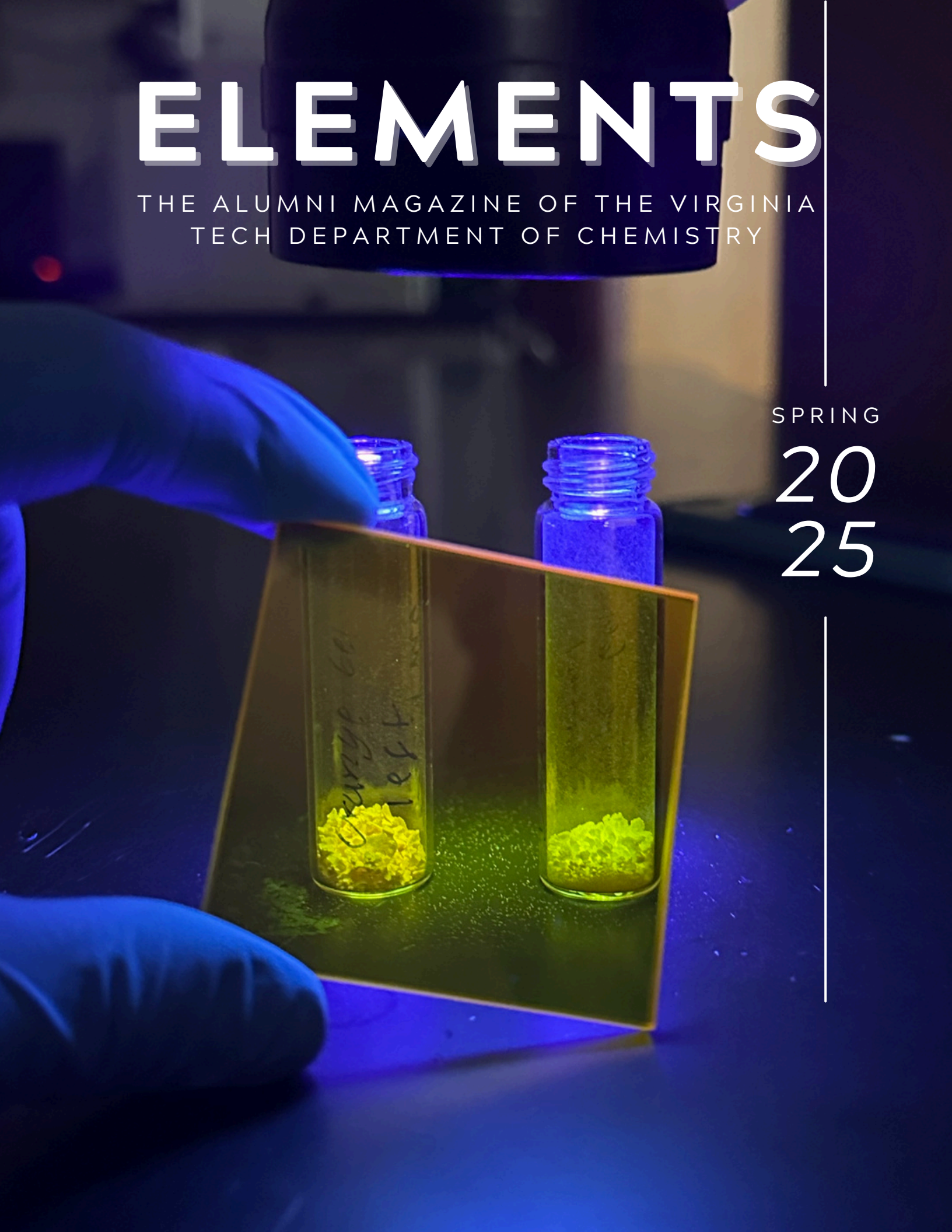

ELEMENTS

THE ALUMNI MAGAZINE OF THE VIRGINIA TECH DEPARTMENT OF CHEMISTRY

SPRING

2025

LETTER FROM THE CHAIR

Dear Alumni and Friends of the Chemistry Department,

I hope this message finds you well. The Department of Chemistry continues to build on its strong foundation, advancing research, education, and opportunities for our students. I am excited to share some updates on the achievements of our students and faculty, as well as new initiatives that will shape the future of Virginia Tech Chemistry.

Our commitment to addressing global energy challenges continues to grow with the addition of new faculty who will enhance our research efforts in this critical area. We are strengthening our expertise in energy storage with potentially two hires—one of whom has already accepted—and expanding our medicinal chemistry efforts with a new faculty member. These new faculty members will bring fresh perspectives and expertise to our department, expanding opportunities for discovery and innovation. I look forward to sharing more details soon!

I am also incredibly proud to celebrate VT Chemistry Senior Stephen Argauer, the recipient of the College of Science Outstanding Senior Award. Stephen is an exceptional student, researcher, and leader. His academic achievements speak for themselves, with a nearly perfect GPA in our rigorous B.S. in chemistry program. His dedication to research spans both experimental and computational organometallic chemistry, where he has contributed to projects ranging from photophysical spectroscopy to carbon dioxide reduction. His work has already earned him national recognition, including the prestigious Astronaut Scholarship. In addition to his academic excellence, Stephen has shown remarkable leadership as a Cadet Colonel in the Virginia Tech Corps of Cadets. He is set to commission as a Lieutenant in the U.S. Air Force and continues to inspire his peers through his commitment to service, leadership, and excellence. His story is a testament to the caliber of students we have in our department and the bright futures they are shaping.

