

### News from Chemistry

The past year has brought changes and new challenges. With the pandemic behind us classes have returned to in-person and most everyone has stopped wearing masks. Our enrollments have grown ever so slightly, we continue to offer small classes and more one-on-one interaction. Alumni returned to campus to share their experiences in our Alumni Seminar Series. Faculty have active research programs and students have presented at SPACE our campus Research Symposium and the ACS Student Affiliates Symposium at Duquesne. Our biggest accomplishment is becoming an ACS APPROVED Chemistry Program.

Thanks to your generous donations the Chemistry Department Instrumentation Fund has been growing and we've been able to update more instrumentation. Read on for an update from the Department.

## CHEMISTRY MAJOR EARNED APPROVAL OF ACS

On August 22<sup>nd</sup>, 2024, the Chemistry major at UPJ recently earned the approval of the American Chemical Society (ACS) for providing students with the knowledge and skills they need to be successful in their future careers. The entire process began officially in the summer of 2022, when we submitted our pre-application. Our full application was submitted the following year. Next, there was a virtual meeting with the ACS Committee on Professional Training, which was followed by a two-day on-site inspection. During that visit, auditors toured our labs, and met with administration, faculty, first-year General Chemistry students, Chemistry majors, students in upper-level courses, and students involved in undergraduate research. In total, 13 different students including chemistry, biochemistry, biology, civil engineering, and chemical engineering majors participated in these discussion groups, and we are so grateful and proud of all of them.

The ACS is a scientific society in chemistry with more than 150,000 members and is also a leading source of scientific information, producing over 60 scholarly journals and organizing national conferences. The ACS also holds a congressional charter and provides support for education, career development, and scientific research. The certification recognizes that students who complete this educational pathway will possess the skills and experience necessary to be successful in careers in chemistry and other pro-

fessional positions. The approval of our Chemistry degree also demonstrates that our program is of the same quality as the large public universities, such as Penn State, IUP, and Pitt Main, and small private colleges, such as Bucknell, Franklin and Marshall, Chatham, and Dickinson.

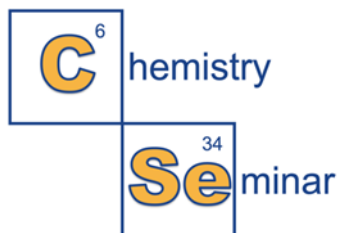
This certification is something the Department has been working on for over a decade and we are so proud of all the hard work done by current and former students and faculty.



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## CHEMISTRY DEPARTMENT ALUMNI SEMINAR SERIES



The Fall Chemistry Department Alumni seminar took place on Friday, November 8. Organized by Dr. Marsha Grimminger, the event featured two speakers: Dr. Nathan Grove (2003) and Brosnan McCray (2016).

Dr. Nathan Grove graduated in 2003 with a degree in Chemistry and Secondary Education and now has nearly 20 years of experience in higher education. Before joining Penn State University in August 2024, he spent 15 years as a faculty member at the University of North Carolina Wilmington (UNCW) where he taught general chemistry, organic chemistry, and first-year seminar courses and conducted research in chemistry education. At Penn State University, he serves as the associate direc-

tor of the Grove Center for Excellence in Science Education - focusing on the professional development of graduate students and expanding resources for discipline-based education research - and a teaching professor in the Department of Chemistry. In his talk, he shared how his experiences at Pitt-Johnstown and led to chances and opportunities that have framed his career. His professors at UPJ were essential guides on his journey.

Brosnan McCray graduated from UPJ in 2016 with a degree in Biochemistry. By June of that year Brosnan was employed at Lam-pire Biological Labs as an Antibody Purification Technician. Spring of 2018, he moved to a position at the University of Pittsburgh Clinical and Translational Science Institute where he worked for the NIH funded All of

Us Research Program. In April 2020, Brosnan returned to Lam-pire Biological Labs where he works as a Quality Control Specialist. Brosnan attributed his experience doing research with Dr. Grimminger and working as a Work-study in the Department to preparing him for his career.

