

chemistry *distillations*

Newsletter of the Department of Chemistry at William & Mary

Summer Research Is Back!



Faculty & Titles

Chris Abelt - Chancellor Professor; Chair, Music Department

Debbie Bebout - Professor; Associate Department Chair,
Director of Biochemistry Program

Randy Coleman - Professor

Elizabeth Harbron - Floyd D. Gottwald, Sr. Professor;
Interim Director of the Charles Center

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

Jeff Molloy - Instructor, Director of Labs & Instrumentation

Rachel O'Brien - Assistant Professor

Bob Pike - Professor; Department Chair

J.C. Poutsma - Garrett-Robb-Guy Professor; Director of
Undergraduate Research

Jonathan Scheerer - Associate Professor

Beverly Sher - Senior Lecturer; Health Professions Advisor

Dave Thompson - Adjunct Professor; Chancellor Professor Emeritus

Jordan Walk - Senior Lecturer

Kristin Wustholz - Associate Professor

Doug Young - Cornelia Brackenridge Talbot Term
Distinguished Associate Professor

Emeritus Faculty

Gary DeFotis - Garrett-Robb-Guy Professor Emeritus

Dick Kiefer - Professor Emeritus

Steve Knudson - Professor Emeritus

Dave Kranbuehl - Professor Emeritus

Gary Rice - Professor Emeritus

Bill Starnes - Floyd D. Gottwald, Sr. Professor Emeritus

Staff

Dawn Alleman - Administrative Coordinator

Janet Hopkins - Senior Lab Specialist

DerHong Shieh - Senior Lab Specialist

Claudia Smith - Fiscal & Materials Manager

Chemistry Welcomes Dr. Cemile Kumas as Visiting Assistant Professor



Joining the teaching ranks in Chemistry this fall is Dr. Cemile Kumas. She earned her Ph.D. at Southern Methodist University in Chemistry, and most recently taught at the University of Richmond for five years. Her *curriculum vitae* includes bachelors and masters degrees in Chemical Engineering from Istanbul and Bogazici Universities respectively.

Professor Kumas' experience at the lectern was evident during the interview process. Comments from the student interview panel affirmed that Kumas would be a great fit for W&M. "Her lecture seemed enthusiastic and engaging. The questions she put in the lecture paralleled what she discussed and would allow students to ensure their understanding of the material before leaving class," one panelist wrote.

This fall she teaches the lecture for Organic Chemistry II for Life Science Majors. She will teach Organic II and General Chemistry Lab sections, aiding the existing chemistry faculty with these labs which serve 640 students.

Kumas' previous research lies in the areas of stimuli-responsive imaging agents, supramolecular assemblies, polymer science, and biomaterials. W&M has gained a great asset with our new Visiting Assistant Professor.

Cover:

Summer 2021 Chemistry
research students and
faculty in the Integrated
Science Center courtyard.
Photo by Stephen Salpukas /
William & Mary

This newsletter is available online:





Letter from the Chair, Bob Pike ...

Hi everyone! I hope you and your families are all safe and doing well as we enter the holiday season. Many of us have experienced changes in our lives over the last year and a half. A big change for me is that I find myself sitting in the Chemistry chair's office in the Integrated Science Center. This transition came about rather suddenly in June when our chair, **Rob Hinkle**, accepted a Vice-Dean position in Arts & Sciences, and our associate chair, **Elizabeth Harbron**, accepted an appointment as head of the Charles Center. This left Chemistry with a looming leadership vacuum as of July 1, 2021. In response I accepted the role of chair and **Debbie Bebout** the role of associate chair. We found ourselves taking on these roles with little time to prepare.

Being chair of Chemistry is not something I aspired to. Most academics know that being chair means that any and all administrative troubles will find you. In fact, while most of my Facebook friends offered congratulations, a few savvy academics sent along condolences. That said, I'm finding the job to be a lot more satisfying than I expected. In large part this is because I now get to work more closely with our top-notch laboratory technical staff (**Jeff Molloy**, **Janet Hopkins**, and **DerHong Shieh**), as well as our amazing faculty. I'm enjoying the chance to try out new ideas to improve how the department functions. Finally, and perhaps most positively, I've assumed the role of chair at a hopeful time when the world is finding its way out of the pandemic and W&M is returning to what we do best – gathering together around the creation and transmission of knowledge.

Getting to faculty news, I want first to offer all of our congratulations to **Randy Coleman** who passed his 52nd anniversary as a faculty member at W&M. The department hosted a big 50th Zoom reunion, hosting 280 of Randy's appreciative former students this past April. Randy gave a great public talk on dementia research and his group's contributions in this area, followed by an extended question & answer/getting reacquainted session, chatting and reminiscing with many of the attendees. It was a great time celebrating a great gentleman. *(See page 12 and back cover for more about Randy.)*

Several faculty received substantial grants over the past year. **Rachel O'Brien** was awarded a prestigious NSF CAREER award for her proposal titled "Multi-Generational Aging of Atmospheric Organic Mixtures." She and her students will be investigating the chemical transformations that occur when organic aerosol particles are transported long distances in the atmosphere. Since aerosol particles help to cool the climate, this work will provide valuable information for climate modelers to estimate the amount of this material in the atmosphere. Her group will work with students at Bruton High School to learn about the local concentration of these particles and what fraction settle, or dry deposit, onto surfaces. Rachel was additionally awarded a grant from NOAA entitled "Size-resolved Organic Aerosol Composition, Sources, and Characteristics in Urban Areas." For the NOAA grant, Rachel will team up with a group from the University of Michigan to collect and then measure aerosol particles associated with urban air pollution in New York City. This project is part of

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a larger field campaign with groups from many different universities across the USA coming to NYC to try and develop a better understanding of how volatile emissions (like scents) from things like wall paint or fingernail polish can contribute to the poor air quality often observed in cities.

Nathan Kidwell was also the recipient of an NSF grant for his proposal “Single-Conformation Spectroscopy and Dynamics on Multiple Potential Energy Surfaces: Flexible N-Heterocycle Chromophores and Complexes in Aerosols.” Nathan and his group will study the spectroscopy and dynamics of flexible light-absorbing molecules found in aerosols. Furthermore, the educational outreach program will engage teachers from the Governor’s School and their students as citizen scientists to build sensors and collect atmospheric data across varying geographic locations and seasonal variations.



Kristin Wustholz received a new NSF grant for her proposal titled “Harnessing the Blinking Heterogeneity of Fluorescent Probes: A New Take on Single-Molecule Research.” The Wustholz lab seeks to capitalize on the significant molecule to molecule variations in emission behavior found in even the best fluorescent probes to unlock new opportunities in fluorescent probe design and imaging. Prof. Wustholz and her students will collaborate with Temple University to demonstrate multicolor super-resolved imaging without spectrally-distinct dyes.



