 2023, 19, 24, 9102–9117

Dr. Simanek's team is providing insight into the molecular motion of large macrocycles to understand their ability to interact with proteins and serve as new therapeutics for amyloid related diseases. Chem.Eur. J.2023, 29, e2023009

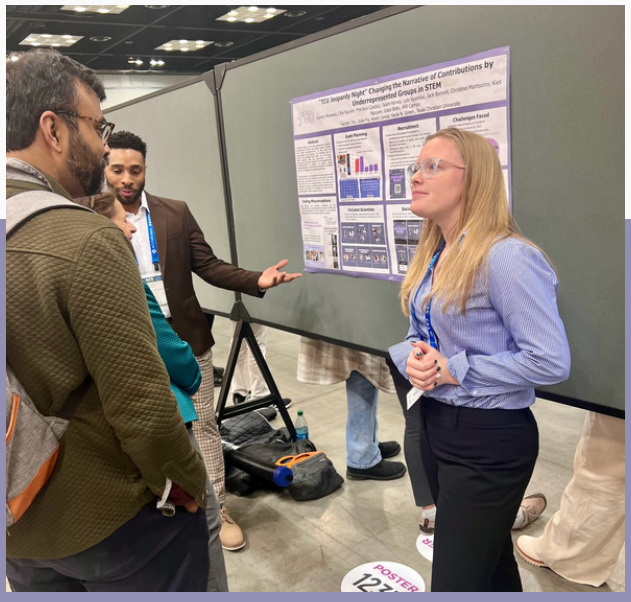
When combined with transition metals, new nitrogen rich cyclic molecules from Dr. Green's lab are proving to be catalysts for antioxidant processes that prevent aging and disease. Inorg. Chem. 2023, 62, 14, 5415–5425

STUDENT SPOTLIGHT

UNDERGRADUATE: TATUM HARVEY

Tatum Harvey, a second-year undergraduate and native Texan is pursuing a major in biochemistry and a biology minor. Tatum's long term goal is to earn her PhD and use this to enhance the role that chemistry plays in immunology research. Currently Tatum contributes to groundbreaking research as an Undergraduate Researcher in Dr. Janesko's lab. She explores the capabilities of Density Functional Theory methods, aiming to provide accurate properties of macromolecules without conventional testing. Tatum's summer research was supported through a collaborative NIH grant with Drs. Green and Janesko.

Tatum's leadership extends to her role as the ACS Travel Coordinator for the TCU Chemistry Club. She was recently awarded the ACS 2024 Student Leadership Award for her dedication to fostering a dynamic academic community. Tatum Harvey's journey embodies academic excellence, research innovation, and emerging leadership, making her a standout figure in the scientific community.



Tatum is pictured presenting the TCU Chemistry Club poster along with her colleagues at the ACS National Meeting in Indianapolis in March 2023.

GRADUATE: LIAM CLATON

Introducing Liam Claton, a second-year graduate student in Dr. Eric Simanek's lab. Liam earned a Chemistry BS and a Biology BA from TCU. His academic journey took an unexpected turn from pre-med to research, driven by a profound affinity for chemistry and pharmaceutical medicine design. Presently, his research delves into the realm of organic properties of triazine-containing compounds and site-specific protein modification linked to breast cancer. Beyond the laboratory, Liam finds solace in the outdoors alongside his fiancée and their cat and German Shepherd puppy.

Guided by mentors like Dr. Simanek and Dr. Conrad, Liam's path underscores the transformative influence of passion and persistence in the pursuit of scientific knowledge, contributing to advancements in organic chemistry and cancer research. Find out more about the exciting work that Liam is achieving with Dr. Simanek here.

FROG FINDINGS: EXAMPLES OF RECENT PUBLICATIONS

Dr. Coffer and his team are using templates to produce perovskites to fine tune the emission spectra between green and sky blue. This work will ultimately lead to improved light-emitting diode designs that we use everyday! Adv. Optical Mater. 2023, 11, 2202755.

Protein crystallization is a complex and slow process that is a bottleneck in biotechnology and pharmaceutical industries. Dr. Annunziata's group identifies novel strategies to enhance protein crystallization. J. Mol. Liq, 2024, Just Accepted

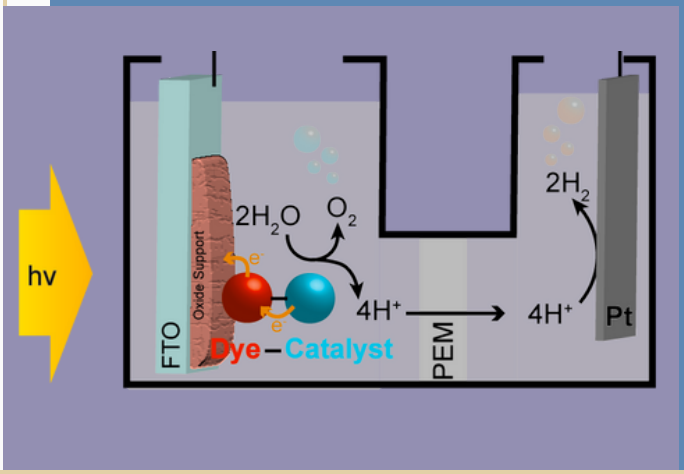
Being a square has its advantages when designing probes to obtain information about the properties of a solution. Dr. Dzyuba's group is exploring squaraine-containing dyes to evaluate their environment-sensing capabilities. J. Photochem. Photobiol. A: Chemistry 2023, 437, 114498.

