

chemistry *distillations*



Faculty & Titles

Chris Abelt - Chancellor Professor; Associate Department Chair
Debbie Bebout - Professor; Director of Biochemistry Program
John Bedford - Lecturer, Director of General Chemistry Laboratories
Randy Coleman - Professor
Elizabeth Harbron - Floyd D. Gottwald, Senior Professor;
 Director of the Charles Center
Emily Hardy - Adjunct Lecturer
Emily Heery - Adjunct Lecturer
Rob Hinkle - Professor; Vice-Dean of Natural, Physical,
 Computational Sciences & Interdisciplinary Studies
Nathan Kidwell - Assistant Professor
Cemile Kumas - Visiting Assistant Professor
Lisa Landino - Professor
Dana Lashley - Senior Lecturer
Bill McNamara - Wilson & Martha Claiborne Stephens Associate
 Professor of Chemistry; Director of Graduate Studies
Tyler Meldrum - Associate Professor,
 Director of Undergraduate Research
Jeff Molloy - Director of Labs & Instrumentation
Bob Pike - Professor; Department Chair
J.C. Poutsma - Professor
Jonathan Scheerer - Garrett-Robb-Guy Professor
Beverly Sher - Senior Lecturer; Chief Health Professions Advisor
Izzy Taylor - Assistant Professor
Dave Thompson - Adjunct Professor; Chancellor Professor Emeritus
Jordan Walk - Senior Lecturer
Kristin Wustholz - Mansfield Associate Professor
Doug Young - Cornelia Brackenridge Talbot Term
 Distinguished Associate Professor

Emeritus Faculty

Gary DeFotis - Garrett-Robb-Guy Professor Emeritus
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Dawn Alleman - Administrative Coordinator
Janet Hopkins - Senior Lab Specialist
Der-Hong Shieh - Senior Lab Specialist
Claudia Smith - Fiscal & Materials Manager

Welcome New Faculty!

Tribe Chemistry gained two full time instructors in 2022: Dr. John Bedford as Lecturer & Director of General Chemistry Laboratories and Dr. Isabelle Taylor as an Assistant Professor specializing in Biochemistry.



John earned his Ph.D. in Chemistry – Biochemistry from Old Dominion University. He was teaching as an adjunct at Norfolk State and Christopher Newport Universities before coming to W&M. His doctoral research focused

on protein folding and stability. His teaching assignments include general chemistry lectures and labs. He is already thinking of ways to streamline lab preparations and economize on teaching lab supplies.

Isabelle prefers to be called Izzy. She earned her Chemistry BS at Bard College and her Ph.D. in Chemistry and Chemical Biology from the University of California, San Francisco. She worked as a post-doc in Molecular Biology at Princeton University before joining the Tribe. Her research interests include medicinal chemistry, drug discovery, and microbiology.



We have two adjunct faculty this year: Dr. Emily Hardy and Ms. Emily Heery (*nēe* Legaard). The level of professionalism and expertise brought to our lab sections by the “Emilys” has been amazing.

Cover Art designed by senior Grayson Hoy.
 This newsletter is available online,
 scan the QR code to access.

**Letter from the Chair, Bob Pike ...**

... Hi again everyone! It's my pleasure to welcome readers to our annual newsletter and give you an overview of the 2022-2023 academic year. Now that I'm in my second year as Chemistry chair, I feel like I have a better handle on my duties. Nevertheless, there's always something new (whether something to plan for, to smile about or to worry about) popping up. It is nice to see our students, faculty and staff in the Integrated Science Center (ISC) going about the business of learning, studying, teaching, mentoring, researching, and just being together. This is a great place filled with wonderful, interesting, and kind people.

During the last year we experienced many changes in the department, especially in personnel. Overseeing hiring is one of the most significant duties of the chair. Finding the right person yields a bumper crop of benefits to the department for years to come. Let's start with personnel changes during the last year, we welcomed two permanent faculty members this fall semester.

Welcome, **Isabelle Taylor!** Izzy is a new Assistant Professor who will teach in our biochemistry and organic chemistry sequences. Her research areas include chemical biology, biochemistry, and antimicrobial drug discovery targeting the mechanisms of bacterial cell-to-cell communication, called quorum sensing. Izzy is setting up her lab and is sure to attract many bright and motivated students to help her carry out cutting edge studies in biochemistry and molecular biology.

John Bedford fills a new lecturer position, the Director of General Chemistry Laboratories. He will help instruct the ever-growing numbers of students in General Chemistry and will have oversight of our General Chemistry laboratories. We are grateful to the Dean of Arts & Sciences for recognizing the need for this position, and grateful to John for taking on the challenge. Welcome John!

We said farewell to **Rachel O'Brien** at the end of summer 2022. Rachel has joined the Department of Environmental Engineering at the University of Michigan. No doubt our loss is Michigan's gain. Rachel was a highly successful teacher and researcher here, and we will miss her sorely. We are conducting a search for an analytical chemist to join us next fall.

I am happily announcing that we have signed on **Dr. Isaiah Speight**, an organic chemist, who will also be joining us as Assistant Professor next fall. I'll have more to say about Isaiah in next year's newsletter. But with degrees from Norfolk State and Vanderbilt Universities and post-doctoral experience both in academics and industry, we look for great things from Isaiah. He has already inspired our NOBCCHE students at the national conference (p. 9) and will help grow that program once he settles in Williamsburg.





We congratulate **Jonathan Scheerer** on his promotion to full professor at W&M. Jonathan is a highly successful and nationally recognized scholar of organic chemistry. You can read about his research program in last year's newsletter. Jonathan is on a well-earned year sabbatical in '22-'23.

In this issue we highlight an extraordinarily generous gift from **Ms. Eleanore Seiler Flagg ('50)** that has enabled us to purchase a new thermogravimetric analyzer (p. 13). We also announce two exciting programs: a peer-mentoring program and an improvement to our seminar program. Peer mentoring will train and equip students to help one another, not just with the challenges of learning chemistry, but also with navigating opportunities in the department and beyond. The Diverse Scholars seminars will offer increased student/public engagement with invited speakers.



There are two major faculty grants to highlight this year: **J.C. Poutsma** was awarded a National Science Foundation grant, *Intrinsic Gas-Phase Acid-Base Properties and Structures of Non-Protein Amino Acids and Non-Protein Amino Acid-Containing Peptides*. J.C.'s lab will explore the fundamental relationship between the structure of small biologically-relevant molecules and their energetic and spectroscopic properties, hoping to better understand the effects of intramolecular hydrogen bonding on the gas-phase chemistry of amino acids and peptides and the mechanisms for "selective" fragmentations in low-energy tandem mass spectrometry experiments. They will use the extended kinetic method and high-level computations to determine the fundamental gas-phase acid-base properties of small peptides to understand how these properties contribute to the fragmentation process, and infrared multiple photon dissociation spectroscopy and H/D exchange techniques to investigate the structure of small peptides.