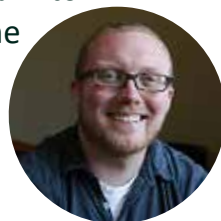
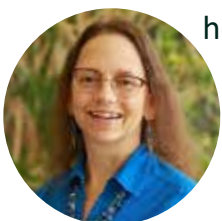
Tyler Meldrum was awarded a grant by the United States-Israel Binational Science Foundation for his collaborative proposal entitled “Metals, Magnets, and Microwaves: Enhancing Single-Sided NMR Signals in Materials with DNP.” In a joint project between W&M and The Hebrew University in Jerusalem, Tyler and his group will study how metals naturally occurring in artists’ paint can improve the magnetic resonance signal obtained from a range of samples. Combining expertise in single-sided magnetic resonance in dynamic nuclear polarization, this project will help detail the microscopic behavior of complex materials, including adhesives, art, and coatings.



Several of our faculty and staff transitioned into new positions this year. Our former chair, **Rob Hinkle** (*photo on next page*), has become a Vice-Dean as part of a reorganization within the Dean of Arts & Sciences’ office. Rob serves as a “contact dean” overseeing all of the sciences (except Chemistry, a potential conflict of interest!) and interdisciplinary programs such as Neuroscience, Environmental Science and Policy, the Center for Geospatial Analysis and others. **Elizabeth Harbron** will be at the helm of W&M’s Charles Center for the next year. The Charles Center oversees undergraduate research grants, honors, national fellowships, and scholars’ programs. Both Rob and Elizabeth will continue to teach a reduced number of chemistry courses.



Within the department, **Debbie Bebout** has added associate chair to her responsibilities, which already include serving as the Director of the Biochemistry Minor program. **Bill McNamara** has stepped up as the new Director of Graduate Research, overseeing the Chemistry Master’s degree program. Our chemistry faculty are busy to say the least!



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ZOOMCOMING 2020!!!

BY **ROB HINKLE,**
PAST DEPARTMENT CHAIR



As with most things in 2020, homecoming was very different from what we always took for granted as “normal.” Though we typically host an in-person reception in the atrium of the Integrated Science Center (ISC) on the Saturday morning of homecoming weekend, we miss many of our youngest alumni who have become engrossed in new careers, graduate programs, etc. -- or they just cannot afford a special trip to Williamsburg or have limited vacation time! However, W&M’s adoption of Zoom as a meeting (and teaching!) platform allowed us to host a virtual homecoming for which we set up breakout rooms according to five-year blocks according to year of graduation.

During a “normal” homecoming reception, about 25 of our chemistry alumni (plus family members) visit us in the ISC. Using Zoom last year, approximately 60 of our chemistry alumni were logged-in at once, with many being recent graduates. During this time, alumni as well as current W&M faculty and staff moved freely between breakout rooms to reminisce as well as share current news.

We thank you for making our ZOOMcoming better than we expected! With many of us being vaccinated against COVID-19, we hope to see as many of you in-person for homecomings in future. As our “new normal” we plan to augment the “old normal” in-person experiences with virtual ones.

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Claudia Smith has settled into her new role as Fiscal & Materials Manager for Chemistry and has been doing a terrific job overseeing the department’s accounts, suppliers, contracts, and many other commitments.

This past February we welcomed **Dawn Alleman** as our new Administrative Coordinator. Dawn comes to us from the W&M Government Department with lots of institutional knowledge and creative ideas as she steps into Claudia’s former position. Claudia and Dawn make the job of being chair so much easier, especially for a newcomer like me.



Yours truly, Bob Pike.



**HOMECOMING
2021 ISC
OPEN HOUSE
OCT. 9TH**

This was a wonderful success and a lovely, COVID-safe gathering of alumni, friends & family! Read all about it in next *Chemistry distillations!*

*Hosted by Chemistry, Biology,
Neuroscience & Psychological Sciences.*

Department Research Highlights

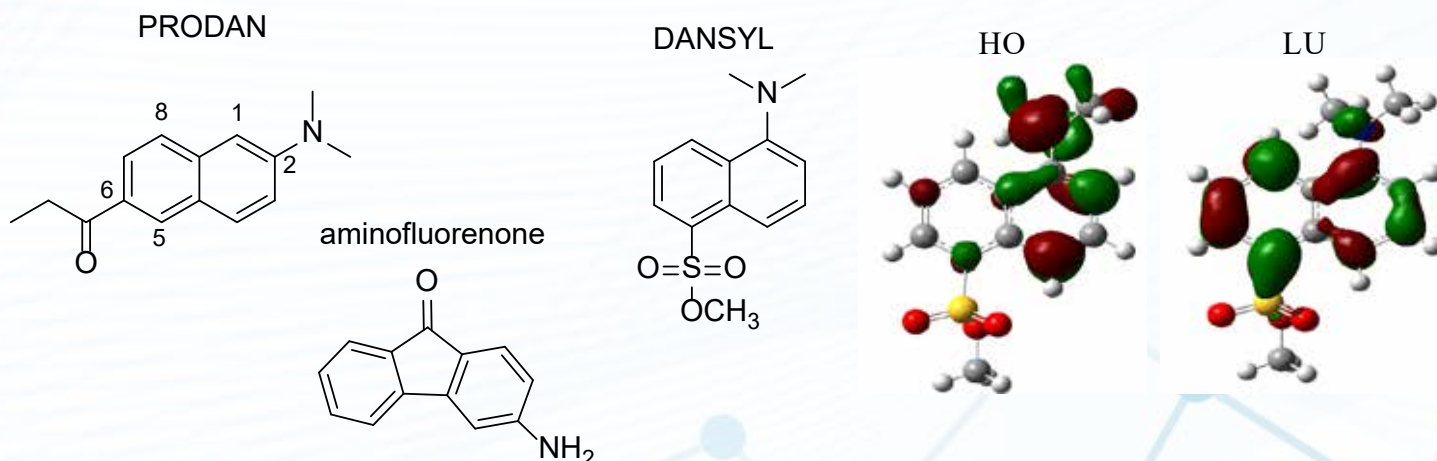
ABELT LAB RESEARCH



My current research looks at the mechanism for fluorescence and fluorescence quenching in donor-acceptor-substituted naphthalenes. This line of research began at the turn of this century with PRODAN, which was synthesized in 1978 as a sensor of micropolarity and used to characterize binding sites in proteins. Similar molecules fluoresce from an excited state where the dimethylamino group is completely twisted out of the plane of the naphthalene. This perpendicular geometry allows for maximum charge-transfer. Through the preparation of constrained model compounds with twisted and planar dimethylamino groups, we were able to show that PRODAN emits from an excited state where the dimethylamino group is co-planar, not twisted. We have shown that a planar excited state is also indicated for the 1,5 and 2,5-derivatives. Just this year, we found that DANSYL behaves the same way. DANSYL is widely used in labelling proteins and other biomolecules.

While all of our efforts indicate that the dimethylamino group planarizes in the excited state, we found that enforced twisting in the carbonyl group gives rise to strong H-bond induced quenching with alcohols. The magnitude of this quenching can be used as a sensor of H-bond donating ability, which we exploited in providing new insights into detergent-induced unfolding of human serum albumin. We showed through preferential solvation studies that there are two H-bonding interactions. Studies with aminofluorenones showed that quenching comes from an in-plane H-bond, not out-of-plane. Professor Scheerer and I collaborated in the study of some azafluorenones, available through a Diels–Alder/retro-Diels–Alder cycloaddition process worked out in his lab.

