chemistry distillations 2024

Newsletter of the Department of Chemistry at William & Mary

In this issue:

WILLIAM & MARY
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DEPARTMENT OF CHEMISTRY

CHEMISTRY DISTILLATIONS

2024 Annual Report

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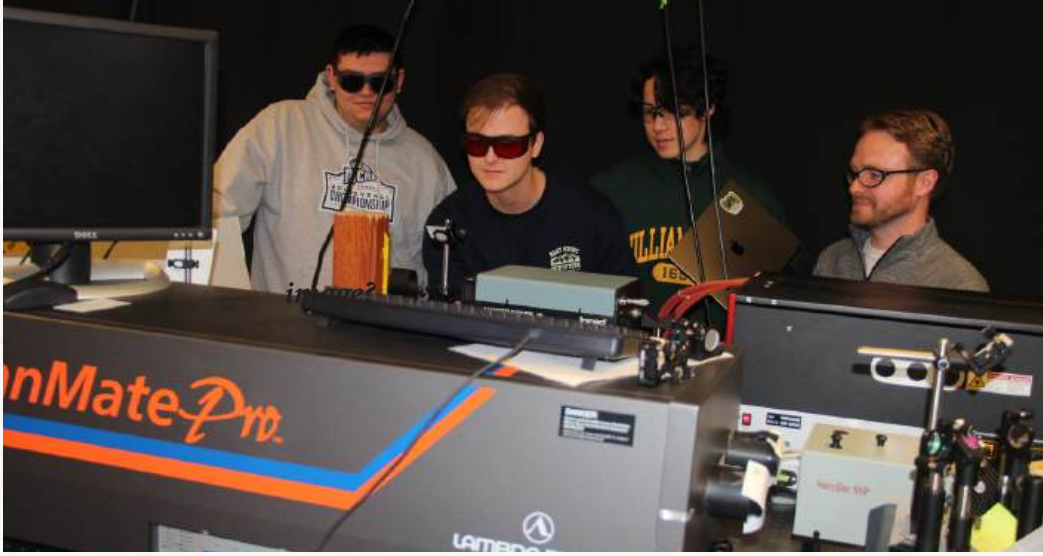


FACULTY

Christopher Abelt, *Chancellor Professor*

Madison Ames, *Visiting Assistant Teaching Professor*

Deborah Bebout, *Professor; Associate Chair; Director of Biochemistry Program*

John Bedford, *Assistant Teaching Professor; Director of General Chemistry Laboratories*

Randolph Coleman, *Professor*

Elizabeth Harbron, *Floyd D. Gottwald Senior Professor; Director of the Charles Center*

Robert Hinkle, *Professor; Vice-Dean of Natural, Physical, and Computational Sciences & Interdisciplinary Studies*

Nathan Kidwell, *Associate Professor*

Lisa Landino, *Professor*

William McNamara, *Director of Graduate Studies; Wilson & Martha Claiborne Stephens Associate Professor*

Tyler Meldrum, *Associate Professor; Director of Undergraduate Research*

Jeffrey Molloy, *Director of Laboratories & Instrumentation*

Katelynn Perrault Uptmor, *Assistant Professor*

Bob Pike, *Professor; Department Chair*

J.C. Poutsma, *Professor*

Jonathan Scheerer, *Garrett-Robb-Guy Professor*

Beverly Sher, *Teaching Professor; Health Professions Advisor*

Isaiah Speight, *Assistant Professor*

Isabelle Taylor, *Assistant Professor*

David Thompson, *Adjunct Professor; Chancellor Professor Emeritus*

Jordan Walk, *Associate Teaching Professor*

Kristin Wustholz, *Margaret Hamilton Professor*

Douglas Young, *Cornelia Brackenridge Talbot Term Distinguished Associate Professor; Health Professions Advisor*

EMERITUS FACULTY

Gary DeFotis, *Garrett-Robb-Guy Professor Emeritus*

Richard Kiefer, *Professor Emeritus*

Stephen Knudson, *Professor Emeritus*

David Kranbuehl, *Professor Emeritus*

Gary Rice, *Professor Emeritus*

Bill Starnes, *Floyd Dewey Gottwald Senior Professor Emeritus*

STAFF

Dawn Alleman, *Administrative Coordinator*

Nicole Freeland, *Administrative & Fiscal Supervisor*

Janet Hopkins, *Senior Laboratory Specialist*

Katie Jones, *Administrative Coordinator*

Der-Hong Shieh, *Senior Laboratory Specialist*

Letter from the Chair

A warm hello to our faithful alumni and friends! 2024 has been an exciting year for William & Mary in general and for Chemistry in particular. I continue to be amazed and delighted at the creativity and collegiality of my colleagues, the abilities and commitment to learning of our students, and the dedication and generosity of our alumni and friends. We've got lots in store for you in this year's newsletter. This time around we'll do things a little differently when it comes to sharing our news. I'll hit the highlights here in the chair's letter, and you can read more about each item in our Department News and other features herein.

Faculty & staff comings and goings

We have two faculty goodbyes to report this year. Prof. Randy Coleman has retired after a remarkable 54 years at W&M. Dana Lashley has resigned and taken a teaching position at Notre Dame. This year we welcome Visiting Teaching Professors Mauro Tiso (biochemistry) and Madison Ames (organic). We also bade farewell to both our Administrative Coordinators, Dawn Alleman who has recently moved to the Mason Business School, and Rochelle Coker, who has moved to Psychological Sciences. We welcomed Katie Jones as Rochelle's replacement and will be actively searching for a replacement for Dawn.

New instrumentation

The technique of chromatography/gas chromatography/mass spectrometry (GC×GC-MS) is a powerful new tool in analytical chemistry, and it has come to W&M. With Prof. Kate Perrault Uptmor joining the department last year, she purchased a LECO GC×GC-MS instrument to support her research program in forensic, environmental, and biological analysis. LECO was so impressed with Kate's work that they awarded her a free(!) newer generation instrument. You can read more about the capabilities of Kate's two GC×GC-MS instruments, along with the many other mass spectrometric capabilities in the department in this year's Instrumentation Focus.

Randy Coleman Mentorship Endowment

As is described in this issue, a group of very generous former students and friends of Randy Coleman have established the Randy Coleman Chemistry Mentorship Endowment. Funds from the endowment will be used to support mentoring activities involving students studying Chemistry at W&M. Once the endowment begins to generate interest that can be drawn upon, this money will be used to support the PRIME mentorship program. You can also read about the PRIME program, now in its third full year, later in this issue as well. We are very excited about the impact of the Coleman endowment, and we hope to see it grow.

Also in this issue

This year we highlight the research programs of Profs. Izzy Taylor and Rob Hinkle. We feature a history of Chemistry at W&M written by Prof. Chris Abelt and Profs. Emeriti David Thompson, Dick Kiefer, and David Kranbuehl. As always, we congratulate our graduates, thank our faithful donors, and publish alumni updates. Speaking of which… this newsletter belongs to you, our alumni and friends. So as always, we invite you to share your updates with us so that we can share them with everyone.

Staff – row 1: Derhong Shieh, Dawn Alleman, Jeff Molloy, row 2: Nicole Freeland, Rochelle Coker, Janet Hopkins

Faculty – row 1: Debbie Bebout, Tyler Meldrum, Lisa Landino, row 2: Izzy Taylor, Jonathan Scheerer, Kate Perrault Uptmor, row 3: Nathan Kidwell, Kristin Wustholz, J.C. Poutsma, Bev Sher, row 4: Bob Pike, Elizabeth Harbron, John Bedford, row 5; Isaiah Speight, Chris Abelt. Missing: Madison Ames, Rob Hinkle, Bill McNamara, Mauro Tiso, Jordan Walk, Doug Young.

Department News 2024-2025

Randy Coleman retired in May 2024 after an astounding 54 years at W&M. The task of summarizing Randy's many accomplishments and contributions to W&M is a daunting one. We probably can't do better than to simply copy his retirement citation. For those of you who were lucky enough to have had Randy as an instructor, you know that his greatest gift was his kindness and respect for all his students. Randy, you will be missed more than we can say. And now, the citation:

Randolph Coleman received an A.B. in Chemistry from Susquehanna University in 1966. He earned his Ph.D. in Organic Chemistry from Purdue University in 1970, working under Prof. Herbert C. Brown, who received a Nobel Prize in 1979. He joined the William & Mary faculty in 1970 as an Assistant Professor of Chemistry. He was promoted to Associate Professor in 1976, and to Professor in 2017.

Randy has received both of William & Mary's highest faculty awards: In 1998, he was awarded the Thomas Jefferson Award, which recognizes significant service through their personal activities, influence and leadership. Then in 2018, he received the Thomas Graves, Jr. Award for Sustained Excellence in Teaching.

As confirmed by these honors, Professor Coleman has been a dedicated, innovative teacher. He has inspired generations of students to pursue medical and research careers through his joy of teaching. His foundational courses, including Organic Chemistry and Biochemistry, have challenged students for decades. His freshman seminar/COLL course, The Chemistry of Emotion, has been immensely popular with new students. His engaging senior-level COLL course, Neurochemistry, has introduced students to cutting-edge scientific literature and been a longtime staple of the Neuroscience program. In addition, Randy has initiated many students into scientific research through his research group, often working with 20 or more students at a time.

