DEPARTMENT of CHEMISTRY & GEOSCIENCES

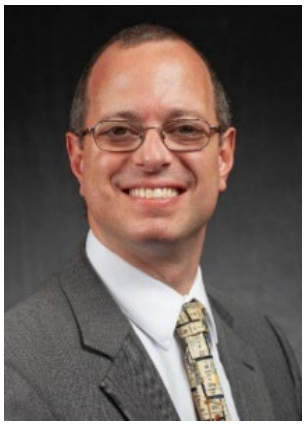
VALDOSTA STATE UNIVERSITY

2023 Chemistry Newsletter

Welcome to the latest VSU Chemistry Newsletter! We have lots of updates to share with you about the outstanding accomplishments of our students, faculty, and graduates. Thank you for reading!

In this issue:

From the Department Head's Desk



Greetings, Blazers! I hope that you and your family are enjoying a relaxing fall. We are crossing our fingers that cooler weather is here to stay in South Georgia. Regardless of the time of year, it's always a good time to read about our Department's activities related to teaching, research, and service. But first, we have several BIG announcements.

Dr. Jim Baxter - VSU Chemistry alumnus, Professor, Department Head, and now Professor Emeritus - has generously donated the first $25,000 for the newly established Jim and Judy Baxter Chemistry Student Scholarship Endowment. All funds from this endowment will provide scholarships to one or more VSU Chemistry majors, as chosen by the Chemistry faculty.

Even better: Dr. Baxter has also pledged to match donations to this endowment, up to an additional $10,000. That means that your donation is doubled in value so you can provide twice the help to our current and future students.

This year, we were fortunate to begin spending funds from the Martha F. Robertson Chemistry Endowment, initially established in 2019 by the Robertson family in memory of Martha Barrs Jones Robertson, a VSU Chemistry alumna. She had a successful career with Nehi (now Crown Royal) and Coca-Cola. At a time when budgets are tightening at VSU, this endowment enables us to support research conducted by our faculty and students, purchase cutting edge instruments for our teaching labs, and provide scholarships for deserving students.

Do not get the impression that there is nothing left for you to do. We can all do more to help our students. Flip to the last page of this newsletter to find out how you can donate. Each donation makes a difference in our students' lives. When faculty in other departments ask me how we pay for student travel, scholarships, or new lab equipment, I love to tell them, "Our alumni donated the money for this, because they are the best alumni in the world."

Please stay in touch with us using the links below. VSU Chemistry alumni have their own private Facebook page. Email me so that we can add you to that group. Send us a note about what you're up to and your recent accomplishments. We always love to hear from you. If you are ever near Valdosta, it would be my pleasure to treat you to lunch and chat about your time at VSU.

Best wishes and Go Blazers!

Kurt Winkelmann,

Professor and Department Head

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Recent Department News

Our Department had another great year! Here are some of our faculty and students' most notable accomplishments.

New Course in Forensic Chemistry

We are now offering a course in Forensic Chemistry. Students asked to learn more about forensics and it's one of their most common career aspirations. Dr. Linda de la Garza developed this course with both lecture and lab activities. Her students enjoyed the class and I expect that we'll be teaching it frequently in the coming years.

Alumni Events

We held our first alumni event in recent years in March. We received a tour of Georgia Beer Company's fermentation facility. It fascinates me how knowledge of chemistry, biology, and business combine to make a successful brewery. We plan to host more local alumni events this fall. Be on the lookout for our announcements and I hope you can come out to join us.

Industry Partners

Our Department continues to build stronger relationships with industry. During the past year, we hosted visits by several companies including SAFT Batteries, CJB Industries, and ERCO Worldwide. These meetings have direct benefits for our students. For instance, we now have a student interning at SAFT Batteries. Chemists from Ryam and ERCO Worldwide talked to our students about working in industry.

Companies are now seeking out our faculty for research collaborations and instrument training. Dr. Yakov Woldman recently led a training session about high-performance liquid chromatography (HPLC) for CJB Industries, a chemical company. We are now planning future instrument training sessions so **if you think your organization could benefit by working with us, please contact me.**

Award-Winning Students

After a brief hiatus, the Southwest Georgia ACS (SOWGA) chapter and Optima Chemical are honoring Chemistry students for their academic excellence. This year, Carleton Francis received the SOWEGA Optima Chemical award at the annual award luncheon, sponsored by Optima Chemical. Pictured on the next page, from left to right: Dr. John Barbas (VSU Professor Emeritus), Carleton Francis, Dr. Barbara Tsuie (R & D Manager at Optima Chemical), and Dr. Shipra Gupta (VSU Assistant professor and 2023 SOWEGA Chair).

Airionna Fordham (’25, pictured below, right) won Best Poster in STEM Overall Award in the 2023 Symposium on Undergraduate Research. Dr. Linda de la Garza (left) mentored Airionna’s research project “Effect of the Mobile Phase in the Analysis of Anti-Arrhythmic Drugs Using High-Performance Liquid Chromatography.”