Nathan Kidwell's grant is from the Petroleum Research Fund of the American Chemical Society (ACS) for *Intermolecular Interactions Drive Chemical Outcomes: Controlling Chemical Pathways with Quantum State Preparation*. The Kidwell lab is investigating the bimolecular collision pathways between molecules commonly found in combustion and in the atmosphere. Using laser-based methods in collaboration with theoretical chemists, Nathan's research group is obtaining molecular-scale insights into the reactive and nonreactive mechanisms when nitric oxide radicals collide with a series of alkane molecular partners (methane, ethane, propane, and n-butane). In doing so, they aim to increase the accuracy of theoretical calculations and predictive models developed for combustion and atmospheric chemistry.

Our faculty continues to carry a disproportionately large share of W&M governance. Former chair, **Rob Hinkle** continues to serve as Vice-Dean of Natural, Physical, Computational Sciences & Interdisciplinary Studies. **Elizabeth Harbron** transitioned from interim to permanent head of the Charles Center, overseeing UG research grants, honors, national fellowships, and scholars' programs.



In addition to the full-time administration roles noted above for Rob and Elizabeth, **Kristin Wustholz** is currently chair of the Educational Policy Committee, **J.C. Poutsma** is chair of Faculty Affairs Committee, and **Doug Young** is chair of the Undergraduate Research Committee.



Chris Abelt has completed three years' service as chair of the W&M Music Department, and is currently associate chair of chemistry while **Debbie Bebout** takes a sabbatical year. **Tyler Meldrum** has taken over as Director of Undergraduate Research, replacing J.C. Poutsma, who handled this role for over a decade.

I want to acknowledge our staff, who keep us running smoothly. **Claudia Smith** is our Fiscal & Materials Manager, handling all the grants and contracts in the department so efficiently, and who will be retiring as of January 1, 2023. **Dawn Alleman** is our Administrative Coordinator, she arranges so much of what goes on in Chemistry, including Homecoming and this newsletter. **Jeff Molloy** is our Director of Laboratories & Instrumentation; he keeps our equipment running and is truly a jack-of-all-trades. **Der-Hong Shieh** and **Janet Hopkins** are Senior Laboratory Specialists, handling all the materials prep, equipment set up, and overall administration of our lower division labs. Read what our students have to say about these great folks in "Staff Spotlights" (p. 12).



This August we said, "Happy Retirement," to a fixture in Chemistry, Ms. Kenitha "Roxanne" Futrell. Roxanne has worked in Chemistry since the Roger's Hall days, as a Building Services employee. Always present with a smile on her face, a kind word to lift you up and a hug of genuine warmth. See the pictures of Roxanne's retirement celebration below.

Thanks to all of the Chemistry Team from the bottom of my heart.

Yours truly, Bob Pike.



Roxanne's with her husband, Kirk, who also works in Building Services, and her Chemistry family.



All the girls (almost) in Roxanne's family came to celebrate her retirement from W&M. Many friends & co-workers from all across campus joined the party too!

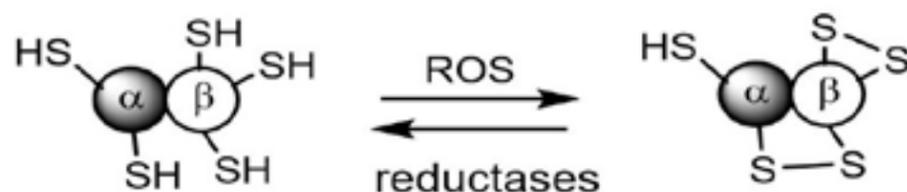
Department Research Highlights

LANDINO LAB RESEARCH

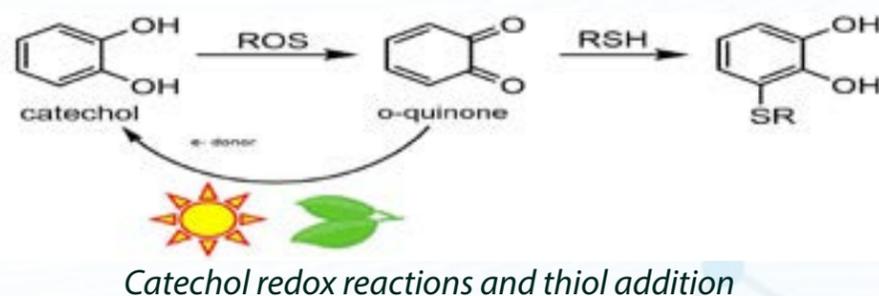


As a biochemist, my goal is to study biologically relevant redox reactions in vitro so that we can make predictions about what might happen inside a neuron as we age. My lab wants to understand the effects of reactive oxygen species (ROS) on microtubule proteins of the cytoskeleton and, more recently, on enzymes of glycolysis. ROS form as normal byproducts of O_2 reduction to H_2O or under conditions of oxidative stress (illness, auto-immune conditions). While most ROS are scavenged by enzymes and cellular or dietary antioxidants, as we age, ROS oxidation of proteins accumulates and is associated with diseases like Alzheimer's and Parkinson's.

The major findings of my lab over more than two decades are that cysteines, the amino acid with a thiol (RSH) of microtubule proteins are readily oxidized to disulfides by a range of ROS and that those disulfides can be repaired by reductase enzymes. Oxidized cysteines of target proteins can even undergo thiol-disulfide exchange with glutathione (GSH) and cysteines of other proteins to "repair" them and, in some cases, restore a protein's function that was lost due to oxidation.



More recently, we have begun to study both antioxidant and pro-oxidant reactions of catechols. Examples of catechols are the neurotransmitter, dopamine and catechin from green tea. If a catechol is oxidized by ROS to the o-quinone, it may react with protein cysteines or with GSH. What happens to a protein if it were covalently modified by a catechol? Great question! Lastly, we are studying photoreduction of o-quinones using chlorophyll metabolites and red light. This reaction of dietary chlorophyll is intriguing because it suggests a path to recycle catechol antioxidants.



Landino, L. M., Shuckrow, Z. T., Mooney, A. S., Lauderback, C. O., and Lorenzi, K. E. (2022) Photo-oxidation and Photoreduction of Catechols by Chlorophyll Metabolites and Methylene Blue. *Chem. Res. Toxicol.* 35(10), 1851-1862.