RESEARCH HIGHLIGHTS

Dr. Ben Sherman

Ben Sherman is a recently promoted associate professor at TCU, having earned a B.S. in Biochemistry and Spanish from the University of Michigan in 2008 and a Ph.D. from Arizona State University in 2013. His doctoral research focused on tandem dye-sensitized photoelectrochemical cells for solar fuel production. After completing his PhD, he conducted postdoctoral research at the University of North Carolina, emphasizing ruthenium-based complexes and novel electrochemical methods for photoanode analysis.

Examples of recent publications:
Photosynthesis isn't just for the trees and weeds—the Sherman group is investigating bismuth vanadate-based photoelectrodes for harnessing light energy to drive endothermic reactions for the production of fine chemicals and fuels. ACS Appl. Eng. Mater. 2023, 1, 11, 3122–3133



Sherman Research Group

Research Focus

Develop innovative methods for converting solar energy into stored chemical potential energy. Sherman's research group emphasis is in generating 'solar fuels,' involving the conversion of water into molecular hydrogen and oxygen, or carbon dioxide and water into molecular oxygen and reduced carbon compounds (such as methane, ethanol, etc.).

Why artificial photosynthesis?

Climate change. It is clearly the most critical and important problem facing humanity.

Involvement

The Sherman research group is currently looking for motivated and driven graduate students, who resonate with their research motivation or are interested in learning skills associated with their research.

For more information on the Sherman Research group visit the website here.

SIMANEK LAB RECEIVES GIFT FROM FORMER STUDENT

"This gift serves to express gratitude for the tremendous opportunities and mentorship Dr. Eric Simanek provided throughout my tenure," says former research student Joey Mellberg (BS Biochemistry, '23) on his family's gift to Simanek Lab. Mellberg was named an author of a manuscript published in Chemistry-A European Journal, which describes how molecular door hinges can be designed and engineered. The potential effects of this discovery could bring distinct advantages to materials, particularly in terms of antiballistic properties. The energy needed to activate numerous molecular hinges might be adequate to disperse the force of a bullet, preventing it from reaching its intended human target. Simanek says, "The Mellberg family's gratitude truly displays how TCU's teacher-scholar model impacts life beyond the classroom. We are proud of how these research opportunities provide students with the intentional support and guidance they need to create a better future." The Simanek Lab is continuing these investigations.

TCU Chemistry Club

2022-23 OUTSTANDING-ACS AWARD

The organization continues to focus on outreach and education within the DFW community. Highlights for this past year include:

- Burton Hill Elementary Science Club: We work with 20 students after school for 1.5 hours every Tuesday along with twice monthly activities at other schools.
- The National Chemistry Week event was held at the Fort Worth Museum of Science and History in October. TCU provided over twenty volunteers out of almost 200 volunteers from DFW.
- TCU Chemistry Club hosted a jeopardy themed event to highlight scientists from backgrounds and underrepresented groups. We had over 160 participants and are planning another night for 2024, which will include other local universities.
- Eight students from TCU Chemistry Club traveled to Indianapolis to attend the National ACS meeting in Spring 2023, where they presented a poster during SciMix and recieved Outstanding recognition from ACS.

NATIONAL CHEMISTRY WEEK 2023

"Chemistry Club is a safe, encouraging space that fosters excellence. I have found my people."

AUDREY DOLT,
TCU CHEMISTRY CLUB PRESIDENT

HOW YOU CAN SUPPORT OUR STUDENTS

Our goal is for every student in the Department of Chemistry and Biochemistry to have hands-on experience in cutting-edge chemical research, as well as opportunities to interact with leading researchers across the discipline. Gifts of any size are appreciated.

Gifts of $4000 can typically support a single undergraduate research experience. Gifts of $500 can bring a nationally recognized researcher to TCU. Gifts of $100 will help a Chemistry Club member attend a National ACS meeting.

To donate, click here to visit TCU Giving and under "Gift Information", importantly, select "Other – User Input Text" and enter your gift designation in the comment box.

Examples of gift funds include directly to the Department of Chemistry & Biochemistry or to the Neilson, Minter, or Ruth Evelyn Sanders funds. Designations can be in honor or memory of a chemistry faculty that made an impact on you. Please be sure to include Chemistry in the designation.

PLEASE **SHARE** THIS NEWLETTER WITH ALUMNI AND ENCOURAGE THEM TO KEEP IN TOUCH WITH US HERE OR EMAIL CHEMISTRY@TCU.EDU