# MU Chemistry

## Fall 2023 year-in-review

## Chemistry Travelog


Student travel is back in full swing after the pandemic. In 2022-2023, two major trips were made sponsored by the Babb Trust, which was established by the late Professor Dan Babb to support student travel and scholarships.

Nineteen undergraduate students, one graduate student, and six faculty members attended the Southeastern Regional Meeting of the American Chemical Society (SERMACS) in San Juan, Puerto Rico on October 18-23, 2022. Aakriti Damai, Trace Clark, Kayla Tyler, Perin Schray, Tess Courtney, Hunter Mitchell, Darshan Sangani, and Haylee Mays each presented posters of their research, while Khaled El-Shazly and Sara Moreno (M.S. student) contributed oral presentations. Dr. Rosalynn Quiñones, a Puerto Rican native, organized many cultural and sightseeing opportunities for the entire group to enjoy. Activities included dinner and dancing at the SERMACS "Puerto Rico Night" celebration, a walking tour of Old San Juan, and kayaking in the bay.

In March 2023, a second delegation traveled to Seattle for the American Society of Biochemistry and Molecular Biology national meeting. Professor Derrick Kolling traveled with Kara Joseph, Trace Clark, Sierra Lutz, Kayla Tyler, Brendin Flinn, and Garrett Shields to DiscoverBMB, the American Society for Biochemistry and Molecular Biology Meeting, in Seattle, WA. All six students presented posters on their tardigrade- or algae-based research in the Kolling Lab.

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## Karl V. Shanholtzer: 1945 - 2022

We are saddened to report that our former laboratory manager Karl Shanholtzer passed away on December 24, 2022 at the age of 77. At the time of his retirement in 2013, only Prof. Daniel Babb had been a member of the chemistry department longer. Karl was far more than his job title, however, both professionally and personally. When joining the department, new faculty were told that they were expendable, but Karl was not. He was the one person who was necessary for Chemistry to function and there was little hyperbole to that observation. Karl was as talented as he was curious and knowledgeable. As a department with limited resources, Chemistry did not have a budget for instrument repair contracts, so Karl learned how to keep every piece of equipment functioning. He was so good at this that some instrument companies allowed him to make warranty repairs for them by talking him through the procedures on the phone. He worked so well with their technical staff that we frequently got free parts and upgrades. Along the way, he became an excellent teacher, usually having frequent users of the equipment assist him so that faculty could troubleshoot when he wasn't available. With a much lower budget than almost any comparable department in the U.S., Karl was a master at making sure we got the most out of every dollar. A series of department chairs leaned on his expertise to manage the department's budget. Karl developed a good understanding of chemistry, despite not having any significant formal training in it, and became the department's *de facto* safety officer ensuring that we stayed in compliance with state and federal regulations.

Karl was a wonderful colleague personally. In the early days, from when personal computers transitioned from being the playthings of the tech savvy to becoming necessary for day-to-day living, Karl regularly invited colleagues into his home to help them custom build home computers. He literally saved colleagues thousands of dollars, which on state salaries was deeply appreciated. He assisted at least one faculty member with wiring his house for a computer network. With all that he did at work, one could just drop into his office for a chat about anything. He mentored countless work-study students and helped supervise teaching assistants regularly. He helped research students with both instrumentation and their lab equipment. If not indispensable, the void he left when he retired was still gaping.

Karl is survived by his wife of 55 years, Laurie, and children, Karl Jr. and Christy. His family has established a fund at the **St. Jude's Children's Research Center** in his memory. More details on his life may be found at the **Henson & Kitchen Mortuary website**.

## Chemistry Develops Areas of Emphasis in Biochemistry and Forensic Chemistry

Student interest and a new university initiative have led to the creation of two "areas of emphasis" (AOE) in chemistry. AOEs are essentially minors, except that minors are formally connected to departments (e.g. one receives a minor in chemistry), whereas AOEs are connected to topics. They differ from minors in that students can complete an AOE in their major, as well as other majors. They may also include courses from different disciplines. There has been considerable interest by chemistry majors in obtaining a credential in a second subspeciality (e.g. a biochemistry major obtaining credentialling in forensic chemistry) and AOE's will provide that opportunity.