Outside the classroom, Professor Coleman has significantly transformed the student experience. He initiated William & Mary's premedical advising program, and was its heart and soul for a remarkable 35 years. He also founded our undergraduate academic advising program, serving as the first faculty head of the Office of Academic Advising, and helping to bring the Banner system to campus.

After leaving the Office of Academic Advising and returning to Chemistry in 2005, Professor Coleman embarked on a completely new research direction in biochemistry. Engaging a large number of undergraduate researchers his research, and partnering with researchers at Eastern Virginia Medical School, he has used mathematical models to better understand neurodegenerative diseases such as Alzheimer's, Huntington's, and Multiple Sclerosis. Demonstrating relevance and critical importance of his research, Randy's work has been supported by the Commonwealth Health Advisory Board and the Virginia Alzheimer's and Related Diseases Fund. His results have been published in numerous high-impact neuroscience journals, illustrating the potential impacts of undergraduate research.

Professor Coleman has been a wise and generous mentor for his students, for his advisees, and for his colleagues. He is irreplaceable, and he leaves William & Mary a better, kinder place.

You can listen to Randy's farewell lecture, delivered May 11, 2024, to an audience of hundreds of former students, colleagues, and friends here.

https://www.wm.edu/as/chemistry/news/the-chemistry-department-celebrates-professor-randy-coleman-with-retirement-lecture.php

Dana Lashley left us at the beginning of the 2024-2025 academic year. She has taken up a teaching position at the University of Notre Dame. Dana will be fondly remembered by scores of former organic chemistry students for the creativity and clarity of her teaching, and for her kindness toward each of her many students. She helped bring many teaching innovations to our department and to W&M, including Gradescope, a tool that makes grading both faster and fairer, and Piazza, a course-based discussion tool. Dana was also active in research, mentoring many students in her program. Dana was a great champion for diversity on campus, heading up the Arts & Sciences committee addressing this issue, and winning a Diversity Champion award. She founded the thriving student chapter of NOBCChE (National Organization of Black Chemists and Chemical Engineers) on the W&M campus. As you can easily imagine, we are very sad to say goodbye to Dana, and we wish her all the best at Notre Dame.

Mauro Tiso has joined us as Visiting Teaching Professor with responsibilities in biochemistry. Mauro earned his B.S. and M.S. from the University of Padova, Italy, and his Ph.D. in Clinical Bioanalytical Chemistry from Cleveland State University, OH. He taught as a Professional Lecturer and Senior Professional Lecturer at American Univ. in Washington, D.C.

for ten years. A practicing biochemist, Mauro is a Special Volunteer in the Molecular Medicine Branch or the National Institute of Diabetes and Digestive and Kidney Diseases at the National Institutes of Health, Bethesda, MD. His research interests focus on the molecular pathways governing the link between dietary nitrate metabolism, the microbiome and human health, including the enzymatic reduction of nitrate and nitrite to generate nitric oxide in microbiota and by globin hemoproteins. He also investigates historical aspects of the representation of invisible objects such as the 3D shape of proteins. Benvenuto, Mauro!

Madison Ames has joined us as Visiting Teaching Professor with responsibilities in organic chemistry. Madison earned her B.A. in Chemistry with a minor in French Studies from Lewis & Clark College in Oregon, and her M.S. in Chemistry with emphasis in Industrial Polymer Science from the Univ. of Oregon. She has extensive industrial experience, having worked as a Senior Associate Scientist in Vaccine Conjugation at Pfizer, an Organic Production Scientist at Thermo Fischer, and a Research & Development Technician in Specialty Catalysts Process Management at W. R. Grace. Madison will be teaching Organic Chemistry I & II in our department. Welcome Madison!

Dawn Alleman joined us as an Administrative Coordinator back in February 2021. Thus, she has been the smiling face of the department office for 3.5 years. Additionally, Dawn has generally been keeping things going, showing extra leadership during a three-month period between Claudia Smith's departure and Nicole Freeland's hiring in 2022-2023 when she was staffing our busy office alone. As of November, Dawn has moved to the Mason Business School. We wish Dawn the very best over at Mason, and we will be working diligently to find her replacement.

Rochelle Coker, who joined us as an Administrative Coordinator in July 2023, has moved over to the Psychological Sciences Department in April 2024. Since then, we have missed her expertise and welcoming demeanor in the Chemistry office. Fortunately, she is just down the hall in the Integrated Science Center, so we routinely get to say hi and catch up with her.

Katie Jones joined the department in September as an Administrative Coordinator. Katie holds a B.A. from Christopher Newport University. She has many years of experience in office administration and customer service. With Katie's arrival Chemistry now has three full-time administrative staff positions: Administrative Coordinators Katie Jones and a soon-to-be-hired replacement for Dawn Alleman, and Administrative & Fiscal Supervisor Nicole Freeland. Welcome aboard Katie!

We congratulate **Doug Young** on his promotion to full professor at W&M. Doug's research program lies at the interface of chemistry and biology, developing novel therapeutics and diagnostics via the application of chemical tools to biological systems. Specifically, his multi-pronged research program synthesizes and genetically encodes non-canonical amino acids to develop unique bioconjugates for numerous applications. Additionally, his research focuses on the development of new methodologies based on the Glaser Hay alkynyl coupling reaction to rapidly access large libraries compounds for antibacterial, antifungal, and therapeutic screening. Doug has been a tireless advocate for our students, conceiving and founding our PRIME mentoring program in Chemistry. He is a newly minted health professions advisor. He is the former recipient of the Faculty Governance Award, the Lambert Faculty Scholar award, was a Cornelia Brackenridge Talbot Distinguished Term Associate Professor of Chemistry, a Henry Dreyfus Teacher-Scholar Award, and a W&M Alumni Fellowship Award. He received a prestigious Plumeri award in 2023, and as of this year was named McLeod-Tyler Professor. Doug is on a well-earned release during the 2024-2025 year.

In addition to Doug's named professorship, we congratulate **Kristin Wustholz** on being named a Margaret Hamilton Professor for 2024-2025. And we congratulate **Tyler Meldrum** for his selection by German Academic Exchange Service (DAAD) to serve as a DAAD Research Ambassador for the 2024/2025 academic year. We congratulate **Nathan Kidwell** on securing a prestigious Henry Dreyfus Teacher-Scholar award, of which only about eight are awarded nationally each year. Nathan's award is entitled, "Accelerated Chemical Transformations in the Atmosphere". Nathan's is the W&M Chemistry Department's 11th such award over the history of the Dreyfus program. We also congratulate **Jonathan Scheerer** and **Chris Abelt** for their joint American Chemical Society Petroleum Research Fund award entitled "A Unified Approach to the Study of Azafluorenimine Derivatives: Precursors for Stable Radicals, Reactive Synthetic Intermediates, and Luminescent Labelling Reagents". Finally, we congratulate **Kate Perrault Uptmor** on being awarded a GC×GC-MS instrument (her second) free-of-charge by LECO Corp. You can read more about Kate's equipment, as well as the department's wide array of other mass spectrometric instrumentation in our Focus on Instrumentation later in this issue. Kate is also the winner of the 2025 LCGC International Emerging Leader in Chromatography Award.

Research Highlights:

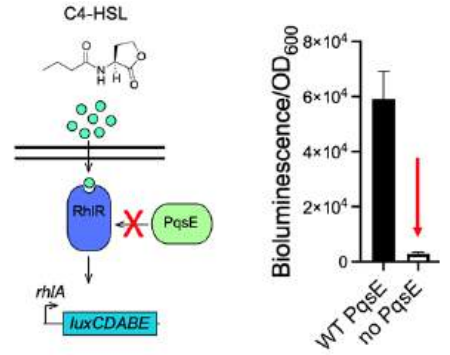
The Taylor Lab

Research in the Taylor Lab is focused on the discovery of new antibiotics effective against the human pathogen, *Pseudomonas aeruginosa*. *P. aeruginosa* is a particularly problematic bacterium, as it is notorious for causing hospital-borne infections in immunocompromised patients. Furthermore, very few antibiotics currently being used in the clinic are effective in treating *P. aeruginosa* infections. There is an urgent need for new antibiotics with non-traditional mechanisms of action to combat the rise in antimicrobial resistance, and to provide a treatment option for patients suffering from *P. aeruginosa* infections. One such mechanism currently being explored in the group is the possibility of blocking communication between bacterial cells.

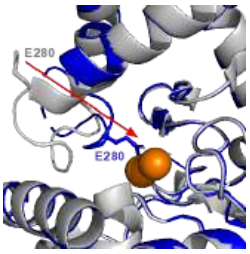
Fall 2023 Group. Top row, left to right: Master's student Jesse Derringer, Clement Greco '25, Nelson Lee '25, Bilalay Tchadi '25. Second row, left to right: Anna Detweiler '26, Maggie O'Hara '26, Kisa Avrutina '26, Meg Baxter '24. Bottom, row left to right: Mai Ishikawa '25, Izzy Taylor, Casey Yu '25.