To further support students like Stephen, we are launching an ambitious effort to expand undergraduate research opportunities in our department. Hands-on, minds-on learning is at the core of a transformative chemistry education, allowing students to apply their classroom knowledge to real-world scientific challenges. Research experience fosters critical thinking, creativity, and technical skills that prepare students for careers in academia, industry, and beyond. Our goal is to establish six summer undergraduate research scholarships, ensuring that more students have the opportunity to engage in meaningful scientific work without financial barriers. We invite you to be part of this initiative—your support can directly impact the next generation of chemists and innovators.

It is also with mixed emotions that I announce the retirements of two esteemed colleagues, Professors James (Jim) Tanko and Joseph (Joe) Merola, whose remarkable careers have left an indelible mark on our department. We highlight their careers later in the issue. Jim was the department chair who hired me into the VT Chem Hokie Family. He was a much-needed mentor and calm head while I took the usual assistant professor stumbles and falls. Joe became more of a mentor later in my career, and certainly when I became chair. His small bits of wisdom led to self-reflection and growth, and I am incredibly grateful for his insights. I look forward to increased pictures of Joe with his grandkids on social media and hearing about Jim's camping and hiking adventures. Please join me in extending our heartfelt gratitude and best wishes to both Jim and Joe as they embark on their well-deserved retirements.

In recent years, colleges and universities across the country have navigated an evolving landscape marked by shifts in enrollment trends, funding models, and societal expectations. At times, these changes have introduced uncertainty for students, faculty, and staff alike. Amid these challenges, our commitment to academic excellence, student support, and impactful research remains steadfast. We continue to adapt thoughtfully—guided by our values, informed by data, and focused on preparing students for meaningful lives and careers. While the path forward may not always be clear, our mission endures.

Thank you for being part of our community and for your continued support of Virginia Tech Chemistry.

Warm Regards,

Amanda J. Morris

Join Us for Out Homecoming Social Hour

HOMECOMING WEEKEND - OCTOBER 3, 2025

ELEMENTS

SPRING 2025

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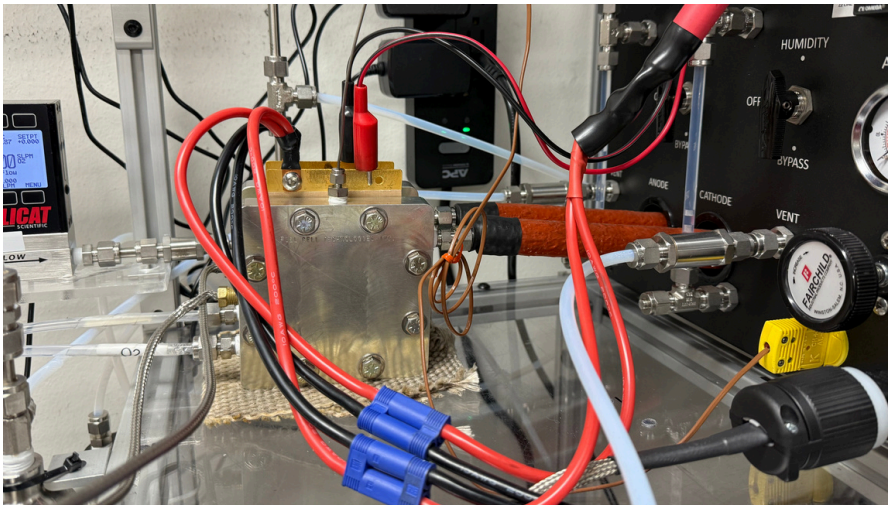
ON THE COVER

Synthesized doped cadmium silicate determining if it fluoresces under UV light, from Suzie Muller's Capstone Project, Spring 2024. Photo courtesy of Suzie Muller. Read more on page 4.

VIRGINIA TECH CHEMISTRY BOOSTS BRIDGE EXPERIENCES

VIRGINIA TECH'S DEPARTMENT OF CHEMISTRY WORKS TO ENSURE ALL STUDENTS GET A CHANCE AT EXPERIENTIAL LEARNING



Fuel cell performance determination via Muller's current internship

2024 graduate Victoria Frank found her Virginia Tech Bridge Experience invaluable, helping her decide what to do with her future.

"I really wanted to do medicine and had a pretty big focus on narcotics because, as an EMT, I've seen tons of overdoses, so I wanted to focus on researching illegal narcotics," said Frank.

It was the responsibilities that Frank was assigned while working in the Department of Homeland Security's indirect narcotics lab that helped hone her focus on her next steps.

"One of the projects they put me on was with standard samples for controlled substances." Frank said. "I tested around 325 controls. They had me ensure the quality of the controls so we could identify the narcotics better."

In her last year, Frank's academic schedule was hectic to say the least. Balancing two majors, a B.S. in clinical neurology and a B.A. in chemistry, and an additional two minors in adaptive brain behavior and psychology, led to a crammed year. However, it was Frank's internship with the Department of Homeland Security and her Bridge Experience as an onsite medical representative at Amazon that prompted her to continue her education. She's now enrolled in Virginia Commonwealth University's Masters in Anatomy and Neurobiology and Premedical Graduate Health Sciences Certification programs.

"Both my internship and job made me want to pursue emergency medicine," said Frank. "Because of them, I saw how chemistry is pulled into my job and research."

In an academic and career environment that is getting increasingly competitive, internships and hands-on experiential learning has become essential, especially for Virginia Tech chemistry undergraduate students. The department has joined Virginia Tech's Bridge Experience program to help students find the experiences that could shape their academic endeavors and their career.