***For more details about any stories in this newsletter, please visit our News page by using the News link at www.marshall.edu/chemistry***

## Professor Dr. Yongick Kim Joins the Department

Dr. Yong-Ick Kim has joined the department as our newest biochemist. Dr. Kim obtained his B.S and M.S from Sunkyunkwan University in South Korea and his Ph.D. from Texas A&M University, working with Andy LiWang on the reconstitution of the cyanobacterial circadian clock. He then joined New Jersey Institute of Technology (NJIT) as an Assistant Professor of Chemistry in 2015, before moving to Marshall this fall. Dr. Kim's research currently involves studying the biochemical mechanisms underlying circadian rhythms, the bodily and behavioral changes tied to the 24-hour daily cycle that are responsive to light and darkness. His research to date has focused on pinpointing the activation and inhibition of proteins integral to regulating the circadian clock and on the biochemical mechanisms that reset it. He is interested in examining disruptions such as jet-lag in order to help devise effective treatments. While at NJIT, Dr. Kim involved graduate (3) and undergraduate (18) students extensively in his research. He published 11 papers with 2 graduate and 6 undergraduate student coauthors in journals, ranging from *Analytical Chemistry*, to the *Proceedings of the National Academy of Science*, and *Science*. He has been funded by NIH.

## Professor Rosalynn Quiñones Completes a Sabbatical Leave

Prof. Rosalynn Quiñones was on sabbatical leave during the Fall 2022 semester. She conducted much of her research at the **Forensic Science & Law** and **Chemistry & Biochemistry** Departments at Duquesne University in Pittsburgh, PA, with the remainder done at Marshall University. At Duquesne, Rosalynn studied cannabinoids in products such as lotions, creams, and vape liquids. This was important because there is much misleading information on labels and not very accurate and precise quality control on those products.

Part of her sabbatical leave was spent becoming proficient in **liquid chromatography tandem mass spectrometry** (LC/MS/MS), a technique used to identify materials that are either nonvolatile or that would decompose on vaporization in a gas chromatograph. Her mastery of instrument allowed her to finish three projects she was working on before her sabbatical began. One of these, "Quantification of Cannabis in Infused Consumer Products and Their Residues on Skin," was published in *ACS Pharmacology & Translational Science* (**2022, 5, 642-651**) with her students Sara Moreno, Amanda Smythers, Carrie Sullins, Haley Pijor, and Glenna Brown, as well as collaborators at the MU School of Pharmacy and Duquesne University. This paper examined 13 over-the-counter consumer products for the presence of cannabidiol (CBD) and similar materials. Additionally, the efficacy of topical applications was investigated. Her group finished a paper in the Journal of Chemical Education (**2022, 99, 10, 3558–3565**) titled "Integrating Elemental Analysis and Chromatography Techniques by Analyzing Metal Oxide and Organic UV Absorbers in Commercial Sunscreens." This paper presented a laboratory experiment for undergraduate students in analytical and organic chemistry courses was developed utilizing high-performance liquid chromatography (HPLC) analysis to identify and quantify cannabinoid compounds present in commercially available topical products. Dr. Quiñones coauthored this paper with Marshall students Haley Pijor, Sara Moreno, Tamara D. Westfall, Carrie Sullins, Sarah Ivey, and a group of faculty and students from Trinity Washington University.

Dr. Quiñones also presented her work at several universities and conferences, including the International Colloid Conference in Lisbon, Portugal. She also submitted research proposals, one of which was funded and is described later in this newsletter.