Landino photograph by Stephen Salpukas.

www.wm.edu/as/chemistry

YOUNG LAB RESEARCH

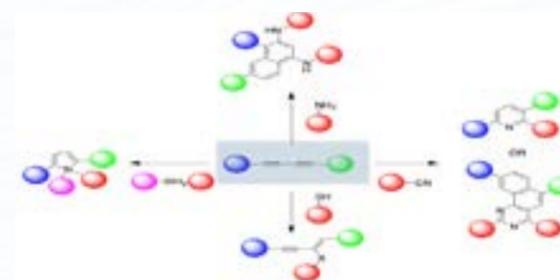


Our research occurs on the interface of biology and chemistry as we develop novel chemical tools to address biological issues. Currently, we have two major research areas with many individual projects.

The first area involves the synthesis and genetic incorporation of unnatural amino acids (UAAs) into proteins and the development of new therapeutics and diagnostics using the UAA.

The second project collaborates with Rob Hinkle's lab involving the preparation of small molecule libraries based on a biologically active core structure that we then screen in *E. coli*, *P. fluorescens*, *M. smegmatis*, *S. cerevisiae*, and human cancer cells to assess biological activity and develop new antibiotics with unique actions.

The genetic incorporation of UAAs has numerous applications, but we focus on utilizing them to introduce unique chemical functionalities that facilitate bioorthogonal reactions. These reactions were the subject of the 2022 Nobel Prize in Chemistry, illustrating their importance. Specifically the lab developed a unique bioorthogonal reaction, the Glaser Hay alkynyl coupling several years ago, and is now interested in further probing its biological application. This includes generating multivalent conjugation reactions, by coupling this reaction to yield a diyne functionality that then can be further reacted.



Examples of multivalent conjugations with diynes.

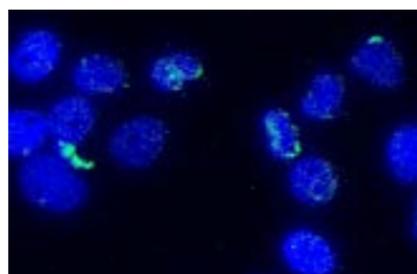
This enables the bringing of three or more components together in a therapeutic agent. An example would be an antibody (providing targeting to disease state cells), a therapeutic agent (a small molecule drug that treats the disease) and a fluorophore (to track the delivery of the drug to the cell). A second application includes using UAA to link a fluorophore to any protein to allow it to be tracked within cells as a diagnostic agent. Lastly, we investigate using this reaction to immobilize proteins to surfaces and resins to facilitate lab-on-a-chip technologies.

Protein immobilization for novel diagnostics. This strategy allows for multiple proteins to be immobilized.

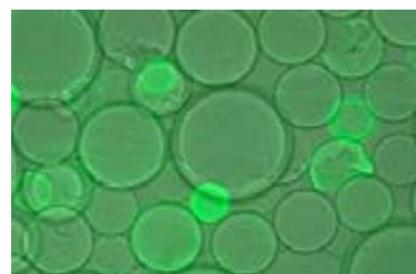


events.wm.edu/calendar/upcoming/chemistry

(YOUNG LAB RESEARCH CONTINUED)

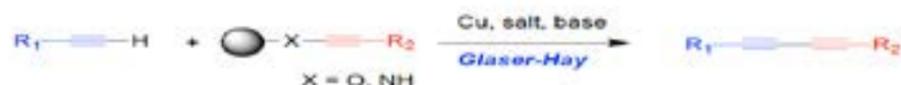


Detection of cancer cells with bioconjugates.



Immobilization of GFP on beads.

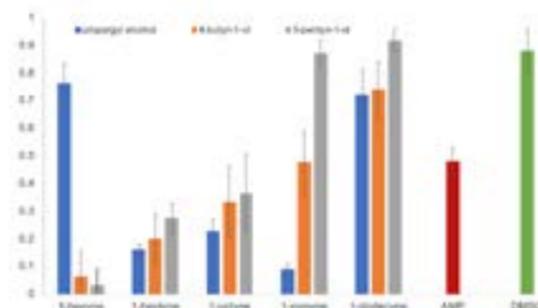
The second major research area involves the synthesis and screening of small molecule libraries based on polyynes that can be prepared using the Glaser-Hay reaction that is common in our UAA work.



Given the prevalence of conjugated alkynes in several biologically active natural products, we work with the Hinkle lab to systematically probe the requirements for biological activity and ultimately produce new antibiotics. This is especially relevant with growing levels of resistance to current antibiotics on the market.



Testing new antibiotics in yeast and bacteria.



Graph showing the loss of cell viability with specific compounds.

We have already named and investigated several compounds that demonstrate unique specificity for certain types of bacteria and are relatively potent. Example: one compound effectively kills only *E. coli* and its activity is tied to the length of the aliphatic carbon tail. Investigating other compounds is currently underway in different species.

Travis, C.R.; Gaunt, G.H.; King, E.A.; Young, D.D. "Genetic Encoding of a Bioconjugation Handle for [2+2+2] Cycloaddition Reactions" *ChemBioChem* 2020 21, 310-314. (VIP Paper) <https://doi.org/10.1002/cbic.201900391>.

Hale, E.A.; Ryan, H.M.; McOsker, A.M.; Funk, C.M.; Green, L.C.; Mazur, L.E.; Uthappa, D.M.; Flood, B.M.; Young, D.D.; Hinkle, R.J. "Effects of Structural Variations on Antibacterial Properties for Conjugated Diynes Generated through Glaser Hay Couplings" *ChemMedChem* 2022 accepted.

Tribe NOBCChE is Back in Force!



William & Mary's National Organization for the Professional Advancement of Black Chemists & Chemical Engineers (NOBCChE) had a wonderfully successful year!

NOBCChE works to increase diversity in STEM programs by providing opportunities to students of all backgrounds. Under the mentorship of Dr. Dana Lashley, the organization aims to increase the number of graduating chemistry majors of color. Community outreach and professional development are main pillars of NOBCChE.

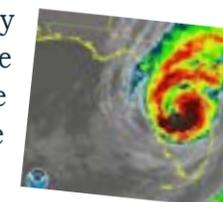


Tom Zhang, Willough Sloan, Naya Burrow, Kyle Lewis-Johnson, Jada Bonds, Sophia Haile, Chris Chun, Bilalay Tchadi, Professor Dana Lashley

Eight W&M NOBCChE students were awarded the organization's "Advancing Science Grants" which funded their lodging and partial registration as presenters at the 49th Annual National NOBCChE Conference in Orlando, FL. Funds from our Chemistry Student Opportunity Fund and W&M Conference Travel grants supported the remainder of travel costs. This marks the highest attendance of W&M students since our NOBCChE chapter's founding in 2018. Our group met incoming Tribe Chemistry faculty, Dr. Isaiah Speight, at the conference. Isaiah is very active in NOBCChE nationally and will help our program grow even more!