The Bridge Experience program at Virginia Tech is a learning initiative that encourages students to seek out an opportunity such as undergraduate student research, an internship, a co-op, or even shadowing a healthcare professional. These experiences are aimed to connect students' disciplinary knowledge to their career pursuits and help shape their post-graduation plans.

In its second year, the Bridge Experience program led to 77% of students attaining an experiential learning (EL) position. The goal is to have 100% of all incoming students participate in some form of EL. To aid this endeavor, the Department of

Chemistry has initiated the required "Bridge to the Future" course, where students learn how to find EL opportunities, build a resume/CV, and explore different career paths.

Suzie Muller, another 2024 graduate of the Department of Chemistry, found her path to graduate school and research through her summer internship with Ohio State and her undergraduate research experience in Michael Schulz's lab.

During her summer with Ohio State, Muller was given an independent project within their battery research initiative — a unique experience for her. She dedicated a lot more time to research over her summer there, finding it fun to be fully immersed in it.

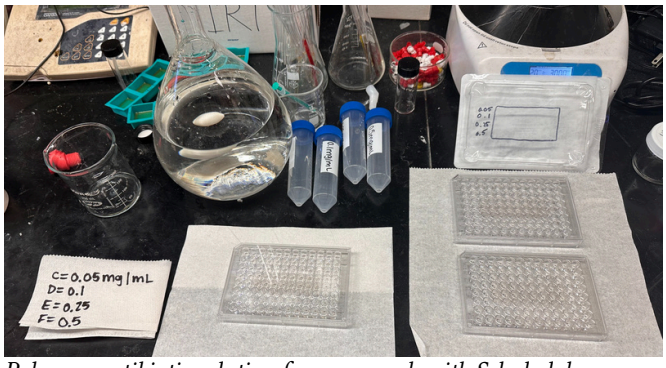
"That was the turning point for me in knowing I wanted to go to grad school and pursue a career in research. Before that, I didn't really know what I wanted to do with my degree," said Muller.

She knew research and a graduate program were the next step, but it was her undergraduate research experience with Schulz, an associate professor in the Department of Chemistry, and an additional internship with Parker Lord in North Carolina that narrowed her interest to polymer chemistry.

At Parker Lord, Muller worked on adhesives for vehicle application, specifically gap fillers that adhere cells in battery packs to aid with thermal management.

"It was a great experience because I was really able to learn about polymers and some of their many applications during the project. That was what solidified my desire to do polymer chemistry in grad school."

In Schulz's lab, Muller worked under our graduate student feature Gillian Kropp, who she views as a critical mentor. It was Kropp's problem-solving work in the Schulz lab's chemofilter project that inspired Muller.



Polymer-antibiotic solution from research with Schulz lab.


Cycling of coin cell batteries from research at Ohio State. Courtesy of Suzie Muller

"Gillian was one of the first people to show me all of chemistry's real-world applications," said Muller.

Muller cites that everyday, when she left the lab, Kropp thanked her for the work she did. "It made me feel like I was doing something meaningful — that I was contributing to something that could make the world a better place. It was little things like that that pushed me towards research."

To continue to pursue research, Muller committed to the University of North Carolina at Chapel Hill this past spring, where she will be starting a Ph.D. program in chemistry.

Both Muller and Frank agree that their EL experience taught them so much about their respective disciplines — a lot of which they wouldn't have gotten in a traditional classroom and lab environment. They found their callings, their futures, and gained both hard and soft skills that would have been hard to acquire without their EL experiences.

It's stories like Muller's and Frank's that serve as a reminder of how critical these experiences are to the undergraduates within Virginia Tech Chemistry.

It's funds from gifts that propel these undergraduate research experiences, allowing students to pursue research in labs year-round. The Virginia Tech Chemistry Department remains committed to providing students with these invaluable EL opportunities, and you can play your part by giving at give.vt.edu. Once there, enter the "Chemistry Friend Scholarship" fund when searching for an area to support.

By continuously establishing and expanding this fund, the department ensures that students have access to experiences that will shape their academic and professional journeys.

THE MURALS: CREATING COMMUNITY BY MIXING ART AND SCIENCE

EVERY UNDERGRADUATE CLASS CREATES A MURAL IN THE TUNNEL BETWEEN DAVIDSON HALL AND HAHN HALL TO SHOWCASE THEIR FOUR YEARS

As the Class of 2024 was deciding on what the topic of their graduating mural would be, the theme of a historical painting was thrown out. The brainstorming group quickly came up with the idea to recreate the painting *The Death of Socrates*. Camille Bridgewater, who would be leading the painting of the mural, took this as a challenge, and decided to dive in.

Something was missing, though — the tie-in to their class. How would the Class of 2024 chemistry majors be represented? Bridgewater couldn't just paint *The Death of Socrates*, so the brainstorming group sent out a form to members of their class to submit their memorable quotes and funny stories from the past four years.

It was a success, and Bridgewater was flooded with good ideas for their mural. She took the easiest suggestions to picture and paint and created a collage of memories.

"It was so much fun to just reminisce on all of the different memories that came together," said Bridgewater.

There are countless stories represented in the Class of 2024 mural, such as a depiction of a screaming gummy bear on fire; to remember the time when Professor Daniel Crawford performed the screaming gummy bear experiment for the chemistry majors, but the ring stand caught on fire. There's also a moped painted in the mural, to forever remember Professor Paul Deck's preferred mode of transportation. The class also chose some quotes like "I don't know, you're the chemist," and "the more French you say Grignard, the more correct."