Airionna also earned the prestigious ACS Scholar award, given to Chemistry students based on their academic record, career goals, and participation in research and community service. Airionna is a sophomore Chemistry major with an interest in natural products chemistry. Her career goal is to start a skincare company after earning her VSU Chemistry degree.

Chemistry Summer Camp

Local high school students had fun while learning chemistry at our first annual Chemistry Summer Camp. Drs. Duncan, Gupta, Salami, Winkelmann, and Woldman led different activities each day. Campers made magnetic slime with nanoparticles, used forensics to solve a mystery, powered a hydrogen-fueled motor, performed an oscillating reaction, and extracted caffeine from tea and coffee.

Campers got a taste of college life each day by dining on campus for lunch and they met with faculty to learn more about VSU. Scholarships from the American Chemical Society allowed most campers to attend for free.

If you live in the Valdosta area, look for more science camps next summer!

What is it like to discover a new element?

Last fall, Chemistry students and faculty had the honor to meet Clarice Phelps, a nuclear chemist at Oak Ridge National Laboratory and one of the scientists who collected isotopes of Element 117, later named Tennessine (Ts). It is very unstable and the second-heaviest known element. It is a member of the halogen family with an atomic mass of 294 g/mol. Ms. Phelps talked to our students about her educational and career journey and the research that she performs at Oak Ridge.

Mentoring Lunch Participant Invitation

Ms. Phelps' visit was part of our annual Mentoring Luncheon. This event provides an informal setting for students to learn about post-graduate and career options from members of the chemical industry and research communities.

We invite our alumni to represent their organization by participating in next year's Mentoring Luncheon. This is a great opportunity to visit campus, reconnect with your favorite faculty, and meet our aspiring chemists. Our students are enthusiastic about meeting you and learning more about careers in chemistry.

Please contact Dr. Kurt Winkelmann if you can donate your time to helping our students (kwinkelmann@valodsta.edu).

Meet an Outstanding Alum

To celebrate his recent retirement and his new scholarship endowment, this year we will highlight somebody you all know - Dr. Jim Baxter. First, a career summary, then you'll read the reflections of Chemistry faculty who admire him.

Dr. James Baxter, Professor Emeritus and retired Chair of VSU's Chemistry Department, dedicated an impressive 47 years to his alma mater. He witnessed and contributed to its growth and transformation. With unwavering dedication and a genuine love for teaching, Dr. Baxter has become an influential figure at VSU, leaving an indelible mark on both the university and its students.

Having graduated from Valdosta State College in 1966 with a Bachelor of Science degree in Chemistry, Dr. Baxter pursued his master's and doctorate degrees at the Georgia Tech. As a graduate student, Dr. Baxter was initially drawn to a career as an industrial chemist. Soon he discovered his true passion for teaching during his time as a teaching assistant. The joy of imparting knowledge and guiding students on their educational journey led him to embrace a career in academia.

After briefly teaching high school chemistry, Dr. Baxter began teaching at VSU in the 1971-1972 school year. This position was supposed to be only temporary but, recognizing his exceptional teaching abilities, he was appointed as a permanent professor in 1973 and he assumed the role of Department Head of chemistry in 2002.

Throughout the years, Dr. Baxter witnessed significant changes within the university, including new buildings, a dramatic increase in the use of technology for teaching, and more students participating in faculty-led research.

As an esteemed Professor and Department Head, Dr. Baxter's influence extended beyond the classroom. Colleagues and students alike looked up to him for his leadership and dedication. Part of his enduring legacy is the construction of the Bailey Science Center in 2000 and its expansion a few years later. Even more well-known is the encouragement and support that he gave to all the Chemistry faculty and students in his classes. Colleagues and students hold him in high regard, praising his exceptional leadership skills and friendly nature.

Dr. Baxter decided to retire from full-time teaching at the end of the 2019-2020 school year. He expressed a mixture of nostalgia and acceptance, acknowledging that nothing can last forever while expressing the joy and fulfillment teaching has brought him.

Throughout his time at Valdosta State, Dr. James Baxter embraced the university as a wonderful place to work. Witnessing the growth and development of the institution, he

has played a vital role in advancing the Chemistry Department and nurturing several generations of nurses, doctors, pharmacists, and scientists. With his unwavering dedication, passion for teaching, and commitment to student success, Dr. Baxter's contributions have left an indelible legacy within the VSU community.

Dr. Baxter continues to support Chemistry students through the Jim and Judy Baxter Undergraduate Chemistry Scholarship. Earnings from the investment of this endowment principal will fund an annual scholarship for one or more deserving Chemistry majors, starting in 2025. You can join Dr. Baxter in supporting our future students by donating to this scholarship. Dr. and Mrs. Baxter have pledged to match all donations up to $10,000.

Reflections by Dr. John Barbas

Jim Baxter had as his focus the best possible education for Chemistry majors. He was in contact with the medical schools, graduate schools, professional schools, and area industry and high schools. Many of our majors were interested in medical school. He attended the annual meetings for premed advisors at the Medical College of Georgia in Augusta. Upon his return he advised students how to prepare, how to improve their grades, how to study for the pre-med exams, and when to apply. He was instrumental in a high rate of acceptance of our majors in medical school. Many of our area doctors and dentists had their early training at VSU.