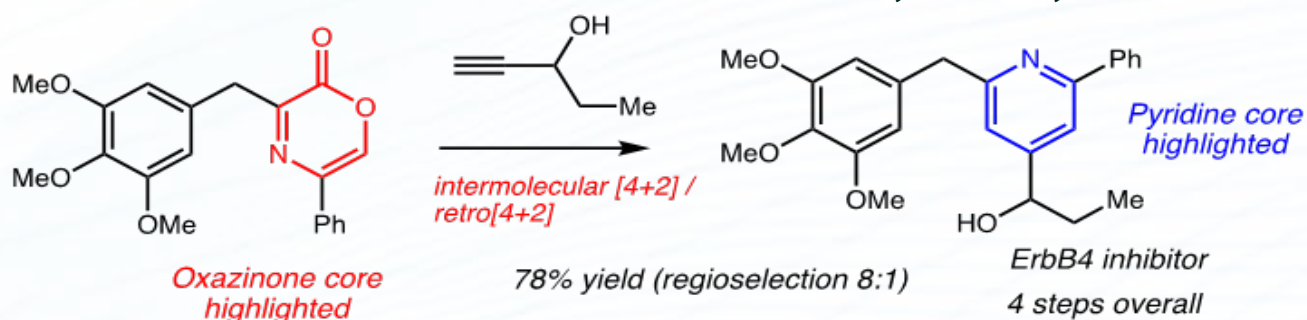
We are currently looking at the 1,8-derivatives. Because of the peri-interactions, the groups must be twisted in the ground state. We are working on preparation of the planar models, which we are finding surprisingly difficult. But that is the nature of research.



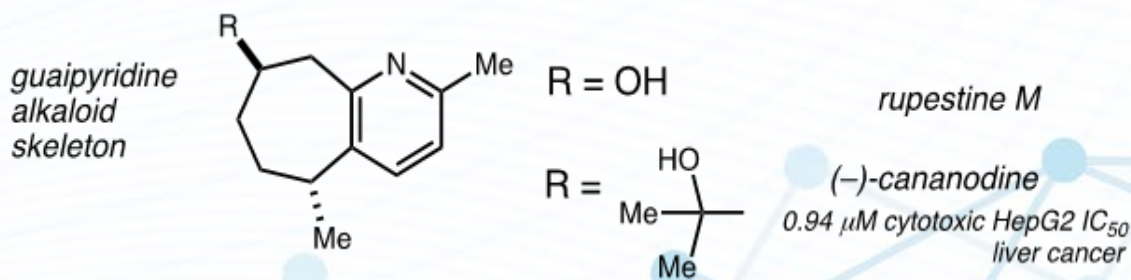
Department Research Highlights

SCHEERER LAB RESEARCH

We have been working on new strategies for the construction of nitrogen-containing polycyclic compounds. One new strategy involves the use of oxazinone precursors (see scheme, oxazinone highlighted in red). These reactive precursors can undergo a Diels-Alder reaction with alkyne components. The subsequent intermediate cycloadduct undergoes a retro-Diels-Alder reaction, where carbon dioxide is extruded to produce a pyridine product. The pyridine structure (noted in blue) is one of the most widely distributed motifs imbedded within biologically-active molecules and other molecules of material interest (e.g., polymers, conductors). With the help of Nicole Carrillo (B.S. '21), we have revealed this new reaction and highlighted the potential of this chemistry in the construction of a known ErbB4 inhibitor in only 4 steps overall. Nicole started Ph.D. studies this fall at the University of Pennsylvania.



Projects in this area continue in our lab and address improvements in the preparation of oxazinone precursors, exploration of reactivity, and construction of challenging polysubstituted pyridine products of interest. Toward this later end, the Scheerer lab is engaged in syntheses directed toward guaipyridine alkaloids (an important molecule class with specific structures possessing significant anticancer activity) including rupepine M and cananodine.



This work was enabled through support of the research by an NIH grant and published this year:

Carrillo Vallejo, N. A.; Scheerer, J. R. Application of 1,4-oxazinone precursors to the construction of pyridine derivatives by tandem intermolecular cycloaddition/cycloreversion. *J. Org. Chem.* 2021, 86, 5863–5869. DOI:/10.1021/acs.joc.1c00288



William & Mary had the honor of hosting Dr. Kerri Pratt, Associate Professor and researcher at the University of Michigan. Dr. Pratt is involved with the University's Department of Chemistry, Department of Earth and Environmental Science, and the Applied Physics Program. Her research lab specializes in analytical and environmental chemistry, specifically atmospheric chemistry. They focus on the impact of trace gases on the global climate, regional air pollution, and human health. By concentrating on the uncertainties in our understanding of winter environments, such as the polar regions, Dr. Pratt and her group have built novel analytical techniques to gain insight into the critical chemical reactions in these regions.

Dr. Pratt knew from a young age that she wanted to dedicate her life to environmentalism and conservation. She grew up in rural Pennsylvania on a farm and adored the outdoors. As an undergraduate at Pennsylvania State University, she pursued a degree in Chemistry before receiving a Ph.D. in Chemistry. We asked Dr. Pratt to tell us how she made this decision, and she stated: "One of the earliest careers I remember thinking about was being a forester. Forester then became a pharmacist, which makes a tremendous amount of sense because if you cross forestry and pharmacology, you get environmental chemistry. But I grew up in a rural area, so I didn't know that the job I have now was available. I didn't know that this was something I could study."

After taking her first general chemistry course and joining a research lab, Dr. Pratt fell in love with analytical chemistry instrumentation. From there, she worked for various chemistry labs throughout her undergraduate, graduate, and postdoctoral years

performing research and learning the chemistry and engineering behind instrumentation. This knowledge would pay off later in her career.

According to NASA, Arctic Sea ice is declining at 13.1% per decade based on data from 1979 - 2020. When we asked Dr. Pratt how her research fits into the push for global climate change, she said, "Everything we do is motivated by the fact that the Arctic is changing faster than anywhere else. I mean, in the last 10 years that we've been working in northern Alaska, the changes in the sea from the melting permafrost are huge. And it's crazy for the residents up there. There was a road that I drove on 10 years ago that doesn't exist today. The waves at the shore didn't use to be there and have eroded away that road. For the residents of that town, there are native communities that have had to move inland because communities that were there for thousands of years can't live there anymore." To help find a solution to this crisis, Dr. Pratt and her

"The nice thing about being an undergrad, is that there are so many opportunities to try out things. ... you look at the jobs around you, and those are what's available ... but the job I do now wasn't even a possibility then!"



Dr. Kerri Pratt,
University of Michigan

research group use custom-built, field-portable single-particle instruments to measure and study the size of gaseous particles and the chemistry of the Arctic atmosphere. In combination with measurements of snowpack, she helps model atmospheric composition based on altitude and time. This results in a better understanding of natural feedback mechanisms and creates more accurate climate and air quality predictions.