## Drs. Derrick Kolling and Rosalynn Quiñones Receive Major Research Grants

Dr. Derrick Kolling has been awarded $366,624 from the **National Science Foundation** to study the biochemical means that tardigrades (also known as water bears or moss piglets) use to survive extreme conditions. This is part of a collaborative research award with Dr. Leslie Hicks, a Marshall Chemistry alum and Professor of Chemistry at UNC-Chapel Hill. This three-year award will support undergraduate and graduate researchers to use electron paramagnetic resonance spectroscopy and confocal fluorescence microscopy to study the production of free radicals in the microanimals when exposed to extreme forms of stress. The project will also include an outreach program that will involve K12-student participation in citizen science projects, including a community tardigrade exchange (**Tardigrade Trading Post**).

Dr. Rosalynn Quiñones is a member of a team that has been awarded $95,000 on a project titled "Advancement of Science and Engineering for Localized Gas Utilization." Prof. John Hu of West Virginia University leads this collaborative effort. This funding will help develop a cost-effective, modular catalytic natural gas-to-chemical process utilizing microwave excitation at low temperatures and pressures. Dr. Quiñones is working on the surface and chemistry characterization of the nanocatalyst. This grant is a collaboration between WVU, MU, the **WV Chemical Alliance Zone**, and **AVN Corp**.

Dr. Rosalynn Quiñones also was funded ($53,000) to continue the First2 network at MU. This will fund 10 STEM scholars' students from minority, first-generation, and under-represented groups. These students will be mentored throughout their college careers by doing research, tutoring, and outreach. The focus of the program is to matriculate students by supporting them with coursework, social events, clubs, and regular meetings promoting communication among the students and between the students, faculty, staff, and administration.

## Transitions

**Eduard Lukhmanov** has re-joined the department as its new laboratory manager. Ed is an alumnus of Marshall University, where he earned both his B.S. in Forensic Chemistry and M.S. in Analytical Chemistry degrees under the mentorship of Professor Scott Day. Previously, he briefly held a position of Adjunct Instructor at the Department, prior to taking up on his new role as the lab manager. Outside of work he enjoys spending time hosting board- and TTRP-game nights for his friends on weekends, as well as some casual downtime of reading, playing videogames, watching TV-shows and movies, and going out spent alongside his best friend, sidekick, and wife — Jaemi Lukhmanov

**Zacchaeus Lucas** has joined our department as its stockroom manager. Zac is a graduate of WV State University with a B.S. degree in biology. Before coming to Marshall, he worked in agronomy, mining, and environmental labs. Outside of work he enjoys movies, particularly horror movies, and is an avid reader of all kinds of books.

## AXE Update

It has been four years since the Gamma Eta chapter of Alpha Chi Sigma has given an update. For most of that time, the chapter had been struggling to stay active like most student organizations during and after the pandemic. However, in the past 4 semesters, the chapter has initiated 53 new brothers and currently has 37 brothers active. Thanks to the current and previous officers along with all of those who have been initiated, ΑΧΣ is now back on its feet and thriving. Our district counselor even noted that we are one of the more active chapters now and complimented how well organized we are. The chapter has begun to implement many old and new activities to help the chemistry department and to become more involved within Marshall's campus and community.

In the 2022 spring semester, the brothers were able to work with chemistry professors and participate in several outreach events like judging a science fair at Fairland High School and putting on a science magic show for a couple of local elementary and middle schools. We have been hard at work spreading the word about ΑΧΣ by tabling at events like student orientation and RecFest. The brothers hope to continue this work and spread their knowledge and passion for chemistry and the brotherhood.

Brothers have also been working closely with the wonderful faculty in the Department of Chemistry to serve students in the College of Science. We have begun to offer tutoring services again along with selling snacks, goggles, and combination locks. The brothers are helping Dr. Castellani test and implement a mentorship program for chemistry majors. ΑΧΣ members have also been decorating the chemistry floor to spread some holiday cheer around midterms and finals when it is the most needed.

– Trace Clark, Master Alchemist

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