The group had LOTS of excitement on the trip! One of our own, Willough Sloan '23, received the ACS award for poster excellence for her

research in Medicinal Chemistry at the award ceremony! Unfortunately, our students endured Hurricane Ian, which hit while they were in Florida. Students claim the conference was life-changing, due to the inspiring, immersive culture of scientific excellence--not the hurricane.



With 20+ active members, we've built connections and shared opportunities with underrepresented populations. The group campaigned and won funds during W&M Impact Week 2021. They hosted 50+ high-school students from Green Run Collegiate, a high school in Virginia Beach. NOBCChE members showcased many labs in the ISC, sharing their love and passion for Chem + STEM: research tours, chem demos, liquid N₂ ice-cream, talks about college applications & financial aid, infectious disease topics, and campus tours.

Outreach efforts included mentorship to local underrepresented students and chemistry activities for local families during Physics Fest.



Elephant toothpaste chemistry demonstration for families and friends at Physics Fest, held during Homecoming 2021.

Next spring, NOBCChE, alongside the W&M Chemistry Club, will plan & host a Chemistry seminar by an invited speaker from the Orlando conference. This is part of the department Diversity Action Plan and is evidence that our NOBCChE group's efforts are making a difference!

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Chemistry is extraordinarily grateful for the generosity of all of our donors, both large and small. We welcome giving to either our general fund or targeted funds, such as those supporting summer research or instrumentation. If you are interested in making a donation or a planned gift, you can visit our website, <https://www.wm.edu/as/chemistry/support/index.php>.

Funds include: General Chemistry #2967; Summer Research #4953; Student Opportunity #5173; ISC Special Equipment #3981; Alfred Armstrong Memorial #2020. Scholarship & Award Endowments include: William G. Guy Endowment #0565; Summer Laboratory Research Endowment #5101; Dr. Alfred R. Armstrong Chemistry Scholarship Endowment #4104; Patricia Barry Scholarship Fund #3345; Kranbuehl-Thompson Graduate Fellowship Fund #3188.

These are by no means the only options for giving. If you would like to explore other funding options, you can contact Arts & Sciences Development (as-development@wm.edu, 757-221-1805) or contact me directly (rdpike@wm.edu, 757-221-2540).

Thanks to all our donors – past, present & future – for your support of our mission!

Bob Pike, Department Chair

Thank you for your support!

Staff Spotlights:



Der-Hong Shieh, Laboratory Specialist Senior, June 2005

"Talking with Ms. Shieh has made me a better student and a more knowledgeable person. She always returns my greetings cheerfully. One time we had a really good conversation about choosing a life path. Thank you, Ms. Shieh for all your guidance and friendliness!" - Willough Sloan, '23
 "I love seeing Ms. Shieh whenever I TA. She always has a solution (haha) if something goes wrong and can fix lab equipment seemingly magically" - Grayson Hoy, '23

Janet Hopkins, Laboratory Specialist Senior, August 2010

"Ms. Hopkins is always willing and more than happy to help me whenever I have questions about the lab. Without her, none of the chemistry labs would run." - Isabelle Kogan, '24

"Ms. Hopkins is essential to the functioning of the department. Her dedication and knowledgeability is unmatched and she works incredibly long hours to keep the teaching labs in order. I simply would not be the person I am today without her trust in me and guidance." - Christina Romano, '24

"She is incredibly hardworking and committed to her work, not to mention extensively knowledgeable about the successful preparation and execution of the labs. Ms. Hopkins has always been kind and supportive. I don't think the department would run half as smoothly if it wasn't for all of her hard work and dedication." - Emma Smith, '24



Jeff Molloy, Director Laboratories & Instrumentation, August 2010



"Prof. Molloy is a wonderful resource in our department! From fixing computer software issues to helping with chemical spills and repairing instruments, he can do it all. In the many times Prof. Molloy has assisted me, he offered a great deal of practical knowledge about laboratory techniques and instrumentation. His analytical expertise, interesting anecdotes, and sarcastic humor are always appreciated."

- Grace DeSalvo '22, Current MS Graduate Student

"Mr. Molloy's passion for Chemistry is prominent, his intuition and patience guide me, consistently inspiring me. He goes out of his way to ensure students are enabled to face any challenge that may arise." - Yousef Barezay, '23

Claudia Smith, Dept. Fiscal & Materials Manager, October 2011

"Ms. Smith is always helpful with issues (finding chemicals, getting access to different spaces in the ISC). I can count on her when I'm not sure who I should ask." - Hannah Smith, '23

"I loved getting to interact with Claudia the past few years and especially over the summers when I've been doing research. She is so kind and always seeks to help. I appreciate her work." - Tayli Shekleton, '23

"Ms. Smith is amazing, I will never forget how understanding and helpful she was in a time of need. She has helped thousands of students over the years! Chemistry is going to miss her so much!" - Ruby Neisser, '23



Dawn Alleman, Administrative Coordinator, February 2021

"She is sweeter than candy, brighter than the sun, & willing to go above + beyond for everyone!" - Chris Chun, '23

"Ms. Alleman is an amazing person within the department. W&M is glad to have her as a resource. She has helped me & NOBCCHE a great deal with our materials and all the things we needed for our conference visit. We appreciate her and everything that she has and will continue to do for all of us!!" - Kyle Lewis-Johnson, '25

Camille Andrews, Chemistry Librarian, August 2021

"What a resource for the department, even if her office is in SWEM. Camille joined W&M last year after working at the Mann library at Cornell University in upstate NY. It's obvious her passion is in the sciences. She is helping broaden our curriculum to make it more diverse & inclusive. She is so fast at looking up information for anyone who needs assistance." - Professor Dana Lashley



Focus on Gratitude:

We would like to extend a big thanks to all of our many donors over the past year that enable us to support our programs. Several very generous donors have established or contributed to new summer research and student opportunity funds, helped us replace outdated major instruments and fortified some of the scholarships we award yearly to our students. We are particularly grateful to **Patricia Barry, Dabne & Laura Carr, Eleanore Flagg, Bev & Spencer Pugh, Jean Takeuchi, Ken & Gail Updike** and **Walter & Mary Kay Wenk** for very generous donations.

Instrumentation Donation: TGA

Chemistry's new thermogravimetric analyzer (TGA) replaces a nearly 20-year-old instrument, which was heavily used. We expect the same to be true of the new machine. As noted on the plaque, the new TGA was made possible by a generous donation by Mrs. Eleanore Seiler Flagg ('50). Thank you, Mrs. Flagg!