The seminar series was well received by both faculty and students. The students appreciated the advice. We are planning to make this an annual event. If you would like to come back to campus to visit or Zoom in for the afternoon to share your experiences, we'd love to hear from you. Contact Dr. Marsha Grimminger at [mag246@pitt.edu](mailto:mag246@pitt.edu).



### Help us Update our Database and join our Seminar Speaker Series

We'd love to know what you are doing. We invite you to give back and share your experiences with our current students through our seminar program.

Contact Dr. Ryan Bird, Department Chair at [rbird@pitt.edu](mailto:rbird@pitt.edu)

## STUDENT ACCOMPLISHMENTS

Last summer (2024), **Caleb Bean** (Senior Biochemistry major) had the opportunity to participate in the Mentoring in Medicine program at Conemaugh Hospital. The paid program involved 10 weeks of mentorship rotations with various physicians in the Conemaugh system. In addition to 400 shadowing hours, Caleb had the opportunities to assist with procedures, interact firsthand with patients, network with fellow pre-med students, listen to weekly talks from various speakers, and even tour a medical school. His favorite singular experience was getting to scrub in and assist with a partial leg amputation. Caleb would absolutely recommend this program to any students seriously interested in pursuing a career in medicine, and he would love to answer any questions people may have about the program. Caleb will be attending Meritus School of Osteopathic Medicine in the fall.

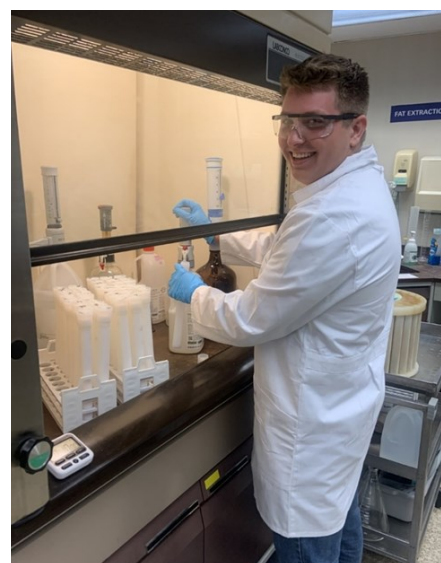


**Student Spotlight**



**Student Spotlight**

**Katrina Diaz**, a junior biochemistry major, participated in the CLIMB UP program at the University of Buffalo this summer. She worked in the department of chemistry under Dr. David Heppner. The main focus of the lab is in developing drugs for non-small cell lung cancer, targeting the Epidermal Growth Factor Receptor (EGFR). Her project was on testing a new method of reducing the nitro group to an amine group, a crucial functional group in drug synthesis. She utilized techniques such as column chromatography, extraction, thin layer chromatography, and nuclear magnetic resonance. Katrina has been accepted into the Memorial Sloan Kettering Chemical Biology Summer Program for 2025.



**Elijah Seibert**, a senior biochemistry major, engaged in a Quality Control Laboratory Internship at The Wenger Group. His responsibilities encompassed executing wet chemistry assays, including Karl Fischer moisture analysis, crude fat, and crude fiber extractions on feed and ingredient matrices. Additionally, he acquired hands-on experience with advanced instrumentation, such as HPLC-MS for mycotoxin detection and ICP-OES for mineral analyte quantification.

## ZIP, ZAP, ZOOM: MICROWAVE TECHNOLOGY FOR THE DEVELOPMENT OF SPEEDY AND ECO-FRIENDLY EXPERIMENTS

Two chemistry professors, Dr. Manisha Nigam and Dr. Matt Tracey are busy integrating green chemistry principles into research and teaching. Thanks to a recent Pitt Moment Fund grant and the Chemistry Department Gift Funds, they acquired a microwave reactor for their research labs, which has become a remarkable boon to advancing sustainability in chemical education and research.

Their innovative use of microwave-assisted synthesis has redefined how chemical reactions are conducted in their research labs and by extension the teaching labs, setting a new standard for sustainability and efficiency in chemical education and research.