Recently, in 2017, one of her group's publications surrounding molecular iodine in the Arctic stirred up controversy among experts as her results contradicted widespread belief.

For years it was assumed that there was not as much iodine chemistry in the Arctic. While analyzing atmospheric particles, however, her group observed an unanticipated level of diatomic iodine, or I_2 , in the atmosphere. But what was the significance of this? How would it affect the course of her research and for research groups across the globe? Dr. Pratt understood that as she continued to work with a complex system, Earth's atmosphere, there would certainly be surprises around every corner. She said, "We don't always know what's going to be there, we have an idea, but sometimes we measure things that we don't know are going to be there and didn't even know we could measure," continuing with what motivates her to keep probing the unknown, "I think it's like a puzzle. Because you measure all these different things, and then you have to figure out how they get put together because it's not a controlled system." Additionally, she understood that a vital aspect of the scientific process, as we all know, is being able to adjust a hypothesis as new data are collected. After observing the iodine molecules, her team was able to model iodine's interaction with ozone (O_3) as well as its formation of clusters with other gases, seeding cloud formation.

From our conversation with Dr. Pratt, it was easy to see that one of the many allures of research for her is the endless opportunity to make new scientific connections. As a matter of fact, she is currently working with a group of international scientists, including researchers from the United Kingdom, Switzerland, Sweden, Canada, France, and the United States. Through this, scientists meet to discuss the ever-changing environment and how we can better protect it. This attraction, however, extends beyond the number of publications or awards she has received and towards a foundational aspiration to build upon previous knowledge for the benefit of the next generation of scientists. Whether it be students who are destined for a lifelong career in chemistry, health care, education, or any other discipline, Dr. Pratt gives the following message, "try things that you're interested in. If somebody is excited about medicine, then I say go find an internship or a job or something that let's you try it out. The nice thing about being an undergrad,

is that there are so many opportunities to try out things. When you're growing up, you look at the jobs around you, and those are what's available to you, but the job I do now wasn't even a possibility then! We don't have to do the thing that we said we were going to do when we were six years old. Life is not straight." And she's right. It's a winding journey that could take you all the way from rural Pennsylvania to the freezing polar regions of the Arctic.

This article was written by undergrads interested in working in science education & outreach.

William J. Lain '22

Haley T. Richards '23

Chemistry students are helping make air filtration boxes to keep the ISC air clean during the pandemic. Students from NOBCChE (National Organization for the Professional Advancement of Black Chemists and Chemical Engineers) and ChemClub are working with Professors O'Brien & Lashley to make "Corsi-Rosenthal boxes". These boxes work by pulling air through 4 MERV 13 filters using a box fan that is taped on top.



The filters work by removing aerosol particles from classrooms. Aerosol particles are small liquid or solid particles suspended in the air (ex: smoke, smog) and are not healthy to breathe in quantity. SARS-CoV-2, the virus causing COVID-19, are found in aerosol particles. Extra-cleaning of classroom air is especially beneficial during the pandemic. Build your own. Search "Corsi-Rosenthal Box DIY" for step by step or video instructions.

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2021 donations helped fund:

University COVID 19 "Mission Critical" budget restrictions limited purchases and repairs, but we can celebrate a year of progress. Purchases include: software to create graphics for publishing research and teaching chemistry, lab supplies for 40+ summer research undergrads and select instrument repair. Awards entailed academic excellence at graduation, recognizing star teaching assistants, scholarships for undergrads and grads, summer research funding and housing stipends for summer students.

How to Give:

We have several funds specifically designed to support our instrumentation, student researchers & innovative research. One-time, regular or annual contributions may be made online or by mail. When writing please include the fund number on your check (i.e., Chemistry Fund #2967). William & Mary, Advancement, P.O. Box 1693, Williamsburg, VA 23187-1693.

Visit our support page at: www.wm.edu/as/chemistry/support/index.php.

Thank you for your support!

So, how do you teach chemistry remotely?

A Journey into Lecturing Remotely by Randy Coleman



I begin this story back in 2014 when I created the first (for Arts & Sciences) fully online summer course. The subject was biochemistry and I didn't know what I was getting into! With the help of the University's IT department, a team was established to produce that course. We had someone from the School of Education, and several members of the IT department and an outside Instructional Design consultant. I, of course, was the content specialist producing all of the lecture videos for the course (approximately 80 videos). The first thing I learned was that you don't produce a 50-minute video for your students. I thank the School of Ed for that tidbit. I was told to break the videos into 15 - 20 minute chunks to make them seem more palatable when first confronted by the student. That turned out to be important! Over the years of teaching this online course, I frequently get appreciative comments from students about the nice length of my videos. Setting up remote asynchronous (RA) classes must take the time commitment of the students into consideration as videos are prepared. These students tend to be busy and highly motivated for success and desire a course that gives them flexibility as they work through the course content. Therefore, careful planning and a significant front loading of work on the part of an instructor will go a long way toward a successful outcome for the students! These RA courses have been fun to teach over these many years. The students move ahead with the content at their own pace, and I hold frequent Zoom help sessions to ensure they are mastering the material.

That was my background in remote learning when COVID struck during spring break 2020. The faculty were given a week after the break to pivot their courses to an online, remote experience! One week! Many faculty were completely in the dark as to what needed to be done to convert their courses to a remote experience. Fortunately, our IT staff had a dedicated group of colleagues to help everyone with highly useful group Zoom sessions to teach the faculty how to do various important classroom activities – from simply lecturing through a Zoom session, to learning how to set up pre-recorded videos to show to the class, to how to show a PowerPoint program through Zoom, etc. In my opinion, without that support, we would have failed in our mission to deliver course content for the remainder of that spring semester!

What I and my colleagues have discovered through this adversity is that there is much more work to prepare for a remote class than there is for an in-person class. There is a significant time investment to properly plan for and then deliver a lecture through Zoom. For me, personally, as I go through this planning phase, I am constantly thinking of my students and how they will perceive the delivered content. That perspective has worked well for me in my in-person classes and it works equally well when properly executed remotely. For me the bottom line is: Did I connect with them in this digital environment?

Postscript: Maybe in future, I can discuss remote testing, remote proctoring, and how to deal with a Blackboard application that doesn't lend itself to drawing chemical structures! But, that's a story for another day...

Teaching Labs Remotely by Jordan Walk



A particularly challenging problem during the pandemic has been the delivery of remote laboratory courses. By their practical nature, these courses are heavily dependent on students being in the laboratory; however, the necessity of social distancing and the limitations of faculty and staff precluded any in-person labs for our introductory curriculum.

The initial pivot to remote teaching in March 2020 left faculty scrambling to quickly assemble a strategy to deliver laboratory courses to students. The difficulty of redesigning a practical course to a remote teaching modality in the timeframe of about a week meant that labs were largely in survival mode for the rest of the semester. The 2020-2021 school year presented a similar challenge; while some students were on campus, many were not and social distancing still made it difficult to deliver any sort of in-person experience. Fortunately, the summer allowed for the preparation of a course that, while not ideal, would best meet the mission of the department under the circumstances.