The most notable parts of the mural are the deeper meanings behind the figures from the original inspiration. Bridgewater wanted to represent the process of moving on and leaving Virginia Tech Chemistry. She did this by replacing the deadly cup of hemlock poison in the original painting with a diploma, symbolizing the professors releasing their students

Ann Marie May putting her handprint on the Class of 2019 mural. Photo courtesy of Ann Marie May.

to the world. Then, Socrates is pointing towards the handprints of the Class members, showcasing the next step of their class's journey in going wherever their path takes them.

"I really wanted to show the evolution of us. We're going off to all different places. We are, in effect, having our last lecture, as depicted in The Death of Socrates. I wanted to bring it full circle — this is where we came from, and this is where we're going," said Bridgewater.

The tunnel connecting Davidson and Hahn Hall is full of murals, all of which represent classes of chemistry majors that are tight-knit, and worked as a unit to find success in their four years of undergraduate studies.

Bridgewater describes how being in many of the same classes with the same people year after year brought the Class of 2024 close together.

"If we all had a homework assignment, we could work on it together, even if we were all struggling. Even though we had our different paths, we would all come together," said

Class of 2024 Mural

Bridgewater. "I don't think that is something that you find a lot of in other departments."

Ann Marie May, who spearheaded the Class of 2019's mural, agreed with a similar sentiment. "You learned who was in your core community, and we just grew together over four years."

May's story with the Class of 2019's mural aligned with the spirit of Bridgewater's 2024 mural in the sense of togetherness that it brought to their respective classes.

"Being the person who really led the project, I felt a big sense of community. Everyone kind of stopped in after class, or whatever breaks they had, and they would come work on pieces of it."

In the 2019 mural, May depicted an atom structure, with each orbital focused on an area of chemistry, to make sure everyone's journey with the chemistry department was represented. Their mural also features little symbols from their four years at Virginia Tech, like a mini Fiji water bottle that was a staple of Professor Nicholas Mayhall's lectures for a period. Most of the mural is made up of symbols, graphs, and structures from their time in their various chemistry classes.

"We brought what we liked and didn't like all together to represent good and bad memories, but memories all the same," said May, reflecting on the process of creating the mural.

The handprints, a key feature on many of the murals, marked a moving on for students. They represent a chance for every undergraduate student to memorialize their time at Virginia Tech.

"At that time, I think putting the handprints on was really impactful for a lot of people. It was their last stamp on the university in a way," said May.

That "last stamp" is something that sticks with students as they leave with the experiences of their undergraduate education. As students move through to what comes next, they take with them lessons learned and a number of invaluable experiences from all of those within the Department of Chemistry.

"The biggest thing is to appreciate that time and also take your experience of collaboration and tight community and try to bring it wherever you go, the best way you can," said May.

The Death of Socrates by Jacques-Louis David

POLYMER CHEMISTRY IN THE OPERATING ROOM

Student in the Schulz Lab

MICHAEL SCHULZ, JOHN MATSON, AND THEIR TEAMS COLLABORATE WITH MEDICAL PROFESSIONALS TO DEVELOP MEDICAL MATERIALS

Back in 2022, Michael Schulz, associate professor of chemistry, and John Matson, professor of chemistry, ended up at a pizza lunch with neurosurgeons from the Department of Neurosurgery, housed in the Virginia Tech Carilion School of Medicine. In this casual setting the pair spontaneously heard about a pressing need for the neurosurgeons.

One of the neurosurgeons mentioned that he performed a lot of back surgeries. During these spinal surgeries, a thin membrane around the spinal cord, called the dura, can sometimes tear. When a tear occurs, it can lead to complications, and the surgeon commented that he needed a specific sealant that could be put over the tear to keep it from leaking.

The problem? There are already several sealants on the market, but none of them worked as surgeons would like them to.

To see the problem in action, Schulz and Matson watched a back surgery where ultimately, the dura tore.

"He finished the suture and said, 'Okay, here's what I want to show you.' He pulled out a two-barrel syringe, and he squirted the epoxy on the area with the tear — it ran everywhere and did nothing," Schulz said, recounting the moment that sparked a new project.

This launched them into the process of developing a small patch that would allow the dural tear to heal, as opposed to the suboptimal sealants already on the market.

If they hadn't collaborated with neurosurgeons, or hadn't gone out to lunch, they would never have known there was a need for a new dural sealant. Upon just looking at the literature, Schulz and Matson would have seen the multiple dural sealants currently on the market, and moved on to find a different problem, assuming that one had already been solved. The project only came with having an actual conversation with surgeons, who would effectively be using this product.

Use-inspired basic research to find the niche

The link between fundamental chemistry and application in medicine is strong. Schulz and Matson partake in what many refer to as use-inspired basic research. They can find their

pocket of discovery by collaborating with medical professionals that would directly benefit from their research and materials development.

The collaboration process for their use-inspired basic research has been an eye-opening experience. “It's like learning a foreign language. Every time we talk to someone outside our discipline the vocabulary changes, and there's a period where we're just trying to learn each other's ways of speaking about things,” said Schulz.

Continuous collaboration keeps moving things forward, highlighting different issues as they come along.

“It's fascinating to learn what their problems are. It provides insight into their lives and what it's like to be the surgeon, trying to fix somebody, and all the different ways that it's difficult — infection being a big one that comes up over and over again,” said Matson.

Schulz and his team are also developing antimicrobial coatings for catheters, and potentially other indwelling hardware, in collaboration with the Infectious Disease Division at the Carilion School of Medicine.