### **Chemical Microwave Features:**

**Microwave Radiation:** The reactor emits microwaves interacting with polar molecules (e.g., water or organic solvents) in the reactants.

**Direct Heating:** Unlike conventional heating methods (e.g. hot plate), which transfer heat from the outside inward, this is direct heating.

**Rapid and Efficient Heating:** Because microwaves penetrate the reaction mixture directly, heating is faster and more uniform than traditional methods, leading to shorter reaction times and increased efficiency.

**Controllable Parameters:** Temperature, pressure, and power can be closely monitored and controlled during reactions in a chemical microwave. This allows for precise optimi-

zation of conditions to improve reaction yields and selectivity.

Dr. Nigam has been spearheading the development of multi-step reaction sequences focused on greener methodologies. Her groundbreaking work centers on the synthesis of barbituric acid derivatives through the Knoevenagel condensation reaction, a process that traditionally relies on lengthy and energy-intensive methods. By utilizing a microwave reactor, Dr. Nigam has achieved remarkable reductions in reaction times and energy consumption. Reactions that once required manual stirring for 15 minutes can now be completed in just five minutes at 120 °C in the microwave. Using water as a solvent further enhances the process's sustainability by eliminating the need for hazardous organic solvents. This approach not only embodies the 12 principles of green chemistry but also demonstrates their practical application in an academic setting!

Meanwhile, Dr. Tracey is expanding the scope of green chemistry reactions to reductions, using a biomimetic reducing agent, the Hantzsch amide. Together, Dr. Nigam and Dr. Tracey are pioneering methods for reducing barbituric acid and Meldrum's acid derivatives using both sodium borohydride and Hantzsch amides. Their investigations reveal that microwave-assisted reductions can significantly cut reaction times compared to traditional methods like refluxing, enabling accelerated synthetic routes.

This collaborative research is paving the way for safer, more efficient, and less energy-intensive chemical transformations, marking a significant advancement in sustainable chemistry.

Additionally, Dr. Tracey is using the microwave to rapidly synthesize biologically active molecules, replacing a 12-hour reaction time with a mere 10 minutes, and producing only benign byproducts. Instead of complex syntheses with various coupling agents, the combination of the Meldrum's acid derivatives from the collaboration with Dr. Nigam and various anilines furnishes a library of compounds for further study. In collaboration with the Biology Department, he hopes to identify compounds that are effective against bacterial biofilm formation. The duo's efforts are not confined to research alone; they are equally committed to



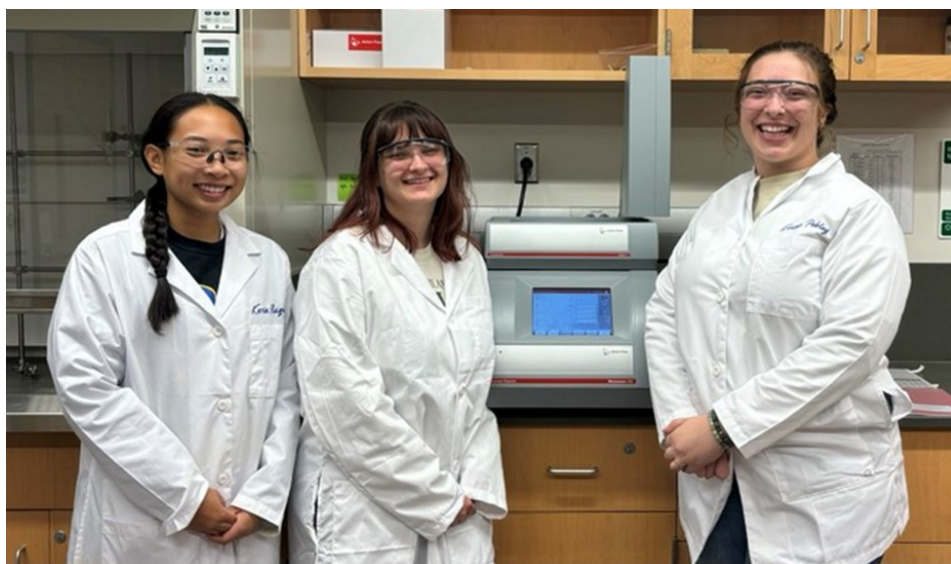
## ZIP, ZAP, ZOOM: MORE ECO-FRIENDLY EXPERIMENTS