Beyond Labz GenChem bench

Experiments vary dramatically in adaptability to remote teaching. The easiest experiments to transition are those that require significant data analysis. While it is ideal that students collect the data themselves, faculty recorded videos can demonstrate how the data are collected. The more difficult experiments to transition to remote learning are those that focus on practical lab techniques. How can a student learn to use a separatory funnel or a Rotovap effectively without being in the lab? Video tutorials and online simulations exposed students to the techniques; however, in-person labs this fall semester must make up for students lacking hands-on labs since COVID.

The biggest change in remote laboratories has been the introduction of Beyond Labz, a software that simulates a wide variety of experimental setups. While students may not have been in the laboratory, Beyond Labz allowed them to conduct experiments using virtual chemicals, glassware, and instrumentation. Beyond Labz offers many experimental setups that are pedagogically useful, but are either cost prohibitive or unrealistic to complete in person. These new setups have given the department novel ways to deliver content to students, and our in-person labs have already incorporated some of the virtual labs into the curriculum.



Beyond Labz Organic bench

The department is proud of its efforts to adapt laboratory courses to remote teaching. The pivot required adaptability to new approaches that have lent us a fresh perspective on teaching labs. We return to in-person learning more knowledgeable and excited to continue improving our laboratory courses. And, heaven forbid we have to go remote again, we have effective tools in our tool chest (or on our lab bench) to teach labs well.



We congratulate Jordan & Kelly Walk on the birth of their daughter, Finnoula Jean Walk, born 6-11-21. Fatherhood is clearly agreeing with Jordan.



Master of Science Program: 40 Master of Science degrees since 2015!

Here are our 2021 MS grads, plus students joining the program in fall 2021:

2021 Master of Science Recipients & Thesis Titles:

Caleb Burns - Hinkle Lab "Electronic Effects in a Cyclization Cascade to Highly Fluorescent Polycyclic, Helical Molecules" **Now-** Research Scientist I, Medicinal Chemistry, Novartis, Boston

Kayla Copeman - Meldrum Lab "Evaluating Epoxy Cure and Adhesion Strength Through Single-Sided NMR Measurements of Molecular Mobility" **Now-** Analytical chemist, GlaxoSmithKline, Richmond

Kelly Kopera - Wustholz Lab "Investigating the Electron Transfer Dynamics of Eosin Y Photo-sensitizers Using Single-Molecule Spectroscopy" **Now-** in PhD studies at Univ. Pennsylvania

Caroline Margonis - McNamara Lab "Polyaromatic-Terminated Iron Polypyridyl Complexes for the Functionalization of Carbon" **Now-** in PhD studies Univ. North Carolina Chapel Hill

Hannah Przelomski - O'Brien Lab "Indoor Chemistry: Development of an Indoor Surface Extractor" **Now-** Seeking Employment

New Master's Students:

Jess Cropley - Christopher Newport Univ., **McNamara Lab**

Lyndi Kiple - Univ. of Iowa, **Meldrum Lab**

John "JD" Davis - Washington and Lee Univ., **Kidwell Lab**

Laurel Nicks - Univ. of Lynchburg, **O'Brien Lab**

Trihn Ton - George Washington Univ., **Poutsma Lab**

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

George Dresser '61

"My faculty were amazing, Dr. Guy, Dr. Armstrong, Dr. Harrell, and my good friend, Mr. Katz. After graduation, I did 6 years of active duty in Naval Aviation and 21-years in the reserves. This was followed by an M.S. in Statistics & a Ph.D. in Civil Engineering from Texas A&M Univ. Then a career with the TX Transportation Institute. Mary Elizabeth Tracy '61, and I have 4 children and 6 grandchildren and have been married for 59 years."

Mary Mann Smith '73

moved to Williamsburg with her husband, Richard T. Smith, a Ph.D. biochemist who attended VTech. Their 2 children are pursuing careers in scientific fields. Haley (W&M '11) is in her 4th year of residency in orthopaedic surgery at Northwestern in Chicago. Kirk (VTech. '15) is a biomedical engineer doing research at Mass. General in Boston.

David Oelberg '74

I retired from medicine 6 years ago as a Professor of Pediatrics at Eastern VA Medical School with over 150 publications, 1 patent, and over a million dollars in grant support over the course of my career. The patent provides the basis for the most commonly utilized means of measuring transcutaneous bilirubin in newborns worldwide.

Michael G. Waters '74 MD, FAAFP

I congratulate Dr. Coleman for his brilliance and longevity. I worked briefly in his lab. I went on to work at MCV in biochemistry labs, first with Dr. Robert Eanes (Pediatrics), who was studying Maple Syrup Urine Disease, and then with Dr. Richard Brandt (Biochemistry), studying glycolysis & methylglyoxal and possible uses in cancer research. I went to medical school at MCV '85, and spent 30 years working as a family physician in Danville, Virginia. I am semi-retired currently and have a daughter who is a senior at VCU, studying business management. I am happy to learn that the Department of Chemistry at William & Mary continues to carry on a tradition of educating the best with the highest echelon of chemistry scholars.

Ray Bleday '76

My family and I are healthy and well. I'm currently in private practice as an Orthopedic Surgeon living in Panama City Beach FL. Oldest child Jennifer ('27, Pitt, Duquense) to be married soon. Second child Adam ('25, Penn) is a Pitching Coach for the Orioles Rookie Team, JJ ('22, Vanderbilt) plays OF for the Marlins. Amy ('19, FSU) in her 2nd year at FSU.

Alumni News

Robin A. Felder, PhD. BS '77

is a professor of pathology and Associate Director Laboratory Medicine at The University of Virginia, and was recently inducted into the National Academy of Inventors in September 2021. Find him online:

<https://www.montepiccolo.com/>



Stephen Sides '77

finally retired after 35 years in paints and coatings. Looking forward to new hobbies and the time to explore them. Congratulations to the department and the ISC on its anniversary.



George Tsahakis '77

My wife, Marinda and I have been married for 41 years. Our three children are married: John to Angie, Andrew to Rita, and Katherine to Steven Wilson. We have four grandchildren, Evie, Nicholas, Georgie, and Andrianna.



David Mullins '78

I retired from Oak Ridge National Laboratory in 2018 after 32 years as a Senior Research Scientist. My career was developing and applying synchrotron light - based methods for studying chemical processes on surfaces and in situ on working catalysts (despite not having a synchrotron light source in Oak Ridge). I served as an officer, and am a Fellow, in the American Vacuum Society (AVS) and the North American Catalysis Society. I was one of founding members of the Synchrotron Catalysis Consortium at Brookhaven National Lab that endeavored to broaden the availability of synchrotron-based techniques to more researchers in the field.

Jeff Douglass '78

asked to keep *Chemistry distillations* newsletter in paper. Happy to oblige!

Bob Schoumacher '78

moved to Grand Rapids, MI, last year where he took a job as Professor of Pediatrics at Michigan State University and has a clinical appointment at the Helen DeVos Children's Hospital.