Virtually all species of bacteria use a process of chemical communication, called quorum sensing, to coordinate group behaviors. *P. aeruginosa* uses quorum sensing to carry out pathogenic behaviors such as toxin production, formation of multi-cellular communities called biofilms, and colonization in host organisms. The process of quorum sensing in *P. aeruginosa* hinges on the activity of many proteins and small molecules and is absolutely dependent on the physical interaction between two proteins: PqsE (pronounced "pee cue ess ee") and RhlR ("rhel are"). We use an engineered, non-pathogenic strain of bacteria that produces bioluminescence when PqsE and RhlR come together to study this protein-protein interaction. We are currently using this engineered strain to screen small molecule libraries of FDA-approved medicines for their ability to block the PqsE-RhlR interaction. Furthermore, this engineered system allows for us to ask questions about how the PqsE-RhlR interaction adapts *P. aeruginos*a to changing external conditions by specifically fine-tuning gene expression patterns in the presence of varying signal molecule concentrations.

The lab is also interested in further elucidating the function of the protein, PqsE. PqsE is a metalloenzyme that exhibits a broad hydrolase activity with a structurally diverse set of ester, thioester, and phosphodiester substrates. PqsE is an easily purified protein and is highly amenable to mutagenesis and structural characterization by crystallography. The lab is continuing work in creating functional perturbations either by mutagenesis of PqsE, or chemically with small molecule inhibitors. As new inhibitors are discovered by screening and as new mutations are designed, the conformational dynamics of PqsE will be observed by X-ray crystallography.

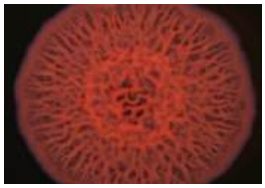


Screening strategy using engineered non-pathogenic strain of *E. coli*



Overlaid crystal structures of PqsE (gray) and the PqsE(E182W) mutant (blue)

P. aeruginosa biofilm



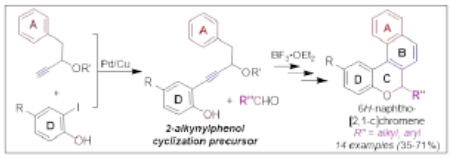
TAYLOR LAB @ W&M

Research Highlights:
The Hinkle Lab

Research in the Hinkle lab currently focuses on two fundamental areas: (a) developing an alkyne-Prins cascade sequence to polycyclic ethers; and (b) examining the fundamental structural components necessary for antibacterial and antifungal activities of polyynes. The second study is a collaborative project with Prof. Doug Young. Both projects originated from our interest in cationic intermediates, but as is often the case, new areas of study have emerged.

Our studies on the alkyne-Prins reaction were an outgrowth of BiBr3 catalyzed cyclization/addition reactions, which occur via oxocarbenium ion intermediates. For the well-known Prins reaction, alkene-electrons trap the intermediate oxocarbenium ion to form a new carbon-carbon bond along with another cation. Though the alkene-Prins cyclization has been used extensively on synthesis, using alkyne-electrons to trap the ion has not garnered nearly the same attention.

In order to examine the alkyne-Prins reaction, we included a pendant aromatic ring ("A" in **Scheme 1,** below) with hopes of adding a Friedel-Crafts step in a one-pot, domino (aka cascade) protocol. This sequence is mechanistically complex but provides rapid entry to helical polycyclics (**Figure 1**).[i] We are currently writing our newest results (24 products) on a similar sequence for publication.



Scheme 1. Rapid polycyclization via alkyne-Prins reactions.

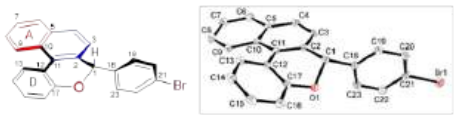


Figure 1. ChemDraw and ORTEP depictions of a polycylic ether.
Rings A and D are twisted ~28 degrees.

The second project, with Prof. Doug Young, combines my lab's expertise in making alkynes with Doug's expertise as a chemical biologist. In addition to maintaining cell lines for biological testing, Doug's group pioneered the solid-supported Glaser-Hay reaction of primary alcohols and amines with simple terminal alkynes to provide "hetero-dimers" of alkynes. This protocol generally provides the milligram quantities of the polyynes needed for biological screening, but we wanted larger amounts of the diynes for more extensive testing. **Figure 2** shows the larger-scale reaction that generates three different diynes. All three dimers resulting are separately tested for activity, but the target "hetero-dimer" is shown as the bottom product. This chemistry produced new diynes with antibacterial activity and a ChemMedChem publication in 2022.[ii]

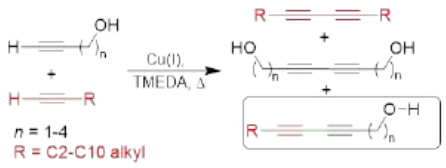


Figure 2. Glaser-Hay Coupling of Terminal Alkynes.

We are now making secondary alkynols using gram-scale reactions that can provide the necessary materials for further structure-activity relationship (SAR) and stability studies. We expect to submit our results this fall for publication.

Goals:

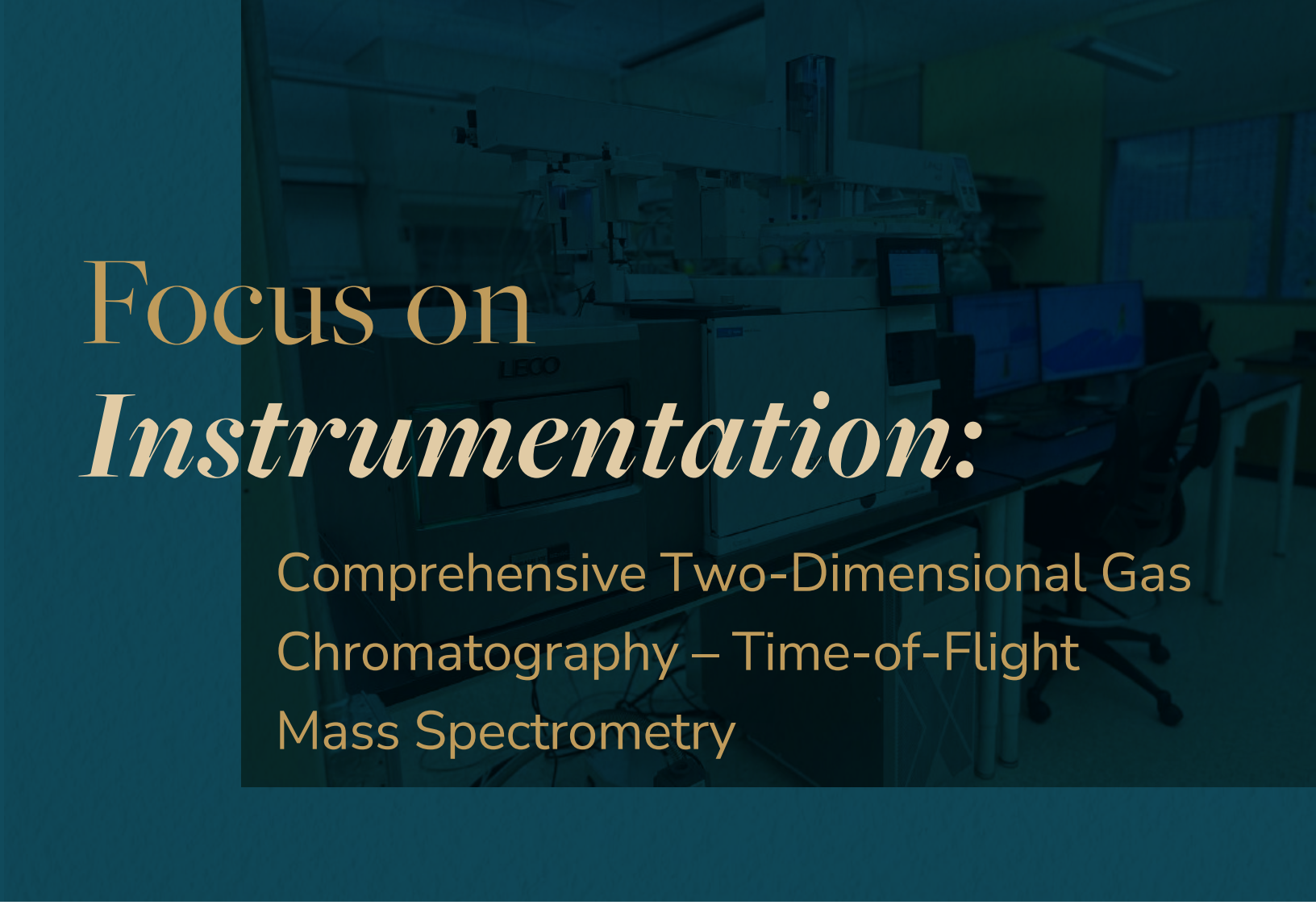
1) For the alkyne-Prins reaction our goals include extending the substrate scope to include a wider variety of pendant aromatic rings as well as modifying the backbone to include nitrogen substrates and additional ether linkages.

2) The polyyne project will be expanded to include a wider variety of substituents on the two different alkyne precursors to continue the SAR studies, and determine what specific portions of the polyynes are necessary for biological activity.

---

[i] Robert J. Hinkle, **Daniel J. Speer, Brendon B. Carnell, Bethany L. Kanter,** Robert D. Pike, "Mild, Modular and Convergent Synthesis of Helical Naphtho[2,1-c]chromenes via a Multistep Cyclization/Aromatization Cascade Sequence," J. Org. Chem. 2019, 84, 15633-15641. Published online 05 November 2019; **Journal Link:** https://doi.org/10.1021/acs.joc.9b02058.