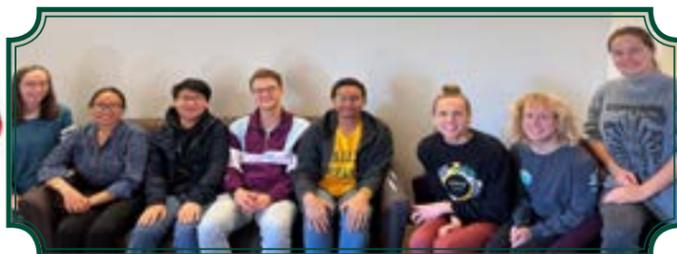


What is a TGA? It is a combination of a high-precision microbalance located within a furnace. A sample is placed in a pan (made of ceramic or platinum, Pt) which is suspended from a balance arm. The furnace is closed around the sample, then gas (argon or air) flows. A thermocouple is used to monitor the sample's temperature. Furnace temperature is ramped or held steady as needed, and the sample mass is monitored by a microbalance measuring change to 1/10 of a microgram.

What does it do? TGAs are used to determine the thermal stability of a compound. They have long been used to determine how polymers hold up to heat + aging and can also monitor the controlled loss of molecules.

Research uses? The Meldrum group uses the TGA to help determine composition and quality of cure in materials like epoxies or paints. This helps develop non-destructive methods to assess the quality of industrial components such as aircraft parts. The Pike Lab's students employ the TGA to measure the temperature at which ammonia (NH₃) is released from metal complexes which act as storage materials for potential NH₃-fuelled vehicles. Chris Abelt's group collaborates with Emeritus Professor Dave Kranbuehl and Jeff Molloy, running the TGA to calculate loss of volatile materials at 240°C in polyamide liners. The liners are used in deep sea oil pipelines which reflects the extent of aging and useful lifetime of the polymer. Both the Bebout and Pike Labs measure the mass lost as ligands are thermally stripped from metal complexes to chemically assess composition.

So what does the TGA *really* do? It enables our department's research to directly impact industrial real-world applications. Once again, thank you Mrs. Flagg, for donating to the ISC Special Equipment Fund!



Our first batch of mentors: Emily Boyt, Marissa Ho, Jungmin Shin, Churchill Wilkinson, Kyle Lewis-Johnson, Robbie Gourdie, Cody Funk, Anna Clayborn.

The department is excited to announce the initiation of a hybrid tutoring/mentoring program targeting students in our introductory courses: **PRIME: Peer Retention & Inclusive Mentoring Experience**. This concept was generated by faculty, staff and students while brain-storming our new Diversity Action Plan. PRIME is organized by Professor Doug Young and the pilot group has eight students hired as mentors.

PRIME strives to create a greater sense of community in the department, encourage representation of underrepresented groups within the field of chemistry, and provide useful resources for all students in our intro courses. Piloting in spring 2023, we'll focus on students enrolled in Organic Chemistry I, hoping to expand its reach in academic year 2024 to all four intro chemistry courses in academic year 2024.

We hired our initial class of mentors (see photo above) and are training through January. There are four "specialist" students that will be directly linked with each of the four sections of Orgo 1 lectures. Specialist mentors will attend classes, assist faculty with active learning exercises, and hold small tutoring/mentoring sessions, providing additional, informal opportunities of assistance.

There are also four "generalists" that will generate programming & resources to assist students and nurture a greater sense of community between faculty & students. Moreover, generalists will organize events to help students identify careers in chemistry, engage in UG research, and facilitate networking opportunities.

Combined, these two types of mentors will bring an elevated experience to students enrolled in Organic Chemistry and cultivate new ways for intro course students to lay hands on & bend their minds around valuable resources that promote success in chem classes and their whole lives.

Homecoming Alumni Career Panel

This October 7th, current students heard from an alumni panel spanning six decades of graduation years and a diverse array of job experience, who graciously offered advice and life experience.



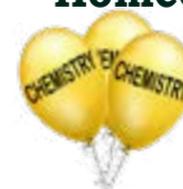
Professor Doug Young introduces the alumni career panelists to the seminar audience.

Panelists:

- Steve Nichols BS '79** - Western State Hospital; Psychiatry
- Stephen Tang BS '82** - Business Commentator; Former President & CEO OraSure Tech
- Arthur Lyons BS '85** - Col US ARMY DiLorenzo Health Clinic
- Melissa Sampson BS '97** - Lockheed Martin Lunar Infrastructure
- Kathy Huynh BS '14; MS '16** - Lead Chemist MITRE Corp., FFRDCs for US Govt
- Allison Kelley, BS '16** - Post-graduate fellowship in Arts Conservation
- Caroline Sublett '21** - NIH IRTA program, current Medical Student

Our alums spoke of inspiration from faculty, "the glorification of stress," appreciating the everyday moments and the ever-winding path that a career and your life will take. The take-home message? Stress should never be glorified & relationships should always be cultivated!

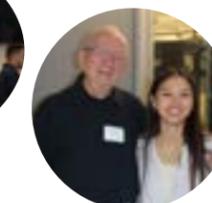
Homecoming 2021 + 2022, what a difference a year makes!



Masked crowd listening to speech at 2021 Homecoming



Raise your hand if you're happy NOT to be wearing a mask!



Randy Coleman, Thanh Pham '22 Neuroscience major



Jordan Walk '08, MS '09 + family!



Joshua Owusu-Koramoah '20, Randy Coleman. Memorial to Joshua on p. 17



Chris Abelt, Caleb Burns '19, MS '21 with baby!



Jerry Lopez Sanchez '22, Zach Shuckrow '22 & friends who were Biology majors

Chemistry Master of Science Program:

2022 Master of Science Conferees & Thesis Research:

Megan Alfieri - Kidwell Lab "Exploring the Photophysics of Brown Carbon Chromophores using Laser-Based Spectroscopy and Computational Methods" **Now** - Research Scientist, Underwriters Laboratories, Inc. Raleigh, NC

Emily Heery (née Legaard) - O'Brien Lab "Characterization of Indoor Surface Films by High-Resolution Mass Spectrometry" **Now** - Teaching as an Adjunct Professor here in Tribe Chemistry!