William "Bill" E. Weiser '81

My wife Sarah Peyton Weiser, '80 (Sociology) and I recently moved to Williamsburg. I am currently Senior Director of Global Quality Systems for the Pharmaceutical Services Group of Thermo Fisher Scientific. The pharmaceutical services group is a contract development and manufacturing organization producing drug substances and drug products for the global pharmaceutical market. I am enjoying the close collaboration with Thermo Fisher's diverse business groups, especially our analytical instruments group.

Bruce McCord '81

is still a professor of analytical/forensic chemistry at Florida International University in Miami, FL. "I now have 2 daughters who also have received their PhDs in chemistry (VPI + Colorado State) and if you add that to the 28 PhD students who I have also mentored in my career, it makes a nice total of 30. I remain grateful to the wonderful friends and mentors I had at W&M." <http://faculty.fiu.edu/~mccordb/>

Rebecca Hartfield '81

is currently living in Swansea Illinois, reports that she graduated from University of Kentucky Dental School in 1985, was a Captain in the US Air Force from 1985-1988, and has been a dentist in private practice ever since. smiles4belleville.com



Spencer Pugh '81

retired in 2019 as the VP of R&D for Michelman Inc. He is currently working part-time with a start-up company, MagPlasma, serving as a Director and Chief Scientist. In addition, he's teaching several short executive education courses on topics such as "Innovation Bootcamp" and "Financial Analysis for R&D Managers." He teaches via Zoom. Spencer & his wife Beverly (also '81) live in Cincinnati and have 3 children, 2 grandchildren, and 2 more grandchildren "on the way."

Erika Holzbaur-Howland '82

is the William Maul Measey Professor of Physiology in the Univ. of Pennsylvania- Perelman School of Medicine. "I have been fortunate to have multiple W&M alums in my research lab, as graduate students and postdoctoral fellows. I appreciate the quality education they (and I) received. Keep up the great work!"

<https://www.med.upenn.edu/holzbaurlab/>

Ron Kravitz '82

Lives in the Dallas area and is working for the Electric Power Research Institute as a Strategic Account Executive.

<https://www.linkedin.com/in/robkravitz/>



Brian Failon '83

Kim ('85 English) and I have a sophomore son, Nick, on campus. He is considering a Chemistry major! He has connected with my former research advisor, Professor Emeritus Dr Gary DeFotis, for some master-level chess matches! npk4u.com/

Mark Brickhouse '83

is living the dream in Lorena, TX as Second Gentleman of Baylor University. "My wife Nancy, is the Baylor Provost. My daughter Elise graduated as a Neurosciences major '20. We both studied under Professor Coleman at W&M, and he was a big part of my decision to get my Ph.D. at Purdue, where I met Nancy."



Melissa Moore '84

is a chief research scientist for Moderna. She oversaw the development of their COVID-19 vaccine and testified before an FDA panel seeking approval of the vaccine. She was elected to the National Academy of Science in 2017. She worked with Prof. Coleman, and needless to say, he is very proud of her accomplishments.

Moira Rafferty '85

went to MCV medical school, then the Univ. of Cincinnati for residency in Internal Medicine. "After working for the Indian Health Service for 5 years on the Navajo Nation in AZ, we moved to Lynchburg, VA. I've been in private practice & done volunteer medical work locally and in Haiti. My husband, Rob Bass, works for Centra Health; he is also in the US Army Reserve Medical Corps with 7 deployments to Iraq & Afghanistan. We have 2 adult children: Eleanor, 24, works for FEMA in DC, and Daniel, 23, is a graduate student at UVA."

Michael Meinhardt '85

thanked us for setting up a homecoming Zoom. He lives near Portland, OR, and it's too far! He worked with Professors Coleman & Orwoll. Interestingly, Michael's wife had Prof. Bebout as a TA at Cornell, where their son is now a chem major in his 3rd year. Now, 35 yrs after W&M, he says "I reflect with a degree of maturity on the friends, foundations and influences established as an undergraduate chemistry major."

Karen Colehamer '92

I still live in VA Beach (a rare native) and work as a Senior Healthcare Documentation Analyst for AQuity Solutions.

Janice Moseley Langer '92

My husband, Andrew, '93, and I have been living in Williamsburg for 8 yrs. I am a family medicine physician with Sentara Medical Group and love practicing medicine here. I especially love caring for my patients with W&M connections and having premed students shadow me in my clinic.

Tanya Myers '92

works at the CDC as a lead on "after vaccine health checker" for COVID-19 vaccines surveillance. "I will return to an epidemiologist in Immunization Safety Office. I am grateful for Drs. Rice, Thompson, Hollis & others who taught us how to make science engaging.

My partner Chris Beck (Biology '93) and I enjoy spending time outdoors and supporting our 12 & 15 yr old daughters on softball fields and at Irish dance events." [linkedin.com/in/tanyarmyers](https://www.linkedin.com/in/tanyarmyers)



Andrew Langer '93 (see Janice Moseley Langer '92)

Karen Harrington '93, '97 PhD Applied Science is a Director at Raytheon Intelligence and Space, Office of Innovation, The Foundry. www.rtx.com



Wendy Kraus Pelton '93

received an MSN in Informatics from Duke in May 2020 and accepted a job doing data analysis and reporting for Sentara Healthcare. She & her husband, Mike (Biology '92, MBA '98), just celebrated 20 yrs and enjoyed a trip to Vermont to celebrate. Find her on LinkedIn.

Michael Amendola '97 MA www.michaelamendola.com

Caryn Prarie Outten '95

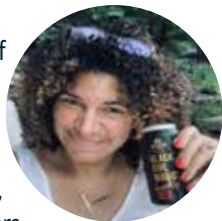
My husband Wayne (Biology '95) and I took classes together- great experiences! Shout out to Dr. Bebout - an awesome research advisor! We're now full professors in the Dept. of Chemistry & Biochemistry at Univ. of SC. We will return next June 2022 for our 25th anniversary to renew our vows in Wren Chapel! PS-

We would love more W&M grads apply to our PhD program: https://sc.edu/study/colleges_schools/chemistry_and_biochemistry/study/graduate/



Tiffany Price Hudok '96

I just celebrated 7 years as a fitness instructor and of Best Foot Forward, my test prep/tutoring business. My daughter is visiting colleges - W&M is on her short list! I work with my local school board, volunteer w/ Girl Scouts, tend to our pandemic puppy (Gracie, a Corgi), bake and enjoy life w/ kids & my husband, Ken, of 25 years.



Chris Adams '97

I was promoted to my Law Firm's Partnership earlier this year and was featured in an article: "How I Made Partner: 'Partnership Is Not Merely a Promotion'" on Law.com.



Melissa Sampson '97

works with Ball Aerospace in Colorado. She leads Strategic Development and Advanced Technology. She is a frequent speaker on aerospace and STEM and is looking forward to getting back into connecting with people.

Michael Hurt '05, MS'07 and Natalie Stinton '07

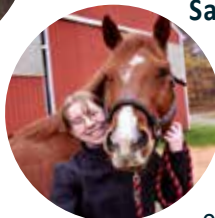
continue living in Bloomsburg, PA with our 4 boys, ages 7, 4, 4, and 1. Michael takes great care of them while Natalie continues her work at Geisinger in Danville, PA, directing the pediatric dentistry residency program and chairing the department of oral medicine.