reshaping chemical education. By incorporating their findings into undergraduate laboratory experiments, they are bridging the gap between research and teaching. Their courses now feature microwave-assisted reactions, providing students with hands-on experience in advanced synthesis techniques while emphasizing the importance of environmental stewardship. For instance, experiments that once required 30 minutes of reflux can now be completed in

just 90 seconds using the recently acquired microwave technology! These innovations are part of a broader initiative to implement course-based undergraduate research experiences (CUREs), which encourage critical thinking, creativity, and an understanding of sustainability in science.

Dr. Nigam and Dr. Tracey's partnership exemplifies the power of collaboration and shared vision. By lever-

aging their combined expertise and the transformative potential of microwave technology, they are not only advancing the field of green chemistry but also preparing the next generation of scientists to confront environmental challenges with innovative solutions. Their work serves as an inspiring model for how academic research and education can work together to promote a more sustainable future.



## GREEN CHEMISTRY AND SUSTAINABILITY COURSE PLANTS TREES

The *Green Chemistry and Sustainability* course provides students with an in-depth understanding of environmentally friendly chemical practices and their broader impact on sustainable development. A key component of the course is a hands-on, project-based assignment where students research and develop proposals aimed at enhancing sustainability efforts on the University of Pittsburgh at Johnstown (UPJ) campus.

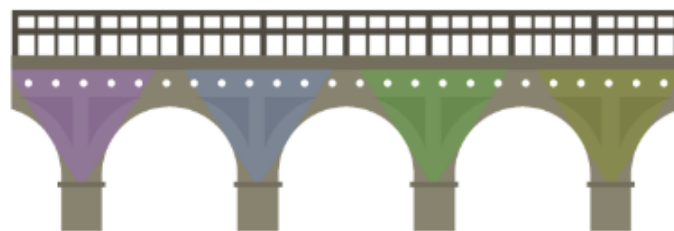
The course is taught by Dr. Nigam in the fall in odd-numbered years. Students in the Fall 2023 course proposed planting native Pennsylvania trees on campus to improve biodiversity, promote carbon sequestration, and contribute to the green infrastructure of the campus. Building on this student-led initiative, Dr. Nigam and the class applied for funding through the Alice Waters Fund, a grant that supports environmental and sustainability projects. With the awarded funds, they were able to purchase and plant four dogwood trees in Fall 2024, adding to the campus's natural landscape.

To ensure a successful planting effort, Dr. Nigam collaborated with the UPJ Chemical Society, inviting student members to participate in the initiative. Under the guidance of the UPJ Physical Plant supervisors, students actively engaged in the planting process, gaining hands-on experience in environmental stewardship. This project not only strengthened student involvement in sustainability but also fostered a sense of community responsibility and interdisciplinary collaboration, reinforcing the real-world impact of green chemistry principles beyond the classroom.



# BRIDGE

## BUILDING RELATIONSHIPS, INSPIRING DEVELOPMENT, GUIDING EXCELLENCE



This special mentorship program *for Freshman and Sophomore Chemistry/Biochemistry Students* at Pitt-Johnstown which began in the Spring of 2025 is designed to foster a sense of community, belonging, and academic success among first- and second-year chemistry students in the Chemistry department at Pitt-Johnstown. This initiative pairs incoming first- and second-year students with experienced junior and senior chemistry majors who have demonstrated academic success and strong leadership skills. By leveraging peer relationships, the program will enhance student engagement, build confidence, and encourage academic and personal growth.