Hao Qian - Poutsma Lab "Mass Spectrometry-Based Proteomics Study of Protein Expression in Mycobacteriophage CrimD" **Now** - Biotech position in San Francisco, CA

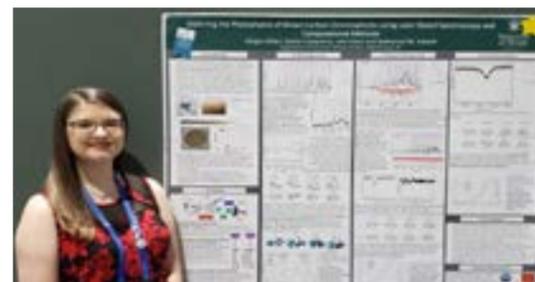
New Master's Students starting Fall 2022:

Jesse Derringer - William & Mary, **Taylor Lab**

Grace DeSalvo - William & Mary, **Wustholz Lab**

Victoria Lehman - William & Mary, **Scheerer Lab**

Amanda Mitchell - Georgia Institute of Technology, **McNamara Lab**



Megan Alfieri presents her masters thesis research at the American Chemical Society conference in San Diego, March 2022.

Alumni News

Stay in touch! Send your news & pictures to chemistry@wm.edu or use the contact form on our Alumni & Friends page: www.wm.edu/as/chemistry/alumni/index.php

Susan Kauzlarich '80

Distinguished Professor of Chemistry at University of CA - Davis, Susan shares that she was awarded the national ACS 2022 Inorganic Award. Congratulations! <https://cen.acs.org/people/awards/ACS-2022-national-award-winners/99/i35>

Jack Kain, '82

I have retired from Federal Service working for NOAA.

Kevin Roche, '82

I graduated from Eastern Virginia Medical School in 1986. Finished residency (1990) and a fellowship (1991) in Pediatric Radiology at New York University Medical Center. I was on the faculty for 10 yrs at NYU, then went into private practice for 20 yrs. Happily retired since 2019 and am now casually studying computer science.

Laura Burrus '86

I live in San Francisco with my wife, son, and doggo. For 24 yrs, I've hung my metaphorical hat in the Dept. of Biology at SF State University, top ranked for diversity. I am now proud to be serving as the first woman & first openly gay person to Chair the Department. After many years of working on cell signaling, I am now focusing much of my effort on climate change. <https://faculty.sfsu.edu/~lburrus/>

Brian Ferris '91

is still working as a Vascular Surgeon in Bellevue, WA. He's now enjoying being an empty nester w/ time for motorcycles and salt water adventures.

Robyn Manke '94

We've lived in SC for almost 13 yrs and have three children, they all have chosen study/careers in Science & Math. They still laugh at my many silly stories of how I memorized Chemistry in college ... and that I named our cat, Benzene. I homeschooled them and still teach/tutor students in math and science. My degree has certainly not gone to waste! I am grateful how my time in chemistry influenced me in my relationship with the Lord Jesus Christ and let me share the beauty of science for the last two decades.

Michael Amendola '95, MA '97

is an MD MEHP working as a surgeon, educator, 3D Printer and doctor in Richmond, VA. michaelamendola.com

Kathryn (Kate) Beers '94



This year I became senior research scientist at NIST, responsible for building their circular economy program. I was recognized with ACS POLY's Herman Mark Scholar Award and gave plenary/keynote lectures at ACS and ASTM International's IMAT conference. My personal focus has been on polymers and plastic waste. I work with amazing people at NIST including Dr. Sara Orski ('06). <https://www.linkedin.com/in/kathryn-beers-5a06929/>

Caitlin Adelson (nee Freeman) '95

I teach chemistry at the secondary level and serve as science department chair at Porter-Gaud School in Charleston, SC. My daughter is following in the footsteps of her parents, studying chemistry at the Univ. of SC. We traveled to Paris and were inspired by our visit to the Curie Museum.



April Eichler (nee Fitzsimmons) '97

I made good use of my chemistry degree in med school at Univ. of Pittsburgh, then moved to Boston for neurology residency, fellowship in neuro-oncology, and an M-PH. I've been there ever since! I'm on the faculty in Neuro-oncology at Mass General/Harvard Medical School and, since 2012, a senior physician editor for UpToDate, a Boston-based online clinical decision support program serving health care professionals worldwide. I have fond memories of organic chemistry with Dr. Abelt, inorganic chemistry with Dr. Pike, and biochemistry with Dr. Coleman.

Katie Kaku (nee Crahan) '97

After W&M and serving in the Peace Corps, I received a Ph.D. in Atmospheric Science from the Univ. of Washington. The past decade has found me working with NRL in aerosol chemistry research. I am currently working with the Navy to develop an educational module in Climate Change. <https://www.linkedin.com/in/katie-kaku-7965b01/>

Thomas Borsari '02

writes, "We are now the proud parents of three children - Merriam (5), Cecilia (3), and Joseph (9 mo). I'm currently the Deputy Chief of Anesthesiology at the Washington VA Medical Center where I've been for the past eight years. I recently earned my private pilot certification and working on my instrument rating. I'm going to be running in the WDW Marathon Dopey Challenge in January on behalf of the JDRF."



Alexander Doyal '02

I went on to med school at UNC, anesthesiology residency at UVA, then private practice in Harrisonburg, VA for eight years, on faculty at UNC since 2020. My role is clinical, educational, with a bit of research. I have remarried, and now have five kids (Patrick 20 - a junior @W&M, Hannah 16, Lucy 11, David 9, Samwise 9). I still use my W&M Chem beaker mug!



Todd Showalter '04

I work at Berkshire Corp. in Greensboro, NC as a R&D Scientist. I live in Danville, VA with my wife Mandy and two kids Evan (4) and Annabell (5). She wants to be a chemist! We took a family trip to Rocky Mountain National park this summer. www.linkedin.com/in/toddshowalter

Travis Grubbs '06

is working as the Superintendent of the Rib Lake School District in the state of Wisconsin.

Isabelle Thibau '11

I got married on May 6th to Swastik Sahoo in Washington, DC. I've settled down in Fairfax, VA and this year will mark my 3rd working at the National Eczema Association doing what I love -- glean insights from the patient experience to inform treatment and delivery of care.

Emily Mayhew (nee Eklund) '12

I'm at Michigan State and we're living in East Lansing. We're staying busy with work, parenting, and home improvement projects. Our first Michigan winter was long, but we are enjoying shorter commutes & a walkable lifestyle. https://www.canr.msu.edu/people/emily-mayhew?roleURL=emily-mayhew?language_id=



Robert A. VanGundy '13

I had a post-doc at Pacific Northwest National Laboratory doing single particle mass spectrometry concerning atmospheric aerosols. Around July 2021 I changed shifted to particle detection method development for the National Security Directorate. Now I'm full time staff chemist at PNNL. I still do method development for single-particle MC-ICP-MS for nuclear forensics applications that I started during my post-doc.