Eric Schluederberg '05

is well in Los Angeles, CA, practicing Family Medicine at the Kheir Clinic.

**Natalie Stinton '07** (see Michael Hurt '05)**Deana Hadley Miller '07**

is a pediatric hospitalist in Wilmington, NC. She is busy in this pandemic & wild respiratory virus season. She's co-editor of the pediatric hospital medicine national eLibrary. Her daughters (2 and 5) keep her busy!

**Jason Fulbrook '14**

Graduated with a Doctorate in Pharmacy from Virginia Commonwealth University in May 2021.

**Sarah Stratton '17**

I attended Penn State University to obtain a master's degree in Forensic Science with a chemistry focus in 2019. I've been working in the Vermont Forensic Lab as a forensic chemist in toxicology. I've been part of the COVID surge testing team at the Vermont Department of Health lab. [linkedin.com/in/sarah-stratton-08a6a2153](https://www.linkedin.com/in/sarah-stratton-08a6a2153)

Lissa Anderson '09, PhD Applied Science

is Research Faculty & Director of Biological Applications for Ion Cyclotron Resonance User Facility of the National High Magnetic Field Laboratory located at Florida State University. The facility develops and exploits the unique capabilities of high-field Fourier-transform ion cyclotron resonance mass spectrometry (FT-ICR MS). They lead the world in instrument and technique development and novel applications of FT-ICR MS. The facility features high magnetic fields – including the world-record 21 tesla ICR magnet. They're available for sample analysis requiring ultrahigh resolution and mass measurement accuracy. <https://nationalmaglab.org/component/maglabdata/?view=personnel&id=LissaAnderson>

**Rebecca Deitch '20**

I am currently attending the VCU School of Medicine in Richmond, VA!

Joshua Owusu-Koramoah '20

is a chemistry & physical science teacher at a private, local, Christian school. Living in Hampton, VA

**Ellie King '20**

is currently a PhD student in Chemistry at University of California at Berkeley

Angela Leersnyder '20

Just began a 2 year Master of Science in Conservation Practice at Cardiff University, Wales. It includes the theory and practice required for the conservation of art and objects.

**Kameron Adams King '13**

I got married on Sept. 2020 to Patrick. I earned my PhD in Environmental Engineering at Old Dominion University, and will be starting my job at the US EPA in the Office of Research and Development this fall.

**Luke Scarano '21**

is a Coordinator for the American Chemistry Council working in the Washington DC area

Homecoming Alumni Career Panel

At Friday seminar on October 8th, current students heard from you, our alumni. Valued advice was shared concerning next steps, career development and the ever-winding path that life takes- after campus is left behind. The panelists listed below got their start in the hallowed halls of the ISC (or Rogers Hall), and graciously shared their career development with current students. Thanks!

Panelists:

Janice Moseley Langer '92 - Family Physician

Ellie King '20 - PhD Student, UC Berkeley

Melissa Sampson '97 - Ball Aerospace, Colorado

Luke Scarano '21 - Coordinator, American Chemistry Council

William E. Weiser '80 - Senior Director, Thermo Fisher Scientific

Tamia Adams
Vibhav Badrish
Peter Brown
John Cacciatore
Nicole Carrillo Vallejo
Emily Chappie
Daniel Jin Hwi Cho
Mackenzie Corcoran
Sonali Dabhi
Stefan Dennis
Sunil Fontaine-Rasaiah
Matthew Frame
Gillian Gaunt
Gloria Yuehan Ge
Cameron Goff
Matthew Goodwin
Josephine Gresko
Emily Griffin
Michael Guzzano
Alexander Hall
Christian Hettwer
Christopher Hicks
Daniel Highland
Joshua Hobbs
David Hood
Ankush Joshi
Sharon Kim
Matthew King
Margaret Lawrence
Kenneth Yongkang Li
Rui Liu
Isabelle Maricar
Neal Marshall
Abigail Martucci
Kevin McFadden
William Moeller
Allison Moyer
Tana Palomino
Laurel Perchalski
Brianna Peterson
Matthew Petitt
Madeline Phillips
Leonie Yihan Qin
Luke Scarano
Emma Scheidegger
Spencer Seward
Nolan Smith
Caroline Sublett
Corey Thrasher
Catherine Tyson
Vittoria Valentine
Lemai Cao Vo
Jaihde Williams

Favorite element: Potassium, because when reacted with certain compounds it's purple.

Chemistry Degree

Favorite element: Lead – it matches my initials!

Chemistry Degree

Favorite Element: Bismuth! beautiful prismatic shape & multicolored oxidized layers!

Off to grad school at Texas A&M for a Chemistry PhD

Going to a job at the Virginia Hospital Center as a medical scribe

I've got a job at US Army and as an Engineer Officer

Chemistry / Minor in Public Health-Data & Public Health Track

My favorite element is Zinc

Fave Element: Lithium (Li) -the lightest metal, powers our devices, bright red sparks

Chemistry & Interdisciplinary Studies: Environmental Science & Policy

Going for a professional degree at WVSOM for Doctor of Osteopathic Medicine

Going to Cornell for certification in DVM

Off to grad school at Johns Hopkins, to study Protein Engineering

To grad school at UNC Chapel Hill studying Inorganic Chemistry

Going to VCU School of Pharmacy for a PharmD

Chemistry / Minor in Math

Off to grad school at George Washington Law School to study Patent Law

Chemistry Degree

Favorite element? The element of SURPRISE!!!

Chemistry & Biology

Fluorine: Most electronegative element, unique acid with HF, has a "uo" thing going on

Chemistry / Minor in Biochemistry

Off to grad school at U. Wisconsin-Madison to study Chemistry

Chemistry & Government

Favorite element? I'm not sure. All the good ones Argon...

Taking a Gap year to gain experience, then I will apply to veterinary school

Chemistry / Minor in French

Going for a JD

Off to grad school at Rice University studying Chemistry

I have a job as an ER Scribe at Inova Alexandria Hospital

Chemistry & Psychology

Chemistry Degree

Chemistry degree then off to hike to Pacific Rim Trail!

Off to grad school at Ohio State to study Chemistry

Favorite element: Hydrogen because I'm always trying to generate it in lab :)

Chemistry Degree

Chemistry Degree

Bismuth - its cool crystal structure + color + it's the largest atom that isn't radioactive

C- I did 2yrs organic research & both senior seminars were organic. Anything else would be heresy!

As a TA, a student told me he couldn't get glassware clean. I asked if he tried soap and he said "no."

Off to grad school at Cold Spring Harbor Laboratory studying Biology

Chemistry / Minor in Classical Studies

Chemistry / Minor in Sociology

Chemistry / Minor in Psychology

Chemistry Degree

Phosphorus! Essential to the function of ATP, which generates energy for living cells!