The researchers aim to develop a coating that medical professionals can put on the surface of a urinary catheter to prevent infections, specifically negative biofilm formations, or the slimy bacteria that can build up on these devices.

This medical material is critical because catheterization is a relatively common procedure for hospital patients, many of whom develop catheter-associated urinary tract infections. To treat them, medical professionals have to prescribe aggressive antibiotics and are usually required to remove the catheter. Researchers aim to cut down on those catheter-related complications with this antimicrobial coating.

Student in the Matson Lab

Motivations for materials

As a graduate student, Schulz started working with clinicians and physicians to get their insights for the very beginnings of the scientific process, finding where he could help most.

“I’ve always been attracted to work that has a tangible impact out in society,” said Schulz.

He points to the fact that lots of his funding comes directly from the government, meaning it comes from taxpayers. “I usually like to conceptualize that in my mind as: can I explain to my neighbor why some portion of their taxes is going to pay for this thing that I'm doing? If I can't do that, then it suggests I should go do something else.”

Matson started with a different approach. He has worked on regenerative medicine for a long time, but this is generally at an earlier stage. On the other hand, the medical materials projects gave his group a chance to think a little further down the line, and gave them a chance to apply their regenerative medicine skills to a more finalized, tangible outcome.

Impacts on education

Fitting in with the Department of Chemistry’s educational mission, these projects are excellent training opportunities and allow researchers and students to see how they can make a positive impact in the world through their science. It also gives them the chance to work on interdisciplinary teams, with people that don’t necessarily have the same understanding of chemistry and think in a very different scientific way than themselves. They get practice at communicating their science, preparing them well for the world, where they will engage in various trans-disciplinary projects.

The values of practical application and societal benefit are at the heart of the department’s mission, fostering a culture of innovation that promises to shape the future of medical materials

By working closely with medical professionals, researchers like Schulz and Matson are not only addressing critical needs in healthcare but also providing invaluable training opportunities for students. These experiences prepare the next generation of scientists to make meaningful contributions in both academia and industry, ensuring that the impact of their work extends far beyond the lab.

WEBSTER SANTOS AWARDED THIRD SIMULTANEOUS RO1 GRANT FROM THE NATIONAL INSTITUTES OF HEALTH

Webster Santos, professor of chemistry, is developing a molecule to disrupt the cellular signaling that occurs when a patient has kidney disease. By targeting the transporter responsible for the cellular signaling, a protein called Spns2, Santos and his research team can inhibit this step in the signaling process and fight back against the negative immune response that results in kidney disease.

The potential of this drug could have significant impacts, both on the health of patients and the economic pressure that comes with hospital stays. Santos cites the example of patients going in for cardiac bypass surgery, where they are at a high risk for acute kidney injury and eventually chronic kidney disease. Further, kidney complications could mean longer hospital stays, resulting in more pain and a higher hospital bill.

Santos sees a better future.

"We could pre-treat them with our molecule, because we know the signaling cascade that's going to happen. We can block it before it even happens — go to the source and fix the problem," said Santos, who also directs the Virginia Tech Center for Drug Discovery, which is affiliated with the Fralin Life Sciences Institute.

But the road to actually having a drug ready for real patients is long, filled with hurdles and complications. To see the drug progress, Santos and his group work closely with University of Virginia collaborators Professor Kevin Lynch and Dr. Mark Okuza. Lynch is a widely recognized expert in the field including the S1P transporter, Spns2. Dr. Okusa, who directs the UVA Medical Center's Division of Nephrology, is a key opinion leader in nephrology and a former president of the American Society of Nephrology.

Support from a $2.4 million R01 grant from the National Institutes of Health means that Santos can keep advancing this possible drug. It represents a promising direction towards his ultimate mission of drug discovery.

"This award and this project — it gives us an even better shot on goal. It allows us to validate our ideas, not just in cells, but also in animals, and hopefully, in the future, with people," said Santos, a College of Science Faculty Fellow.

The foundational research on the Spns2 transporter could also illuminate other areas and possibilities for new drugs. It sparks more questions that lead to even more interesting findings. "The more you know, the more there is to study. The challenging part is finding the most meaningful thing — the right target," Santos said.

As Santos and his team advance their research, they are paving the way for new therapeutics that have the potential to change the treatment landscape, for kidney disease and beyond.

GREG LIU PUBLISHES IN NATURE SUTAINABILITY

Going back as far as his undergraduate education, Greg Liu knew the scientific problem he aimed to solve — chemical and plastic pollution. A long research project encompassing five or six years finally led to a breakthrough with Liu and his team of students finding a way to convert certain plastics into soaps, detergents, lubricants, and other products. The article Liu wrote about the process and the feasibility and commercialization of it was recently published in the publication Nature Sustainability.

Liu's system has two steps. First, it uses heat to break down plastic in a process called thermolysis. The plastic is heated in a reactor to 650-750°F, breaking it into oil, gas, and solids. The goal is to break down the plastic molecules (polypropylene and polyethylene) within a specific carbon range, which Liu's team successfully did.

The residual solids left behind from this process are minimal, and the gas from the process could be captured and used as fuel. It is the oil left behind that Liu was able to functionalize and convert into molecules and then into soaps, detergents, lubricants, and other products.