[ii] **Emma A. Hale†, Hannah M. Ryan†, Alexandra M. McOsker†, Cody M. Funk,** Lauren C. Green, **Lauren E. Mazur, Diya M. Uthappa,** Brian M. Flood, Douglas D. Young*, Robert J. Hinkle,* "Effects of Structural Variations on Antibacterial Properties for Conjugated Diynes Generated through Glaser Hay Couplings," Chem. Med. Chem. e202200455. First published: 04 October 2022 (https://doi.org/10.1002/cmdc.202200455).



Focus on *Instrumentation:*

Comprehensive Two-Dimensional Gas Chromatography – Time-of-Flight Mass Spectrometry

LECO Corporation donates a new separation science tool to increase capacity in nontargeted separations in the Perrault Uptmor research laboratory

Figuring out how to characterize the "chemical soup" within a complex sample remains one of the most challenging analytical problems of this generation. When a sample contains hundreds (or even thousands) of analytes, it is challenging to find the right tool to effectively separate, identify, and quantify all components within the sample. This problem plagues numerous areas of society including environmental monitoring, human health monitoring, forensic casework, alternative fuel development, and more. 'Separations in service of society' is the tagline for the Nontargeted Separations Laboratory headed by Assistant Professor Dr. Katelynn Perrault Uptmor, where she and her research team tackle this challenge using novel chemical instrumentation.

The Nontargeted Separations Laboratory focuses on separating the most challenging mixture samples in forensic science, food science, and other natural products analysis using a technique known as comprehensive two-dimensional gas chromatography coupled with time-of-flight mass spectrometry (GC×GC-TOFMS). GC×GC-TOFMS is currently used in a wide array of research projects in the laboratory with undergraduate and masters students. Current chemical forensic projects from her research laboratory include organic gunshot residue profiling, fingerprint residue characterization, and microbial forensic analysis of decomposing remains for search and recovery/mass disaster applications.

In June 2024, LECO Corporation, a leader in chromatography and mass spectrometry instrumentation, announced that they would donate a brand-new LECO Pegasus BTX 4D with Paradigm Shift Flow Modulator to William & Mary for Dr. Perrault Uptmor's research. LECO Corporation selected Dr. Perrault Uptmor as the recipient of this donation after reviewing hundreds of research laboratories around the United States. "LECO's Pegasus BTX 4D with Paradigm Flow Modulator is a great fit for the kind of work Dr. Perrault

Uptmor is doing in her lab," says John Hayes, Separation Science Product Manager. "Based on the lab's needs, the importance of the work being done, and the genuine passion for GC×GC, we believe she is the most deserving of this state-of-the-art equipment".

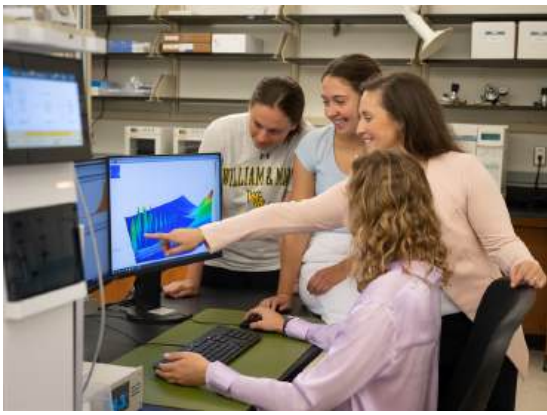
The new Pegasus BTX 4D instrument with Paradigm Shift Flow Modulator will complement an existing Pegasus BT4D with a QuadJet Cryogenic Modulator in the laboratory that was installed in February 2024. While both instruments are strong workhorses in complex sample analysis, the new instrument possesses an increase in the volatility range of analytes that can be captured, and a dual-channel detector workflow that combines the specificity of mass spectrometry with the unparalleled response and dynamic range of flame ionization detection. The new BTX time-of-flight mass spectrometer has a newly designed ion path and detector that boasts femtogram-level sensitivity with an even smaller benchtop footprint than its predecessor.

Both laboratory instruments are compatible to be used with hydrogen carrier gas rather than the traditional helium, meaning that gases can be generated in-house in the laboratory rather than purchased in compressed cylinders that have been sourced from nonrenewable reservoirs. All these components help to support the proliferation of this technology, which was previously viewed only as a "complicated research-grade tool" and not considered an option for more routine analysis environments such as crime laboratories, regulatory agencies, quality control processes, etc. Dr. Perrault Uptmor recently published an article with undergraduate student Kira Fisher in LCGC International's The Column about how to make method development easier for users in routine environments (see QR code), further supporting the transition of this technique into more spaces in industry.

GC×GC-TOFMS was introduced in the late 80's but has become a mature analytical technique in the past two decades. The major benefit of the technique over conventional one-dimensional gas chromatography analysis is its ability to visualize multiple analytes classes simultaneously in a single injection, which often saves sample analysis and preparation time. This is achieved via a trapping and release process at the modulator and a subsequent secondary separation on a column with an orthogonal stationary phase. These technical advances allow an increased peak capacity (i.e. space to separate analytes physically) as well as improved analyte detectability from the enhanced resolution.

The Perrault Uptmor laboratory is tackling several new projects with this instrument that range from fundamental separation science to novel applications to statistical analysis of complex data. Students will benefit from learning about the most up-to-date equipment available on the market and develop transferable instrumentation skills to prepare for graduate school or careers in industry. This donation also establishes a partnership with LECO resources. "The laboratory is gaining much more than an instrument—they are also gaining access to LECO's GC×GC support network, which includes leaders in the field of GC×GC technology, software development, method development, and applications." Farai Rukunda, Director of Separation Science Customer Success at LECO Corporation said in a press release.

The new Pegasus BTX 4D contributes to the long tradition of mass spectrometry



excellence in the chemistry department at William & Mary. The Ionlab, spearheaded by Dr. J.C. Poutsma, also conducts research focused on the characterization of biological samples using tandem mass spectrometry, in combination with high performance liquid chromatography. Students are trained within research environments and the analytical laboratory curriculum to use these tools to solve modern issues, which further prepares them to apply this mindset in their future career paths.

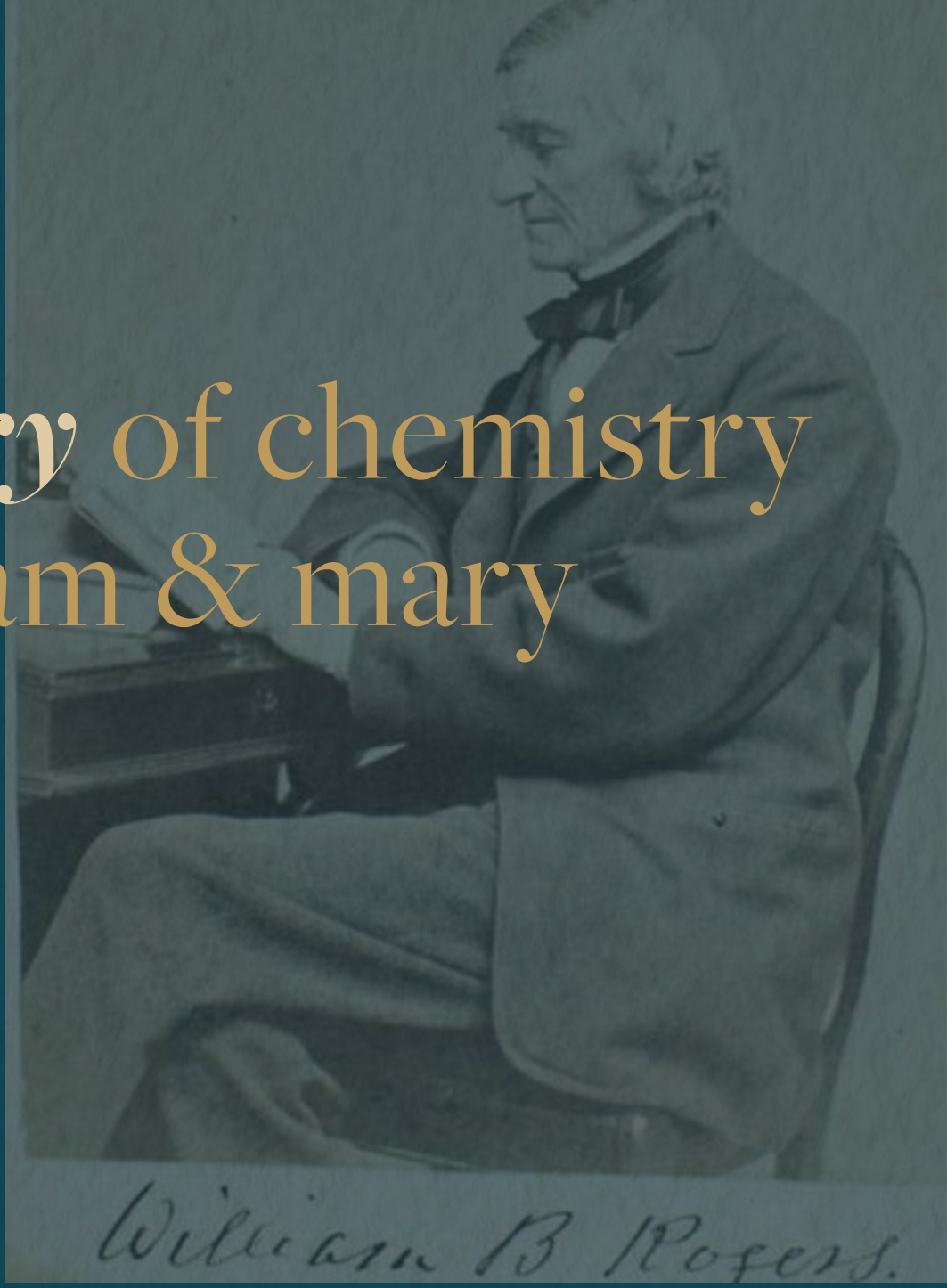
LCGC's *The Column* Article

Instagram: @seplab_wm

seplab.pages.wm.edu

LinkedIn: Nontargeted Separations Laboratory W&M

a *history* of chemistry at william & mary



William Barton Rogers (1804-1882)
Student at William & Mary 1819-1824.
Succeeded his father as professor of natural philosophy and chemistry at William and Mary in 1828, where he remained until 1835. Founded Massachusetts Institute of Technology in 1861.