Boron- it reached its abundance on Earth through cosmic ray spallation (that's a cool thing to say)

Chemistry / Minor in Russian Language & Literature

Chemistry Degree

Off to grad school at VCU to study Chemistry for a PhD

Chemistry Degree



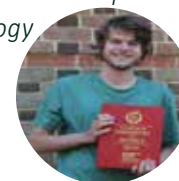
Tamia Adams with NOBCChE stole!



David Hood recipient of CRC Handbook Award



Isabella Maricar, Prof. Harbron, Matthew Goodwin



William Moeller CRC Handbook Award winner

Chemistry or Not? annual crossword by Bob Pike

ACROSS

1. She bore you
4. Append
7. Amount of material or religious service
11. Plead
14. Poems of praise
16. Pike-like fish
17. Margerine
18. Sch. in Charlottesville
19. Conveyance for arriving in style
20. Galena or cobaltite, e.g.
21. Mourn aloud
22. Back-talk
23. ___ Gay, A-bomb bomber
25. Computer key
27. Electron grouping or mollusk covering
29. Street in Italy
31. Homogeneous liquid mixture or the goal of this puzzle
34. "We interrupt this program..."
38. Companion of tuck
39. Together
42. Social science that relies on math, abbrev.
43. A result that replicates well

46. "___ my turn yet?"
47. "Inferno" writer
49. Boy band ___ Direction
50. Refills for printers
52. Voltage or unrealized ability
56. Weigh again
60. ___ talk
61. RCOOR'
66. Workplace rights agcy.
67. Oz city
71. Waste product, C2H4NO
72. Blood, minus cells & clotting factors
74. Drivers' grp.
75. Glare at
77. Chemical/physical characteristic or own's land
80. Immigrant course offering, abbr.
81. Composition of matter or developmental period
82. "___, Pray, Love"
84. Kind of natural pool
88. Self-proclaimed greatest boxer
89. Reach across

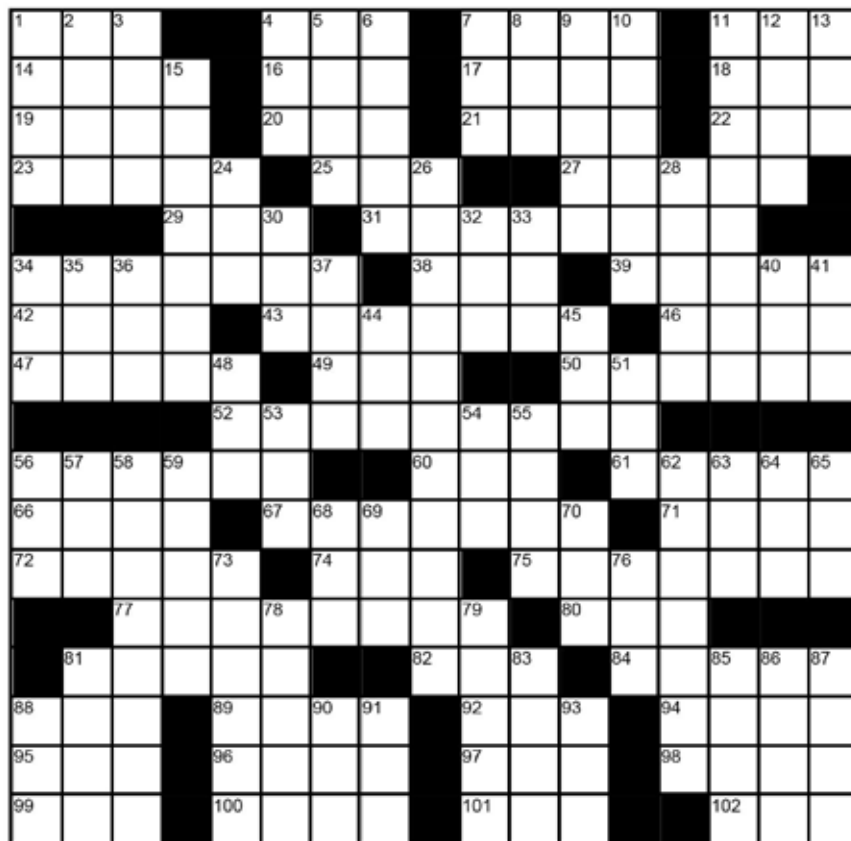
92. Old-style TV screen
94. Cry of the unsatisfied
95. Prevailed
96. Currency in 19 countries
97. Towel monogram
98. Sicilian volcano
99. Summer in Provence
100. Electron quantum property or public relations task
101. Type of quark
102. Instant lawn

DOWN

1. Avogadro's number worth or garden pest
2. One-eyed Norse deity
3. Written office communication
4. A long time ___
5. Anti-narcotics/gangs campaign
6. Put on clothing
7. Cut the grass
8. Full-bodied brew
9. Takes notice of, King James style
10. Woman's name from the Greek for wisdom
11. Rounded counter top edge style
12. Austin's Powers' Dr.

13. When riding the tube, be sure to mind this
15. Part of 31 across or financially okay
24. Found between ready & fire
26. Decrease the volume of 31 across or think hard
28. Red fluorescent dye for staining proteins
30. Phone program
32. Year in Claudius' reign as Roman emperor
33. Package deliverers
34. Referring to the foot
35. Company with dog & gramophone logo
36. A big slice of time
37. Between walk and canter
40. A spectral sub-region, abbrev.
41. SAT org.
44. Double-bonded compound ending
45. When you plan to get there, abbrev.
48. Graphics file type
51. Bullfight shout
53. Chemical suffix for a sugar
54. Potable for two

55. Monty Python's Eric
56. ___ ipsa loquitur
57. Big shoes to fill
58. Opiate named for the god of sleep
59. Luxury Japanese car nameplate
62. Convert directly from solid to gas or wonderful
63. ___ la la
64. Unagi fish
65. N.C. capital, abbrev.
68. Bawdy film star West
69. Piercing site
70. Chemical colorant
73. Sources of peat
76. Winter hours in 65 down
78. Energize
79. Ship of drools
81. Grave or graph
83. The Jonas Brothers, e.g.
85. Points on 81 down
86. Tuscan river
87. Ahead or Pb
88. It accompanies shock
90. Onassis, Gold, or Shaffir
91. Meaning-reversing prefix
93. Small ingredient amt.



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50⁺ years of teaching Tribe Chemistry!

Not many professors can claim to have taught so many accomplished Tribe alumni - and their children too! We celebrate Randy Coleman's 52nd year of teaching and wish him many more green & gold years. The words and phrases on this poster were submitted by caring students and alumni at a seminar Randy gave on April 9th (via Zoom, because of COVID of course). We formally presented this art piece to Randy at the recent ISC Homecoming Open House, with 3 generations of his family present. Every ISC department came together for the occasion- even Neuroscience who left their

own homecoming in Adair Hall for the presentation! Randy addressed his fans and spoke of his continued love of teaching. Although he was a pioneer of remote instruction (see page 12), he promised that he prefers meeting students face-to-face. What a wonderful celebration of the wealth of talent here in your Tribe Chemistry department!



Coleman family (L-R): Randy, April, Aiden, Bryan, Luke, Randy Jr.