This process has extreme potential, and provides clues to solving the larger plastic pollution problem that threatens our environment. Check out the episode of "Curious Conversations," a Virginia Tech podcast, for more of the full story.

https://shorturl.at/znefZ

NATURE SUSTAINABILITY JOURNAL ARTICLE

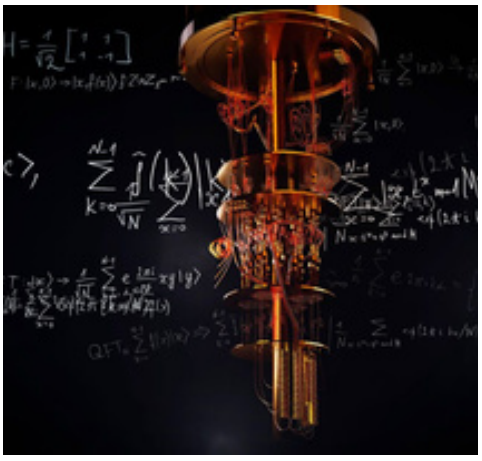
CURIOUS CONVERSATIONS PODCAST EPISODE

https://shorturl.at/0rU8k

NICHOLAS MAYHALL PART OF TEAM TO UNLOCK NEW QUANTUM COMPUTING ALGORITHMS

Quantum computers have yet to outperform today's computers on problem-solving tasks, but a Virginia Tech research team has a plan to bring this next milestone closer: applying an algorithm that can be tailored simultaneously to different types of quantum computers and to specific problems being solved.

This past fall, the Department of Energy awarded the interdisciplinary, multi-university team a five-year $5 million grant to put this plan into action. The team working on these algorithms includes Ed Barnes, a Virginia Tech professor of physics, Physics Professor Sophia Economou, Sumeet Khatri in the Virginia Tech Department of Computer Science, Alexander Kemper from North Carolina State University, and Murphy Niu from the University of California, Santa Barbara.



The team also includes the Department of Chemistry's own Nicholas Mayhall — who is working with the team to improve quantum computer performance by leveraging an approach he's helped pioneer the last few years. The approach consists of improving algorithms for near-term quantum applications. And while quantum computing is a technological advancement, it's still in early days, and shows increasing promise that will hopefully be unlocked by this team of scientists.

CHEMISTRY CLUB TAKES 2ND PLACE IN ACS COMPETITION

This past December, Virginia Tech's Chemistry Club, an affiliate of the American Chemical Society (ACS), took second place in a competition to grow their member count. The competition successfully encouraged local groups and chapters to strengthen their chemistry community by awarding cash prizes and discounting memberships for the duration of the competition.

The ACS challenged all student groups to have the highest growth percentage among chapters and groups from across the country. In taking second place, the Chemistry Club won $1,500 to fund their group.

After going inactive last year, the Chemistry Club re-activated their affiliation with ACS, making them eligible once more for the competition. Virginia Tech's Chemistry Club successfully recruited impressive numbers, growing their ACS membership count within the group by roughly 30 students during Fall Semester 2024. The majority of these new students came from the incoming freshman class.

HARRY DORN RETIRES

Professor Emeritus Harry Dorn joined the Virginia Tech faculty in 1974 after completing his Ph.D. in chemistry at the University of California, Davis. Over the decades, he has taken on many different roles, including professor of radiology at Virginia Tech Carilion School of Medicine and professor at the Virginia Tech Carilion Research Institute, now known as the Fralin Biomedical Research Institute. He was recently honored with emeritus status for his long career and dedication to the Virginia Tech Department of Chemistry.

Dorn's impact extends far beyond his teaching roles. Dorn has made significant contributions to the fields of nuclear magnetic resonance spectroscopy (NMR) research and carbon nanoscience.

A pivotal moment in Dorn's career came during a sabbatical at IBM's Almaden Research Center in the early 1990s. Originally there for NMR research, Dorn was persuaded to explore fullerenes — a form of carbon discovered 5 years earlier. This shift led to influential research on the synthesis, separation, and functionalization of fullerenes, culminating in seminal papers on the bond lengths and solid-state dynamics of C60, a soccer-ball-shaped molecule.

As Dorn enters retirement, he plans on spending more time with his seven grandchildren and continuing to publish papers. Reflecting on his 50 years at Virginia Tech, Dorn emphasizes the most important value he's upheld: "Maintain integrity," Dorn said.

On this foundation of integrity, he hopes his colleagues and future scientists will continue to aim high with their research and achievements. Dorn's legacy will be his unwavering commitment to scientific excellence, and although he is stepping away from his official duties, his passion for science will always remain undiminished.

MAGGIE BUMP RETIRES

After being a member of the Virginia Tech community for more than 23 years, Professor Emerita Maggie Bump has retired, now joining the community in a different light. She has been honored with emerita status for her impressive work as a faculty member with Virginia Tech chemistry. She has demonstrated a commitment to the Virginia Tech Principles of Community in her work with students and colleagues through advising the Chemistry Club, a student affiliate of the American Chemical Society.

Bump has served as a section editor on the editorial board for the journal Poultry Science and on numerous grant review panels, including those for the National Institutes of Health, the U.S. Department of Agriculture, and the Binational Agriculture and Research Development Fund.

Bump has received many professional honors and awards, including the Certificate of Teaching Excellence, the Housing and Residence Life Favorite Faculty Award, Jimmy W. Viers Teaching Award, Virginia Blue Ridge Section of the American Chemical Society, and College of Science Awards for Outreach.

Throughout her career, Bump authored or co-authored educational materials for K-12 and undergraduates in science, and organic, polymer, and green chemistries. In addition, she developed and directed the Youth Experiencing Science Summer Camp and the take-home activity kits to reach underprivileged youth.