The Department Chair is typically the keynote speaker at the department graduation ceremony each May. Often, their speeches have included a historical overview of Chemistry at William & Mary. To make this history more widely available, we asked several faculty members to compose a brief history of the department for inclusion in Distillations. Chancellor Professor Chris Abelt, and Professors Emeriti Dick Kiefer, David Kranbuehl, and Dave Thompson have elected to write a two-part series, the first part of which appears in this edition. We thank them for their contribution, both to this newsletter and to the history of Chemistry at William & Mary itself.

The aftermath of World War II changed global culture in the mid-20th century. Two phenomena were of particular scientific importance: the development of nuclear weapons (both fission and fusion) and the launch of the satellite *Sputnik*. On July 16, 1945, the United States successfully denotated a plutonium-239 atomic weapon. Weeks later, on August 6 and 9, uranium-235 and plutonium-239 bombs were used against military targets. In 1949, the Russians explode a plutonium-239 bomb. Fusion (thermonuclear) bombs, vastly more powerful than fission analogs, followed in 1952 (USA) and 1955 (Russia). Then, in 1957 the Soviet Union launched *Sputnik*, the first orbiting satellite, stunning Americans and portending that the Russians were superior to the US regarding military technological capabilities. In response, the US government markedly increased federal funding for basic and applied science, including mathematics, to ensure the national defense. Two governmental programs illustrate the perceived threat of *Sputnik*: first, the *National Defense Education Act* of 1958, which provided financial aid to students and expanded university funding to accelerate education in the sciences and mathematics; and second, the creation of the National Aeronautics and Space Administration (NASA) in 1958, with the mission to ensure our dominance in space technology, especially regarding military readiness. Science at William & Mary benefited substantively from these two federal initiatives.

The impact of these federal programs makes the launching of *Sputnik* a natural point to divide our history of Chemistry at William & Mary. In this issue we will focus on Chemistry (and other sciences) before *Sputnik*. The post-*Sputnik* era will be addressed in a subsequent newsletter. Let us begin with Robert Boyle and the earliest times of William & Mary.

Part 1: Before Sputnik

Robert Boyle (1627–1691), a founder and fellow of the Royal Society (1693), the fifth and youngest son of Richard Boyle, the first Earl of Cork, is often referred to as the Father of Modern Chemistry. Although Antoine Lavoisier (1743–1794) and John Dalton (1766–1844) are strong contenders for that honor, chemistry alumni of William & Mary tend to favor Boyle. This is due to his outstanding contributions to science (presented in his two seminal works *The Sceptical Chymist: or Chymico-Physical Doubts & Paradoxes* [1661] and N*ew Experiments Physico-Mechanicall, Touching the Spring of the Air, and Its Effects* [1661, with a second edition in 1662]), to his adherence to Francis Bacon's (1561–1626) emphasis on experimentation and observation in understanding the natural world, and to his significant financial connection to William & Mary. The Reverend James Blair (1655–1748), president of William & Mary (1693–1743), obtained funding for the Brafferton building at William & Mary from the estate of Robert Boyle, which had purchased Brafferton Manor in Yorkshire, England. The yearly income from the Brafferton estate's agricultural assets was to be given to the college to educate Native Americans. The Brafferton, near the Wren Building on the east end of campus, remains intact today and currently houses the President's office and associated administrative personnel.

The relationship to Robert Boyle and his estate suggests that chemistry and physics, within the province of "natural philosophy," were taught to William & Mary students from the founding. In addition to his significant work with gases (Boyle's Law states that, for a constant temperature, the pressure of an ideal gas is inversely proportional to its volume), Boyle was an atomist (anticipating Dalton), favoring the word "corpuscle" over "atom." Boyle was also skeptical of the Greek commitment to earth, air, water, and fire being the four foundational elements.

The Chemistry taught at William & Mary in the 18th century was of a practical nature, which was important to early settlers. For example, the colonists at Jamestown were involved in manufacturing glass, porcelain, dyes, waxes, salt, and other useful materials. Nonetheless, a 1785 letter from Thomas Jefferson to John Banister, Jr. suggests that the colonists' interests, to some

James Madison
Bishop, First Episcopal Diocese of Virginia
1790 – 1812
President, College of William & Mary
1777 – 1812

Robert Boyle
A founder and Fellow of the Royal Society
1627 – 1691
Portrait 1689

extent, went beyond the immediate concerns of physical well-being. Jefferson wrote of chemistry at William & Mary as being within the academic taxon of "natural philosophy" as understood and taught in the best of European universities:

> *What are the objects of a useful American Education? Classical knowledge, modern languages, chiefly French, Spanish, and Italian; mathematics, natural philosophy, natural history, civil history, and ethics. In natural philosophy, I mean to include chemistry and agriculture, and in natural history, to include botany, as well as the other branches of those departments. It is true that the habit of speaking the modern languages cannot be so well acquired in America; but every other article can be as well acquired at William and Mary as at any place in Europe.*

Jefferson emphasized, as we do today, the quality of a William & Mary Chemistry education. He may be referring, at least in part, to the late 18th century chemistry of Lavoisier and Joseph Priestley (1733–1804), who uncovered the role of oxygen in combustion. Previously, the paradigm held a fire-like substance named phlogiston was contained in compounds and released upon combustion. Jefferson was in France from 1784 to 1789 when Lavoisier was at the zenith of his career; he may well have met with Lavoisier. Priestley immigrated to America from England in 1794 and both met and corresponded with Jefferson. Ultimately, Lavosier effectively ended the phlogiston theory of combustion when, in 1783, he read to the French Academy of Sciences his paper *Réflexions sur le phlogistique* (Reflections on phlogiston), a full-scale attack on the theory. He then published his magnum opus *Traité Élémentaire de Chimie* (Elementary Treatise on Chemistry) in 1789, which was translated into English the following year. Most certainly, had such prizes existed then, Lavoisier and Priestley would have shared a Nobel Prize in Chemistry.

The Reverend James Madison, another of Jefferson's correspondents and the eighth president of William & Mary, certainly knew Lavoisier's and Priestley's work from their publications. Madison also had direct communications with chemists such as Thomas Peters Smith (1776–1802), member of the American Philosophical Society) and John Maclean, Sr. (1771–1814); both men were fully aware of Lavoisier's oxygen paradigm. Like Priestley, Maclean emigrated to the United States in 1795; he taught at Princeton (then the College of New Jersey) until 1812; afterwards, he taught at William & Mary until his death. In Paris, John Maclean learned of Lavoisier's "antiphlogistic theory" (i.e., the oxygen theory) and gave lectures in New Jersey on the "doctrine of phlogiston and the decomposition of water." The 18th century concluded and the 19th century began with The Reverend James Madison (Professor of Natural Philosophy and Mathematics from 1773–1784, Professor of Natural Philosophy from 1784 until his death in 1812, and President of William & Mary from 1777–1812) teaching Lavoisier's "modern" chemistry and the emerging atomic theory of John Dalton. Madison's list of topics also included Chemical Affinity; Of the Properties of Air; Of Air as Necessary to Combustion, etc.; Of some Gasses (sic) (oxygen, hydrogen, nitrogen); Of nitrous Air (including also "of carbonic acid, of the analysis of atmosphere air"); etc. We do not know the details of his chemistry syllabus beyond this. Madison was a member of the American Philosophical Society and contributed several original papers to its scientific journals. Madison surely taught these early William & Mary Chemistry students "as well… as at any place in Europe."

Chemistry continued as part of the curriculum throughout the 19th century under faculty who were generally designated professors of "natural philosophy," not yet professors of chemistry or physics or biology. The most prominent of these 19th-century faculty was William Barton Rogers (1804–1882; 1819–1821 as a student, 1825–1835 on the faculty), who spent some three decades in Virginia before leaving for Boston as a founder and first president of the Massachusetts Institute of Technology. Charles W. Elliot, president of Harvard from 1869 to 1909, was appointed by Rogers in 1865 as the first professor of chemistry at the Massachusetts Institute of Technology. In a bold and controversial move, Eliot introduced the elective system at Harvard, which broadened access to scientific studies for undergraduates and led to the abandonment of the classical curriculum, which required all students, regardless of their career paths, to learn Latin and Greek as well as the language of mathematics.