Carolina Rojas Ramirez '14

"I became Dr. Rojas...first doctor in the family!" How wonderful!

Amanda VanInwegen '16

I completed a two-year pharmacy residency, specializing in pediatrics, at UVA Health in June 2022. I am now working as a neonatal critical care pharmacist at Bon Secours St. Mary's Hospital in Richmond, VA.



MEMORIALS



Austin Wiles '06 passed away suddenly in July. He was faculty at VCU's Department of Pathology, specializing in Head and Neck Surgical Pathology and Cytopathology. Additionally, he served as the Director of Autopsy and Medical Director of Decedent Affairs for VCU Health. He was passionate about pathology, dedicated to patients, and caring about his colleagues.

In 2018, VCU medical students recognized him with the Outstanding Teacher Award and earlier this year VCU's pathology residents honored him with the Saul Kay Faculty Award. Teaching was, in his own words, "fundamental to securing the future of patient care." At the time of his death, he was slated to become the Director of Cytopathology at the University of Michigan. He is survived by his wife, Isolde.



Joshua Emmanuel Owusu-Koramoah '20

died in early April at home in Hampton, VA. He was 23 years old. His death was proven to be murder and the culprit was also charged with arson.

Joshua was a linebacker for the football team. He was involved in many campus organizations, including the PLUS Program, the Center for Student Diversity, the African American Male Coalition and the Baptist Collegiate Ministry (BCM). Ginger Ambler, Vice President for Student Affairs, described him as "a thoughtful, courageous, and caring man." He was a native of Hampton and went to Bethel High School. After his W&M graduation, Joshua worked as a science teacher at Hampton Christian High School where he taught chemistry. Students called him "Mr. O."

2022 CHEMISTRY DEPARTMENT DIPLOMA CEREMONY DEGREE CONFEREES

Marley Adamek	Chemistry / Minor Biochemistry
Zahl Azizi	Chemistry
Aravindan Balaguru	Chemistry
John Barb	Chemistry
Kate Bobulinski	Chemistry / Minor Kinesiology & Health Sciences
Katherine Burns	Chemistry / Minor Kinesiology & Health Sciences
Colleen Cecil	Chemistry / Minor Biology
Caileigh Dintino	Neuroscience / Minor Sociology
Kelcie Foss	Neuroscience / Minor Biochemistry
Luke Fowler	Interdisciplinary Self Designed Major
Elizabeth Yurong Guo	Chemistry
Elizabeth Hartley Hall	Neuroscience / Minor Biochemistry
Aron R. Jaffe	Chemistry & Sociology
Sydney Kehoe	Neuroscience / Minor Biochemistry
Valerie Kline	Neuroscience / Minor Public Health
Sophia Lake	Neuroscience / Minor Biochemistry
Clare Lauderback	Chemistry
Ella Leeth	Chemistry / Minor English
Victoria Lehman	Chemistry
Jerry Lopez Sanchez	Interdisciplinary Self Designed Major / History
Kaitlyn Maniscalco	Neuroscience / Minor Hispanic Studies
Drew McDaniels	Chemistry
Shara McKee	Chemistry

Sophie Messinger	Chemistry / Minor Public Health
Julianne Miranda	Neuroscience
Alexander Mooney	Chemistry & Psychology
Dulguun Myagmarsuren	Neuroscience / Minor Biochemistry
Thanh Ngoc Pham	Neuroscience
Brianna Pinckney	Chemistry / Minor Math
Tyler Prouty	Chemistry
Lauren Russell	Chemistry / Minor Business Mgmt & Organizational Leadership
Alexandra K. Scott	Neuroscience / Minor Business Mgmt & Organizational Leadership
Joseph Smolowski	Chemistry / Minor Math
Robert Sweeney	Chemistry / Minor Kinesiology & Health Sciences
Kirsten Sweigart	Chemistry & Music
Lauren Tucker	Chemistry
Erin Tweed	Chemistry / Minor Classical Studies
Artemis Vetter	Chemistry / Minor Classical Studies
Ian Shiqi Wang	Chemistry
Natalie Warren	Chemistry / Minor Physics
Bryan Xiong-Loong Yu	Chemistry
Celine Zalamea	Neuroscience / Minor Psychology
Gillian Zavaglia	Chemistry / Minor Kinesiology & Health Sciences

AWARD WINNERS & M.S. DEGREES

Megan Alferi	Master of Science in Chemistry	Kidwell Lab
Henry Cardwell	Chemistry	American Chemical Society Award
Elizabeth Comeau	Chemistry / Minor Biology	American Institute of Chemists Award
Daniel Costantino	Chemistry	ACS Award in Physical Chemistry
Jesse Derringer	Chemistry	Chemistry Department Award for Outstanding Service
Grace DeSalvo	Chemistry / Minor Math	Chemistry Award for Undergraduate Research
Monica Dibley	Chemistry	Chemistry Award for Undergraduate Research
Titouan Duston	Chemistry & Physics	William G. Guy Prize in Chemistry
Emma Hale	Chemistry & Psychology	CRC Handbook Award
Emily Heery (<i>nee Legaard</i>)	Master of Science in Chemistry	O'Brien Lab Alfred Armstrong Teaching Assistant Award
Thomas Joyce	Chemistry & Biology	CRC Handbook Award
William Lain	Chemistry / Minor Math	Merck Index Award, Albert & Phyllis Cornell Pre-Med Award
Jeannette Lundberg	Neuroscience & History	Andrews Teaching Award
Alexandra McOsker	Chemistry / Minor Math	Merck Index Award
Daria Moody	Chemistry / Minor Public Health	CRC Handbook Award
Gwyneth Pudner	Chemistry & Psychology	ACS Award Organic Chemistry
Hao Qian	Master of Science in Chemistry	Poutsma Lab
Hannah Ryan	Chemistry	ACS Award in Organic Chemistry
Zachary Shuckrow	Chemistry / Minor Math	Merck Index Award
Anna Grace Towler	Chemistry / Minor Religious Studies	CRC Handbook Award
Benjamin Travis	Chemistry / Minor Math	ACS Award in Inorganic Chemistry
Stephen C. Yachuw	Chemistry / Minor Economics	CRC Handbook Award
Tiffany Zhaoyun Zheng	Chemistry / Minor Art	CRC Handbook Award