The primary goal of this mentorship program is to support the retention and success of early-stage chemistry/biochemistry majors by helping them navigate their academic journey with the guidance of experienced peers. By fostering connections between new students and upperclassmen, the program aims to increase students' sense of belonging and making them feel integrated into the department. A second goal is to promote academic success by offering practical strategies for excelling in chemistry courses, including effective study habits, time management, and exam preparation techniques. In addition to academic support, the program encourages personal growth by helping mentees build confidence and resilience through mentorship and role modeling. Furthermore, it seeks to create a collaborative community by promoting teamwork, reducing competition, and encouraging shared learning outcomes among students. By addressing common challenges such as adjusting to demanding coursework and managing academic stress, the program ultimately strives to improve retention rates for first- and second-year chemistry students.

### Program Structure

The mentorship program has paired five first- and second-year students with five junior and senior students based on shared academic interests, career goals, and extracurricular activities. These mentor-mentee pairs will participate in structured activities as well as informal interactions.

The mentorship program has introduced mentors and mentees, outlined program expectations, and provided resources focused on communication and goal setting. Mentor-mentee pairs are expected to meet regularly, at least twice per month, to discuss coursework, address challenges, and offer guidance such as research opportunities, advantage of office hours of professors, and utilize campus resources like the Career Services, Academic Success Center and the Office Health and Counseling Center. At the end of the semester, mentors and mentees participate in a reflection session to evaluate the mentorship experience, discuss their achievements, and provide feedback to help improve the program for future participants.

The program is currently overseen by Dr. Nigam, who provides guidance and support to ensure its effectiveness. Dr. Nigam's involvement includes facilitating the pairing of mentors and mentees, regularly checking in with mentors to monitor the progress of mentor-mentee pairs and offering additional academic support to struggling students identified through the program. The faculty engagement will help maintain the quality and impact of the mentorship experience.

# PITT DAY OF GIVING 2025: 2-25-2025

## CONTRIBUTE TO THE CHEMISTRY FUND

Since 2018 we have raised over **\$20,000 for the Chemistry Department Gift Funds**

**Last year we raised almost \$3,500.** Your donations served as matching funds toward the purchase of the microwave that Drs Nigam and Tracey have implemented in their Green Chemistry research. See the story on pages 4 & 5. This year we hope to raise at least \$5,000 for the Chemistry Department Fund. Your donations will serve as matching funds toward the purchase of a new electro-analyzer for the Synthesis and Characterization Lab and Inorganic research and upgrades to the GC/MS for organic research and Instrumental Analysis Lab. Next year we'll be looking toward the purchase of an AA spectrometer or an ICP MS.



## PROMOTIONS

### Dr. Manisha Nigam

Promoted to Professor of Chemistry and named Mascaro Lecturer.

### Dr. Matthew Tracey

Promoted to Associate Professor of Chemistry.

Pitt has two school and college challenges.

**The RAISE THE BAR** (\$100,000) is an all-day competition to “raise the bar” by surpassing each school, college, or campus’ total donors from Pitt Day of Giving 2024. Winnings will be distributed to all units that “Raise the Bar” i.e., exceed their 2024 donor totals

**The LEVEL UP LEADERBOARD** (\$30,000) is an all-day competition for the school, college, or campus that reaches their predetermined Pitt Day of Giving 2025 donor goal. Winnings will be evenly distributed amongst all participants that “Level UP” based on the leaderboard results at the end of the day.

So, we are hoping that you will help. **It’s not about how much you give (though that always helps), but how many donors contribute.** If spouses and partners split their combined gift – giving two smaller gifts – that would get us twice the number of unique donors!

### How to Give:

Every dollar you contribute goes to the Chemistry Fund.

Go to the following link:

<https://pittdayofgiving.com/pages/pitt-day-of-giving>

Select the **MAKE A GIFT** button at the far right

- Select **Pitt—Johnstown** as your category
- Select **UPJ Chemistry Fund**
- Enter the amount (\$50, \$100, \$200 or “other”). The minimum is \$5.00.
- Click **CONTINUE**

## ACCEPTANCE: GRADUATE & PROFESSIONAL SCHOOL

**Korina Pebley:** Accepted into University of Cincinnati, University of Kentucky, and Duquesne University. No decision yet

**Molly Wagner:** Accepted into University of Buffalo, Duquesne, and University of Pittsburgh. Will be attending Pitt in the PharmD program.