In 1905, a new "Science Hall" (later called Ewell Hall) was built at William & Mary, and Chemistry became an autonomous department with its own professor for the first time. Physics and Biology also became self-governing departments in this period and shared the new building with Chemistry. The traditional rubric of "natural philosophy," was now too vague a term to be informative and functional, was abandoned. Van Franklin Garrett (M.A., M.D.), who had taught Chemistry since 1888 under the title "Professor of Natural Science," became the "Professor of Chemistry" at William & Mary. This is the Garrett of the current *Garrett-Robb-Guy Chair* of Chemistry, a faculty honor endowed by the William George Guy estate. Professor Guy taught in the William & Mary Chemistry Department from 1927 through 1968; Prof. Jonathan Scheerer currently holds the Garrett-Robb-Guy Chair in the Department.

W&M NOBCChE leads the way at National Conference

The National Organization for the Professional Advancement for Black Chemists and Chemical Engineers, or NOBCChE (pronounced "no-buh-shay"), is an organization devoted to creating a space and opportunities for black chemists and allies to grow, learn, and expand their horizons. This year, the organization's 51st national conference was held in Orlando, Florida. Our chapter had a phenomenal showing! Six students and one faculty member attended the conference to share research, participate in panels, and make new connections. Prof. Isaiah Speight, the faculty advisor for NOBCChE@W&M, was a panelist for two career development events. Student researchers Bilalay Tchadi (Taylor Lab), Kyle Lewis-Johnson (Speight Lab), Jada Bonds (SLAC National Accelerator Lab), Vanessa Dunu (Speight Lab), and Kaleea Korunka (Environment & Sustainability) all presented posters about their research. The chapter brought SIX awards back to Williamsburg in stunning fashion. Kyle Lewis-Johnson was awarded the Northeast undergraduate rising star award for his outstanding track record in academics, outreach and dedication to research. Jada Bonds received the Winifred Burkes Houck Undergraduate leadership award, an award for outstanding African-American women leaders in chemistry and chemical engineering. The Winifred Burks Houck award is one of NOBCChE's highest honors and Jada joins a storied list of awardees. The chapter was also awarded the Best K-12 Outreach by a student chapter which was a national recognition. In addition to these awards, Vanessa Dunu was awarded best undergraduate poster for the Green Chemistry and Chemical Education division and Bilalay Tchadi was awarded best poster for Biochemistry and Biological Sciences. Additionally, Bilalay was awarded the ACS Student Exchange award where ACS is providing funding to attend any national meeting in 2025.

Vanessa Dunu

Bilalay Tchadi

Kyle Lewis-Johnson

Jada Bonds

NOBCChE was an enriching experience for all who attended and the chapter is eager to win even more awards next year!

Kyle Lewis-Johnson ('24), who has served as a PRIME mentor since the program's inception, makes liquid nitrogen ice cream for new students.

The '23-'24 cohort of mentors celebrating with Prof. Young, who helped create PRIME and its programming.

PRIME

Chemistry's PRIME (**P**eer **R**etention & **I**nclusive **M**entoring **E**xperience) Program is going strong in its third year! The program was born out of conversations between students and faculty about student success and is designed to provide a hybrid tutoring/mentoring experience for students enrolled in our introductory courses. PRIME's goals are to build community, provide concrete resources to students, and retain a diverse population of students in the major. This fall, our cohort of eight PRIME mentors are currently working in support of students enrolled in General Chemistry (CHEM 103 and 103L). After our Welcome Ice Cream Social, where PRIME mentors made and served liquid nitrogen ice cream to the newest members of our community, the mentors targeted specific tutoring and mentoring activities for the semester. To help students succeed in CHEM 103, the mentors hold a weekly Masterclass, highlighting a specific topic and reviewing common pitfalls, as well as hosting a monthly exam review session. The response to these events has been tremendous, with recent event attendance at >50 students! The PRIME mentors also focus on developing and hosting inclusive community events to build a sense of belonging, which is linked to academic success. Additional fall events include Pizza & Chem Trivia and a Mole Day Scavenger Hunt. Student participants can win fun chemistry-themed swag from the American Chemical Society. We are grateful to everyone who has supported the PRIME program, its mentors, and the students who benefit from our programming. If you are interested in learning more about PRIME, feel free to contact the current faculty mentor, Prof. Kristin Wustholz (kwustholz@wm.edu).

Undergraduate Research 2024

The Randy Coleman Chemistry Mentorship Endowment

The Chemistry Department honored Randy Coleman upon his retirement in spring 2024 by establishing the Randy Coleman Chemistry Mentorship Endowment with the support of multiple generous donors. The endowment was inspired by the broad impact Chemistry Professor Randy Coleman made across campus over his remarkable 54-year career.

In addition to being an engaging instructor for his memorable 8:00 am chemistry classes, Randy had a major impact on students outside the classroom. Randy regularly mentored individual students in casual walks around campus. Early in his career he established the structure of integrating faculty from across campus directly into the academic advising of new W&M students. Randy also initiated our remarkably effective pre-medical advising program.

This endowment will establish permanent funding for department mentorship activities. A major initiative in this area is our Peer Retention & Inclusive Mentoring Experience (PRIME) program (see previous article). Currently in its fifth semester, this program is designed to support the academic and career advancement of hundreds of W&M students enrolled in our first-year course sequence of General Chemistry I and Organic Chemistry I. Since these courses are required for multiple majors and professional objectives, the PRIME program has very broad impact. A major goal of the program is to create a sense of belonging amongst introductory chemistry students to enhance retention in STEM and help the talented students enrolled in our courses reach their full potential. We look forward to meaningfully expanding departmental mentorship activities as funding becomes available.

If you wish to give to the Randy Coleman Chemistry Mentorship Endowment (#5527) go to:

https://www.wm.edu/as/chemistry/support/

From https://www.cis-spain.com/en/blog/mentorship-programs-for-college-students/

2023–2024

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The Chemistry Department is grateful to our donors – both large and small. If you are interested in donating to W&M Chemistry, we have many opportunities, including those that are dedicated to specific purposes, such as equipment or summer research, and those that are for general and pressing needs of the department. Some funds go directly to the relevant needs, while others go to endowments that produce funds for those needs. Here are a few funds that we’d like to highlight this year.

Chemistry Summer Laboratory Research Endowment (270923) – This endowed fund was founded by Spencer and Bev Pugh. The return from this endowment supports faculty-advised summer research for undergraduates, particularly those with laboratory and experimental aspects.

Chemistry Student Opportunity Fund (210823) – This fund directly supports research and learning opportunities for undergraduate Chemistry majors at W&M, e.g. supporting attendance of scientific conferences.

Special Equipment Fund (217248) – This fund directly supports the equipment and instrumentation needs of Chemistry, allowing us to maintain up-to-date instrumentation for teaching and research.

Charles E. Flynn Memorial Fund (2Z8325) – This endowment was established through the estate of Charles Flynn. Its returns support the most pressing needs of the W&M Chemistry Department.

If you wish to give to these or any of our donor funds, go to:
www.wm.edu/as/chemistry/support/wayscontribute/

2024

Student Degrees & Awards

Bachelor of Science Degree Conferees

Orhan Acikgoz
Chemistry / Minor Biology

Seth Ethan Anderson
Chemistry / Minor Biology

Graydon Joshua Andres
Chemistry / Minor Math

Justin Matthew Berg
Biochemistry (self-designed major)

P. Garrett Burroughs
Chemistry / Minor Physics

Lauren Joy Camardella
Chemistry / Minor Theatre

Isabela Camp
Chemistry

Amber Nicole Cantu
Neuroscience

Ruby Carlson
Chemistry

Adam Lee Chai
Chemistry

Christopher Ethan Chan
Chemistry / Minor Music

Catherine Seojun Choo
Chemistry

Anna Lynn Clayborn
Chemistry / Minor Math

Delaney Louise Crotteau
Chemistry

Aidan Marea Daly
Neuroscience / Minor Biochemistry

Alexandra Ramsden Erickson
Chemistry

Nicholas Brian Failon
Chemistry / Minor Mathematics

Kiara Freeman
Neuroscience/ Minor Biochemistry

Nicole Anna Fritsch
Chemistry & English

Giovanni Edson Fuentes Mejia
Chemistry / Minor Biochemistry

Raelynn Jessica Goodnough
Chemistry / Minor Biochemistry

Robert Kinsman Gourdie
Chemistry / Minor Math

James Nathaniel Gracia
Chemistry

Paul Angelo Harris
Chemistry & Chinese

Megan Kathleen Heidebrecht
Neuroscience

Andrew Daniel Herrup
Biochemistry (self-designed major) / Minor Sociology

Sophia Marie Holincheck
Chemistry

Thomas Robert Howard
Chemistry

Jack Esselstyn Howell
Chemistry & Biology

Ella Ibrahim
Neuroscience

Max Thomas Jaquint
Chemistry & Economics

Luke Travis Jenkusky
Chemistry / Minor Biochemistry

Roman McNair Kelly
Neuroscience

Adrianne Makayla Kinsey
Chemistry / Minor Biochemistry

Isabelle Margalit Kogan
Chemistry

Sage Marie Kregenow
Chemistry & Classical Studies

Paris Mariah Lundy
Chemistry

Yun Ma
Chemistry

Grace Mak
Neuroscience / Minor Biochemistry

Meredith Grace Martin
Chemistry / Minor French

Rija Masroor
Biochemistry (self-designed major)