Elements 1-Across & 1-Down

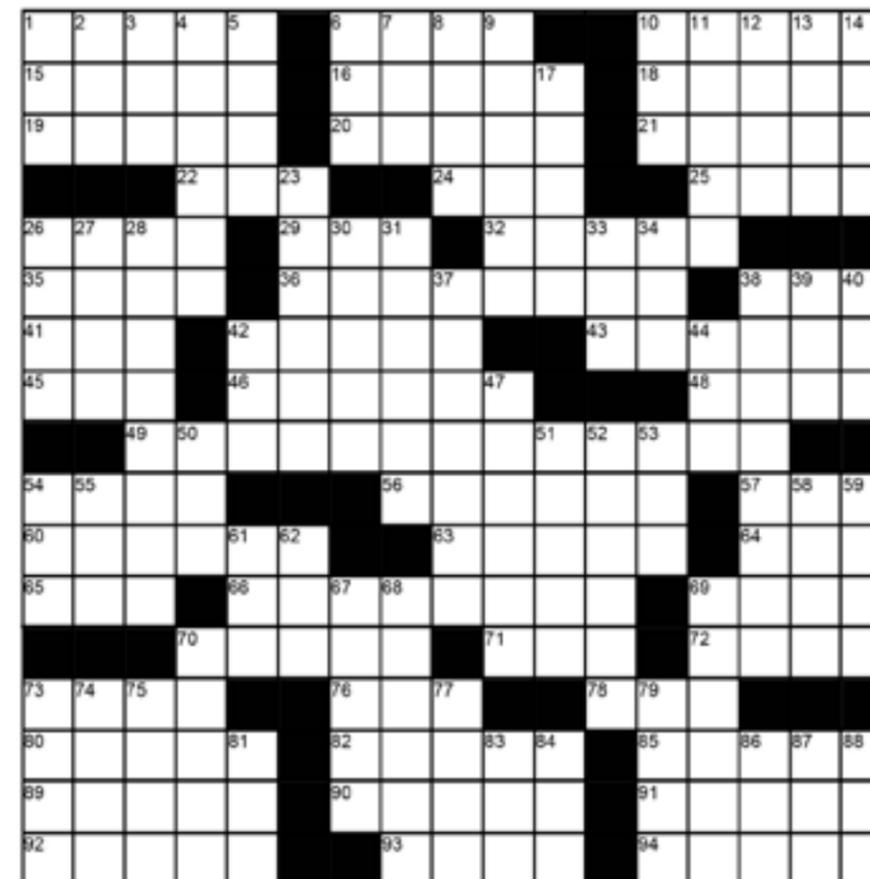
annual crossword
by Bob Pike

ACROSS

1. Early civilization era?
6. Compound with two OH groups
10. Computer brain?
15. Cigar or sandwich
16. Blacksmith shop fixture
18. Kind of whistle
19. Kind of brew
20. Diving gear
21. Relish
22. Sugar molecule name ending
24. Disorderly crowd
25. Internet restaurant review site
26. Internet site edited by its audience
29. Glass or Gershwin
32. Combines
35. Murdered biblical brother
36. Dimpled sphere
38. Airport screeners, abbrev.
41. Project for the handy, abbrev.
42. Part of a cement truck
43. Made a wistful sound
45. Roadway curve
46. Aquatic mammals
48. Aquatic stalk
49. Fever-testing device?
54. Use a cleaver
56. Lightly anesthetize
57. Geographic guide
60. 19th Century cab
63. Architectural indentation
64. Anger
65. Olefin ending
66. Poison a potent potable
69. U.S. 66 and 101, e.g.
70. July 20, 1969 landing
71. C'est _____ ami
72. Energy transferred through atomic motion
73. Multicolored silica-based gemstone
76. U.S. digital intelligence agcy.
78. Recede
80. Deity in Islam
82. Brother of TV's Frasier
85. Ready and waiting
89. Is rife with
90. Texas A&M player
91. India's currency
92. Food packaging?
93. U.S. space agcy.
94. Electric car battery?

DOWN

1. FDR-era work program
2. _____ daily bread
3. Lawyer org.
4. Food packaging?
5. Tolkien's talking trees



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|--|--|
| <ol style="list-style-type: none"> 6. Article in Aachen 7. Company name ender, abbrev. 8. Fertilization site 9. Thermonuclear device? 10. Addenda 11. Montmorillonite, kaolinite, and bentonite 12. Hymenoptera home 13. "American _____" 14. Cop drama heavy 17. Lips, medically speaking 23. Penultimate inning 26. Baseball Hall of Famer Boggs 27. Colorful wading bird 28. Pennsylvania: the _____ state 30. The way there 31. Takes in a garment 33. Older spreadsheet file extension 34. Pharma giant _____ Lilly 37. Make a potable potent 38. $Fe_2O_3 + 2 Al \rightarrow Al_2O_3 + 2 Fe$ 39. Homonym of 84 down 40. Append 42. A place to lay down 44. Grad. sch. adm. test 47. Ion implicated in hypertension 50. Old vinyl, for short | <ol style="list-style-type: none"> 51. Economics prefix 52. C2H4 53. Perch for 36 across 54. Rebel Guevara 55. Most common Chinese ethnicity 58. _____ 51 59. Silverfish or roach 61. Norfolk sch. 62. _____ in Black 67. Grandma 68. Electric-lit advertising? 69. Artist's pigment? 70. South America's camel 73. Morsels for sorrels 74. Peon 75. Baldwin or Guinness 77. Photosynthetic eukaryote 79. End of a fish hook 81. Cable chan.: Call now! Supplies are limited! 83. Ice on the Rhein 84. Caspian or Black 86. Prefix with gram or dermis 87. 80s band _____ Speedwagon 88. Number of amendments forming the Bill of Rights |
|--|--|



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Undergrad Research @ Tribe Chemistry

Undergraduate student research is a hallmark of our department. We are proud of the breadth & depth of opportunity our faculty provide interested undergrads.

We've kicked off the past few semesters with Chemistry Poster Sessions, in which research-active faculty and their current research students share their experimental results, via posters, with the entire campus community. All are invited. It's a pop-up, "one-stop-shop" to see what chemistry research is all about, and the poster sessions are an excellent recruiting tool for new research students from any major or program.



New professor, Isabelle Taylor, explains her lab's research at research recruitment poster session.



Chemistry Club, Health Careers Club, Women in STEM Enterprises (WISE) and NOBCChE (see p.9), recruited for new members as pop-up shops!

Currently, **120+** students are doing mentored research, including **53** declared chemistry majors (many others are not yet eligible to declare a major), **9** honors students, and **8** volunteers. Importantly, **34** UG students are working in a research lab for the first time. These research students are active users of our departmental labs and instrumentation, including our **new TGA** (see p. 13)!

We are continually looking for ways to keep our instrumentation modern, our research innovative, & our program welcoming, all while judiciously using resources to support our mission of equipping students to become successful scientists and engaged citizens. **Thanks for supporting us!**