All of Bump's work within the Virginia Tech community will be her lasting legacy, and even though she's retired, she remains an essential part of Virginia Tech chemistry.

JIM TANKO RETIRES

Professor Emeritus Jim Tanko recently retired from the Department of Chemistry after 39 years of service to the department, which included being department chair from 2010 to 2018.

Tanko came to the university as an assistant professor in 1986 and was promoted to full professor in 1998.

Tanko also led a successful lab group, specializing in kinetics and mechanism, electron transfer reaction, the structure and chemistry of free radical and radical ions, radical ion rearrangements, and oxygen-centered radicals. He has authored dozens of journal articles, and has been an invited presenter at professional lectures and conferences around the world.

Over the years, Tanko has served on numerous educational and administrative committees in the department and has been honored with numerous awards, including the Faculty Teaching Award in May of 2004 and the Alan F. Clifford Faculty Service Award, also in May of 2004. He also served as the chair of the Gordon Research Conference on Radicals and Radical Ions in Chemistry and Biology, an international forum for scientists to discuss frontier research in the field and foster community among researchers.

FELICIA ETZKORN RETIRES

Professor Emerita Felicia Etzkorn retired this past year after over 23 years with the Virginia Tech community. Etzkorn's research focused on understanding the molecular mechanisms of cell division and collagen protein folding and stability. Her work was funded by both the National Institutes for Health and the National Science Foundation.

Etzkorn has published more than 116 papers, abstracts, and reviews and served as an advisor for Virginia Tech Post-baccalaureate Research and Education Program (VT-PREP). Etzkorn has also served on numerous grant review committees for the National Institutes of Health and National Science Foundation and has reviewed proposals for other agencies as well as reviewed manuscripts for high-impact journals.

Etzkorn also made her impact on the broader chemistry community through the publication of her textbook by the Royal Society of Chemistry in 2020 titled "Green Chemistry: Principles and Case Studies." Etzkorn has been an active member of the international green chemistry movement, participating in meetings of the Beyond Benign Green Chemistry Teaching and Learning Community.

Etzkorn taught both undergraduate and graduate courses in organic and green chemistry, creating a lasting legacy in both the classroom and beyond.

JOSEPH MEROLA RETIRES

Professor Joseph Merola came to the Virginia Tech Department of Chemistry in 1987 after an impactful nine years at the research laboratories at Exxon Research and Engineering Company. At this time, he was looking for ways that would allow him to continue his chemical research, but would also allow him to teach young minds — thus becoming a faculty member at Virginia Tech.

He's made a heavy impact in the department and beyond, effectively communicating chemistry and current science to broad audiences. He's appeared in the "Ask the Experts" section for Scientific American and was invited regularly to speak on the AAAS Radio Program "Science Update."

Merola's research work focuses on the study of organometallic chemistry, an area that bridges inorganic and organic disciplines, for diverse applications. His group tries to take advantage of the properties of organometallic systems to study fundamental reaction chemistry, and to design novel catalyst systems.

Merola has received numerous awards and honors, including being awarded the College of Arts and Sciences Certificate of Teaching Excellence multiple times. He also became a fellow of the American Chemical Society in 2019 and is also a fellow for the American Association for the Advancement of Science.

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Meet **Graham Hudson**

Why did you choose chemistry?

Initially, I wanted to be a field surgeon in the army. That was why I went into the premed biology program, but I just did not like it. It wasn't the professor's fault, just the content. But chemistry was what really caught my attention because I like to understand the way things work. Chemistry describes, at almost the lowest level, what's going on. I mean, it's just so fascinating to me, and that we can study it, and that there are exceptions to rules, but it makes sense. I love understanding the way our environment works and how we can use it — that's what drew me into chemistry.

Why did you choose to focus on Polymer Chemistry?

I sat down with the advisor that I had in biology and told him I wanted to switch to chemistry. He presented the four areas to me — B.S. in chemistry, B.A. in chemistry, B.S. in medicinal chemistry, and B.S. in polymer chemistry. I thought, *ooh, polymer sounds cool.* It sounded challenging, and I wanted to do that. I didn't really know what I was getting into when I chose it, but it sounded really cool when he described that it focuses on plastics and materials. I thought it sounded awesome. Then, as I started to get into the more polymer focusing classes, like with Dr. Worch, he does the organic polymer class right now, I really started to love it. Generally, I really like the organic side of things. I didn't like physical chemistry so much. It was hard. Really important — but very challenging. It is kind of a funny story, why I chose polymer. It sounded cool and challenging, so I chose that path. I've really enjoyed it. It was also a bonus because I didn't have to take Physical Chemistry II.

What is your dream job?

Right now, I think my dream job would be in industry, working on material science, which really interests me — we can take something, make something, and actually see where it's going to the customer.

What is next for you?

I want to take at least a year off of school and work — actually get out there, see what's useful, and see what's important in industry. My goal is to get out into industry at a place that wants to build me up and grow my skills, because I have the fundamentals, now I just need the foundational experience.

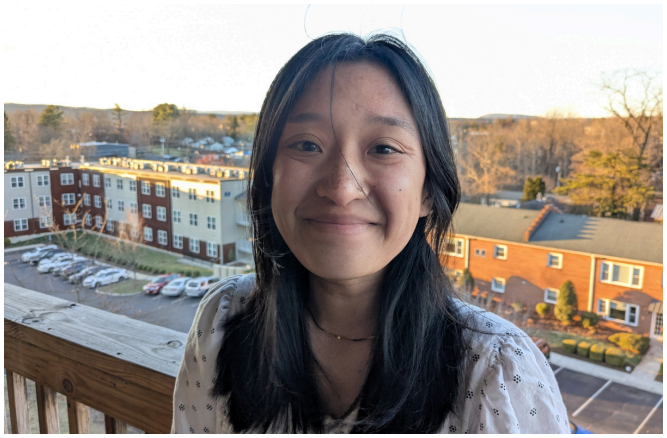
What's the most important lesson you've learned at Virginia Tech?