Kai Noah Miller
Chemistry & Computer Science

Julia Catherine Mitchell
Chemistry / Minor Math

Miko Nina Miwa
Chemistry & Data Science

Jack Miles Nelson
Chemistry

Christian Jin Sung Oh
Chemistry

Rachael Ponticiello
Chemistry / Minor Theatre

Sofya Protsenko
Chemistry / Minor Economics

Dante Andrew Rohlck
Chemistry / Minor French

Christina McDevitt Romano
Chemistry / Minor Biology

Samuel Jacob Rubin
Chemistry / Minor Physics

Abigail Elizabeth Runnels
Chemistry / Minor Biochemistry

Lillian Schulz
Chemistry

Amelia Grace Seabury
Chemistry / Minor Math

Zannatul Shahla
Chemistry & Psychology

Divya V Sharma
Chemistry

Jungmin Shin
Biochemistry (self-designed major) / Minor Math

Jacob Archer Simonpietri
Chemistry / Minor Physics

Emma Natasha Smith
Chemistry / Minor Hispanic Studies

James Ethan VanValkenburgh
Chemistry

Elena-Marie Melis Weissenboeck
Biochemistry (self-designed major) & German

Georgia Cutler Westbrook
Chemistry / Minor Math

W. Churchill Wilkinson
Chemistry / Minor Math

Master of Science Degree Conferees

Jesse Jacob Derringer

Brian Michael Flood

Victoria Anne Lehman

Amanda Catherine Mitchell

Jake Thomas Morrin

Commencement Prizes and Awards

William G. Guy Prize in Chemistry
Robert Gourdie

American Chemical Society Award
Amelia Seabury

Chemistry Award for Undergraduate Research
Anna Clayborn

American Institute of Chemists Award
Emma Smith

ACS Award in Biochemistry or Chemical Biology
Justin Berg

ACS Award in Organic Chemistry
Adrianne Kinsey
Zannatul Shahla

ACS Award in Inorganic Chemistry
Nicole Fritsch

ACS Award in Physical Chemistry
Jacob Simonpietri

Chemistry Department Award for Outstanding Service
Jungmin Shin
Churchill Wilkinson

Merck Index Award
Andrew Herrup
Isabelle Kogan
Sage Kregnow

CRC Handbook Award
Orhan Acikgoz
Sophie Holincheck
Yun Ma
Miko Miwa
Jack Nelson
Sam Rubin
Abby Runnels
Georgia Westbrook

Alfred Armstrong Chemistry TA Award
Victoria Lehman
Jake Morrin

Andrews Teaching Assistant Awards
Jungmin Shin
Jacob Simonpietri
Christina Romano

Junior awards

Blanton Mercer Bruner-VAS Award
Emily Boyt

ACS Award in Analytical Chemistry
Alex Gendreau

Alumni News

James Holimon '65

Woodworking by James Holimon '65

After my time at W&M, I went to Medical College of Virginia, MD degree in 1969. I became a pathologist with subspecialty in gynecologic pathology and clinical chemistry. My career was in Lakeland, Florida, till retirement in 2006. My hobbies are golf, woodworking and tournament bridge. My wife and I live in Sapphire, North Carolina. Our four children are scattered in NC, SC, FL and Colorado.

Christopher Walsh '91

I am happy to share that I am now associate professor and chair of the department of Chemistry and Biochemistry at Eastern Oregon University. I am also the president of the state Interinstitutional Faculty Senate, serve on the state Transfer Council and co-chair the Chemistry curriculum committee for the Oregon Higher Education Coordinating Commission.

Dr. Maria Argiriadi D'Angelo '93

Class of 1993 Alumna Dr. Maria Argiriadi D'Angelo was in Washington, DC on October 10th to receive a 2024 Heroes of Chemistry award from The American Chemical Society. The recipients are scientists and engineers who have advanced sustainability and global health through their ingenuity, creativity and perseverance. After receiving her Undergraduate and Master's degrees in Chemistry at William & Mary, Maria went on to receive her Ph.D. in Biological Chemistry at the University of Pennsylvania in 1999 where she started her scientific career in Structural Biology. She continued her scientific education as an NIH Postdoctoral Fellow at the Rockefeller University in NYC. In 2001, Maria joined Abbott Bioresearch Center (now AbbVie) in Worcester, Massachusetts as a member of the Structural Biology Immunology team where she supported the iterative structure-based drug design process. Over the course of 20+ years at both Abbott and AbbVie, she used a combination of experimental and modeling methods to guide 3D understanding of many protein classes. The Heroes in Chemistry award recognized her structural work while at AbbVie in the design of Rinvoq, an oral JAK inhibitor which is approved to treat certain immune-mediated diseases. She was very proud to share this award alongside her project team colleagues. Currently, Maria is the Senior Director of Structural Biology and Biophysics at Vertex Pharmaceuticals in Boston, Massachusetts.

Maria and her husband Tony D'Angelo ('93) live in Southborough, Massachusetts, with their two boys Andrew, a freshman at Case Western Reserve University, and Anthony, a junior at Saint John's High School, Shrewsbury, Massachusetts.

Panagiotis Kourtesis '94, MS '96

I am currently employed by AstraZeneca as director clinical scientist in early phase oncology global development based in Gaithersburg, MD. I have been with AZ for six years.

Main focus is on early stage (Phase I/II) development and clinical execution of early oncology assets, including the crucial candidate drug investment decision stage to the first-time-in-human proof of concept clinical trials, with Immuno-Oncology biologics and small molecules for solid tumors.

On a personal level, have been married for 15 years and my wife and I have a 12-year-old son who just started middle school.

Ivana (Verona) Yang '96 and John Yang '96, MS '98

continue to reside in Denver Colorado where John manages the institutional Biobank at National Jewish Health and Ivana is a Professor at the University of Colorado Anschutz Medical Campus. This year has been particularly busy and exciting with their eldest son Alex

graduating from American University in DC and their youngest Nathan starting his freshman year at William & Mary.

Charlie Clark '14

is growing his research group as an assistant professor in the Leiden Academic Centre for Drug Research (Leiden University, Netherlands). His research line develops new microfluidic technologies and lab automation strategies for metabolomics, and can be applied to single cell research, high-throughput assays, personalized medicine, and more. He also teaches a bioanalytical chemistry course, and enjoys the academic lifestyle quite a lot

Jessica Armstrong '17

After graduating from W&M, I studied in Cologne, Germany and New Haven, CT before transitioning to teach high school chemistry for three years in Baltimore, MD. I've made my way back to VA and currently work at the American Chemical Society in the Student Communities Office. I regularly travel to ACS Meetings and I have the pleasure of working with and supporting graduate students through our Graduate Student Organizations program. My favorite role is parenting my 5-year old cat, Dash. I also love to rock climb in my free time.

Henry Melzer '19

I saw your email about Professor Coleman's retirement and I wish him well. I know you like to keep your student bios updated but I'll be going back to school this fall. I'm going to Yale School of Management with an intention of doing education entrepreneurship.

Tanner Braman '20

After graduation, I worked for four years as chief of staff to former Secretary of Defense (and our current Chancellor), Robert M. Gates. We tackled several tough issues, to include the US response to the Russian war in Ukraine, reform of US non-military instruments of power, and even restructuring the NCAA. In September, I started a new role as a strategic advisor and researcher on biotechnology policy for Dr. Drew Endy at Stanford's Hoover Institution. Our team's goal is to foster secure, democratic, and flourishing biotechnology. I am thrilled to return to my science background and support American security and competitiveness through biochemistry.

Jesse Derringer '22, MS '24

I am happy to start my first year as a PhD student in the Biological Sciences department at Carnegie Mellon University. I have immense gratitude for my research mentors at William & Mary who prepared me well for my first lab rotation with Dr. Drew Bridges. I have additional thankfulness for all my chemistry professors who prepared me for the course work. I did not expect to see as many wave functions and character tables as I have, but I am up to the challenge. While I miss Williamsburg, I am happy to report that Pittsburgh is a hub for fellow alumni! In fact, Willough Sloan ('23) works upstairs in the same building!

Eric Tweed '22

I have been working as an analytical chemist for Pfizer R&D in Connecticut for a year and a half now. It is an amazing place to work on groundbreaking science and W&M's Chemistry Department prepared me well.

Marissa Ho '23

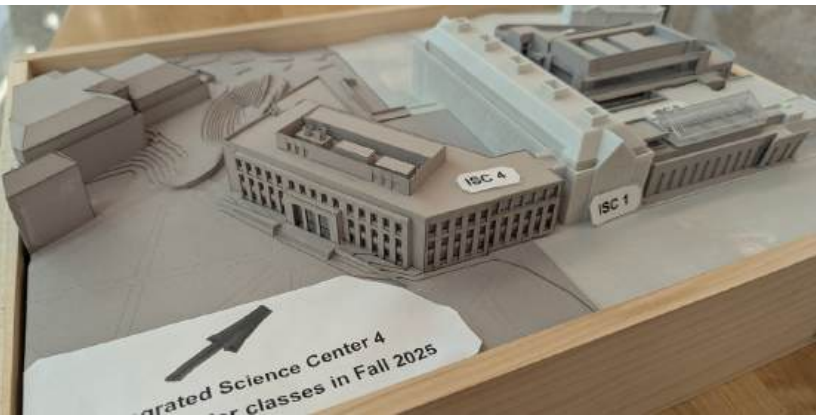
I am pursuing my Master of Forensic Science degree with a concentration in Forensic Chemistry at George Washington University. I am also conducting research at the National Institute of Standards and Technology with a focus in developing a technique for the quantitative analysis of seized drugs using rapid gas chromatography-mass spectrometry.

Nick Failon '24

Nick has now started a position as a QC chemist for Fareva in Richmond.

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/**



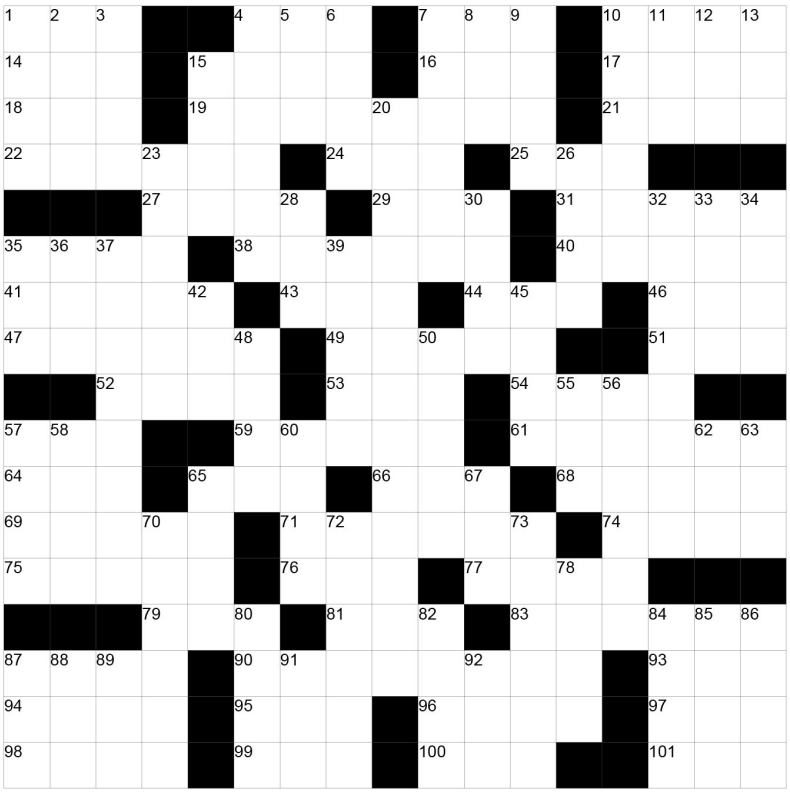
ISC 4 Construction

The Integrated Science Center is expanding! Using institutional funds, Building 4 of the Integrated Science Complex (ISC) will house William & Mary's new School of Computing, Data Sciences & Physics. The project will construct 124,000 square feet of new space and renovate 10,000 square feet of existing space in order to connect to the adjacent ISC. This renovation has caused the temporary displacement of the Scheerer Lab. ISC 4 is being constructed on the site of the former Millington Hall and is scheduled to open for classes in Fall 2025. Come say hi to us and the new facilities next year!

The Scheerer lab has been temporarily displaced while ISC 4 is connected to the current building.

Appetising Elemental Anagrams

by Robert D. Pike



ACROSS

1. Pre-streaming music purchases
4. Firm name abbrev.
7. Electric guitar need
10. Big hauler rig
14. Oliver Sacks' "The Man Who Mistook His Wife for a ____"
15. World's largest technical society, abbrev.
16. Pod vegetable
17. Genesis locale
18. See 93 across
19. Air-travel alternative
21. Breathing organ
22. With 56 down: Bacon crinkle?
24. Harbor guide boat
25. Feeling down
27. Star Wars Episode IV: ____ Hope
29. Golfball pedestal
31. Benefactor
35. Nicholas II or Alexander III
38. Half of a tradional wedding vow couplet
40. Kind of acid
41. Foundation
43. Revolutionary Guevara
44. Wearable crystal
46. Cobb and others
47. Alternative to virtual
49. With 78 down: Dragon ale?
51. Prescriptions, abbrev.
52. Firearm consumables
53. ____ tree falls in the forest...
54. Short term for a big reptile
57. Ingest comestibles
59. With 83 across: Heirloom bun?
61. Hester Prynne's "A" for instance
64. Top movie list-making org.
65. Bill and ____
66. Common video display color scheme
68. Vast water expanse
69. Duncan or Koufax
71. Washer or draft beverage
74. 1890 massacre site, Wounded ____
75. These can obscure your view of the forest
76. Prefix meaning over, near, at, before, or after
77. Prefix with marketer or prompter
79. Cash machine
81. Hub nut
83. See 59 across
87. Take to heart
90. Narcissism
93. With 18 across, Frozen potatoes brand
94. Phenyl group, for instance
95. Smaller version of 68 across
96. The serfs' boss
97. The middle third of North America
98. "50 Shades" color
99. Turf
100. Poetic term for before
101. Standardized test for the college-bound

DOWN

1. The height of fashion
2. Outrageous early 20th century art movement
3. Element foundry
4. Not quite a ringer
5. Floral aloha
6. Iron-age British Isles inhabitant
7. Most distant point in an orbit
8. ____ culpa
9. Launch locales
10. Never? Hardly ever!
11. Part of a college web address
12. In the 80's they were at work or without hats
13. Present participle ending
15. With 23 down, Nairobi rum?
20. Frothier durum?
23. See 15 down
26. Inhabitant of 17 across
28. Govt. nutrition program for families
30. Therefore, Latin-style
32. With 37 down, Entertaining oats?
33. Smooth black stone
34. The tallest of the "Friends"
35. I'll write this clue later
36. An alveolus, for instance
37. See 32 down
39. Academic department head
42. Famous patriotic uncle
45. "All's Well that ____ Well"
48. Grey wolf
50. Scorsese film "____ of New York"
55. O.J. trial judge
56. See 22 across
57. The only compass direction not found in a state name
58. Some distance away, poetically
60. It follows the cab that follows the train
62. 20th century film comedienne West
63. Saturated hydrocarbon ending
65. Fluid-filled growth
67. Wager
70. Like the king cobra or anthrax virus
72. Import software
73. On-board again
78. See 49 across
80. Army chow hall
82. Dorothy's ironic surname
84. Promissory notes
85. Star-bear
86. Vegetarian's avoidance
87. Witch on a bad hair day
88. To do this is human
89. ____ of newt
91. Earth prefix
92. Neither one

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Chemistry Master of Science Program

M.S. Thesis research

May 2024 Defenses:

Jesse Derringer ~ Taylor Lab
Investigation of the PqsE:RhlR Complex as a Target for Quorum Sensing Inhibition in Pseudomonas aeruginosa

Victoria Lehman ~ Scheerer Lab
Synthesis of Onychine by Cycloaddition /Cycloreversion of an Intermediate 1,2,4-Triazine

Amanda Mitchell ~ McNamara Lab
Iron Catalyst with Tetradentate Ligand for Electro- and Photocatalytic Hydrogen Evolution and Modified Photosensitizer for Toxic Metal Detection in Water

August 2024 Defenses:

Brian Flood ~ Young Lab
Utilizing Chemical Biology to Develop New Alkyne Therapeutics

Jake Morrin ~ Abelt Lab
Improved Total Synthesis of 1,5-Acrylodan as a Fluorescent Probe for the Study of Chemical Denaturation Dynamics in Human Serum Albumin

From left – right Jesse Derringer, Brian Flood, Victoria Lehman, Amanda Mitchell, Jake Morrin.

Our new class of Master Students are busy working in faculty labs and providing teaching help in lectures and labs.

The Arts & Sciences Graduate Center began a new community partnership with the Williamsburg Regional Library featuring graduate student research. The "Emerging Scholars Series" is a partnership between the Arts & Sciences Graduate Center at William & Mary and the Williamsburg Regional Library. The series features W&M graduate students and postdocs in talks hosted by the WRL intended to bring cutting-edge research to the local community.

In 2023 Jesse Derringer spoke about is research in the Tayor Lab to a community audience. His talk about Quorum Sensing was well received by over 30 members of the community! This fall Emma Macturk will speak in the series on her research "Advances in Forensic Chemistry for the Courtroom".

From back left – right: Sophia Holincheck (Kidwell Lab), Garrett Burroughs (Kidwell Lab); Chloe Autry (Wustholz Lab); Elizabeth Davis (Scheerer Lab)
Front left – right: Claire Vander Poorte (Abelt Lab); Ada Jiazhen Li (Taylor Lab); Todd Reynolds (McNamara Lab); Emma Macturk (Perrault Uptmor Lab)