I've learned through my experience with people here that everyone deserves a baseline respect, no matter if you know them well or not, or know their strong suits and capabilities, because if you're making judgements before you know a person — before you've seen what they're capable of — then you're not doing them justice. If someone were to make a judgement about me and things I'm not good at, they're not going to see things that I am good at, or see the good parts of who I am. You've got to get to know people, especially if you're part of a team or organization together. Building relationships, professional and personal, is the most important thing to the success of any project or organization.

Who is the most impactful person you've met here?

There's a lot of really impactful people — I'm going to shout out a bunch. Back in Organic Chemistry, Dr. Tanko and Dr. Matson gave me a good foundation and built up my interest in those classes. Col. Alia, he's been a mentor, and has taught me how to lead others — he's been so influential in shaping me. Dr. McAlpine was our SynTech professor — he was so awesome and graceful with us. Dr. Worch, for building my foundation in polymers. Then, of course, Dr. Figg and Jared Baker this semester have been so gracious in teaching me.

Meet Gillian Kropp



What is your research project?

A lot of my research is about making medical materials. Right now I'm working on an antibacterial catheter for patients. Being catheterized often leads to infection for hospitalized patients. We're developing this coating that can release antimicrobial agents to prevent the infection. We're hoping we can coat other things such as shunts as well. A lot of my work lays the foundation for how polymers can be used to develop medical devices, but is still pretty far from being used by patients.

Why did you choose chemistry?

I thought it was really fun when I studied chemistry in high school. Then I did research and I found research really really fun and exciting. Even the reactions that you do over and over again, something could always change. It's exciting to see, did you make what you wanted to make? Did everything work? You never really know. It's always changing. It can be different many times over. Sometimes that can be frustrating, but it's also really interesting. It keeps me excited, even when I have to do the same reaction over and over again. There's always something new, it's always changing, and because of that, there's always something to improve. I just think that there's so much potential in innovation.

Why Virginia Tech?

People seemed happy and like they enjoyed being here. I really liked the research and I thought that a lot of schools did really good and interesting research, but everyone here just seemed happy. The students seemed good and like they got along with their professors. A lot of the professors were really easy to talk to when I was visiting — they were super approachable. The department was super welcoming, and then there were ducks and I thought "oh, this is great."

What is the most important lesson you've learned at Virginia Tech?

You can really learn from everybody — like the undergraduates taught me little Excel tips or you can learn from doctors and professors or your peers. I don't think you ever reach a stage where people can't teach you anything else. I think by being open to learning from all of these different perspectives and taking the best advice from everyone around, you can get better and better. That's something that I want to keep remembering at every stage — you should listen to everybody because they all have so much advice.

What is your dream position?

I really want to keep working with medical doctors as a chemist. I would love to do something that continues what I'm doing now. I'm working on a lot of fundamental materials for medical applications, but I would love to work on something that can actually be produced on a global scale and sent off to countries that struggle with accessible health care or affordable healthcare. I would love to make a material or be part of an organization that makes a material for that application. I think it could have the potential to help a lot of people and I want to get as close to that goal as I can.

What is the most crucial global need that your studies could directly impact?

I grew up outside of the U.S. so healthcare wasn't as accessible as it was here, so I'm really interested in making these medical materials accessible because I feel as a chemist, you have a little control over the cost effectiveness, or how easy it is to make your material. Then, if you can make it cost effective and easy to make from the start, when it goes into production, everyone can have it and it'll be more accessible in the long run. I used to think accessibility was just about policies, but sometimes things just cost so much to make. If you, as the chemist, have that in the forefront of your mind, to an extent, you can control things a little bit. How expensive is your material? How complicated is our synthesis? Things like that.

Larry Taylor

May 14, 1945 - November 11, 2024

Beloved Professor Emeritus of Chemistry Larry Taylor passed away November 11 surrounded by family and will be fondly remembered by friends throughout the Virginia Tech community. Taylor was an outstanding leader, well known for his service to the Department of Chemistry and his invaluable research contributions.

Taylor joined the Virginia Tech Department of Chemistry in 1967 and after an impactful 40-year career, he retired as professor emeritus. During his tenure, he served as chair of the Department of Chemistry for five years. He also founded the Department of Chemistry Advisory Council and continued to be a steadfast supporter of the department throughout his life.

During Taylor's time at Virginia Tech, he taught thousands of students and made hundreds of presentations around the world. In 1977, he was recognized for these efforts and became a member of Virginia Tech's Academy of Teaching Excellence when he received the Sporn Award for Excellence in Freshman Teaching.

Throughout his career, Taylor achieved research prominence, with over three hundred publications, published books, and developed patents. He imparted a vast knowledge of analytical chemistry and research support.

"Larry cared deeply for the people who are part of the chemistry department — the staff, faculty, graduate and undergraduate students, and alumni. He is a very special person and will be greatly missed," said Beth Calvey, a founding member of the Department of Chemistry Advisory Council.

A cherished member of the Virginia Tech community, Taylor will be remembered for the indelible impact he had on Virginia Tech through his roles as researcher, professor, and chair.

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