He did the same for students who preferred graduate school and pharmacy school. As a result, we have many pharmacists in our area who studied in our department. Similarly, we have graduates who received doctoral degrees at prestigious universities all over the United States.

Jim always encouraged the faculty and our students to attend professional meetings. We went to every meeting of the Georgia Academy of Science, the SOWEGA meetings, and many national meetings of the American Chemical Society. He encouraged students to do research and to present their results at these meetings. He was the driver, most of the time, and he paid for the meals of students.

He was one of the ACS members who initiated the founding of the SOWEGA section of the American Chemical Society. He served as secretary and president several times, and organized monthly meetings. He rotated the meetings among the towns of our area to keep the section vibrant. He encouraged faculty and students to attend the local meetings as well as the regional and national meetings. We had faculty and students who presented papers regularly at these professional meetings.

When Dr. Baxter came to VSU, we had only an IR and a 60 MHz NMR. He encouraged the faculty to apply for grants to obtain state of the art equipment. As a result, we currently have sophisticated research and teaching instruments. He and other faculty contributed to the ultimate design of the classrooms, labs, stockroom, and offices in the Bailey Science Center.

Dr. Baxter worked tirelessly to improve the department, our students, and the faculty. He was the ultimate cheerleader.

Reflections by Dr. Ligia Focsan

In life and in your career, for things to go well, it is important to come across good people. I was extremely lucky to have met along the way people like Dr. Baxter, who after I was hired at VSU, became my second boss in my career. Except that he was not bossy at all. On the contrary, he was kind and would do everything for his faculty and students. And when I say everything, I really mean it. He has certainly done it for me.

He would say that he always trusted us, the faculty in the Chemistry department, that we did our work. Indeed, earning his respect was enough for us to perform. He cared deeply about his faculty and students, and they reciprocated that. He would always advocate for the students even in what I would think of lost causes, and from him I learned to better understand my students. If I learned anything from him, is that I should be more kind with all people. He once told me that we faculty are all in different stages in our life and yet we still try hard to do our best. I also understood that together we can get anything done, and that we are at the service of our students.

Reflections by Dr. Linda de la Garza

I appreciate the support that Dr. Baxter always gave me being involved with the outreach efforts of the American Chemical Society and as SMACS Advisor. I also appreciate the easiness with which he handled every situation that might have come up because that helped me focus on my teaching and our students. On the personal side, I appreciate that he understood that I was starting my teaching career with a young family, and we always felt included as part of the department.

Reflections by Dr. Kurt Winkelmann

Like any workplace, a university includes many people with a wide range of viewpoints and attitudes. With that in mind, it is notable when everybody has the same opinion about a person. After three years at VSU, I can say that every single person I've met has praised Jim Baxter's dedication to VSU, his ability to get things done in a sometimes difficult university bureaucracy, and his genuine caring attitude towards students and colleagues. The guidance and support that Jim Baxter provided impacts students and faculty for many years. That's also true about his chemical research - his 40 year old publications are still being cited by researchers. Dr. Jim Baxter is a role model for faculty and Department Heads, including me.

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We look forward to sharing with you more stories about our graduates making a positive difference in science and their community. Please nominate an alum (including yourself) who deserves some recognition.

Student Award Winners

Join us in congratulating our 2022-2023 Chemistry Student Award winners. Chemistry faculty select each award recipient. It is always a difficult choice due to the strong competition. The College of Science and Mathematics held its awards ceremony on April 18 in the Bailey Science Center auditorium and broadcast on Facebook so that family and friends could participate.

Pictured, from left to right: Carlton Francis, Dr. Kurt Winkelmann, Thomas Mancil, Kaylee O'Quinn, Jason Phillips, Katie Copenhaver, and Michael Rice

We are grateful to the family of Dr. M. Elizabeth Derrick and all of our VSU Chemistry donors for their generous financial support of our students. Winners of this year's chemistry discipline awards demonstrate excellence in specific courses and fields of research. The winners are:

Polymer Chemistry in Organic Chemistry Award	**Michael Rice**
Undergraduate Award in Analytical Chemistry	**Jason Phillips**
Undergraduate Award in Inorganic Chemistry	**Danielle Sauls**
Undergraduate Award in Biochemistry	**Larra Williams**
Undergraduate Award in Physical Chemistry	**Yeong Hun Jeong**

The Chemistry Department recognizes many aspects of student excellence, including research, service to the Department, and overall academic performance. The winners of this year's awards are:

American Institute of Chemists Award **Thomas Mancil**

Awarded to a student showing exceptional promise as a chemist.

Outstanding Chemistry Senior Award **Thomas Mancil**

Given to a senior demonstrating overall excellent academic performance.

Outstanding Freshman Chemistry Award **Katie Copenhaver**

Given for achievement in first-year Chemistry courses.

Southwest Georgia ACS Optima Chemical Award **Carlton Francis**

Recognizes outstanding service to the Chemistry Department and SMACS.

Chemistry Undergraduate Research Award **Princess Wynn** and **Karli Icard**

Awarded to a student showing superior skill as a chemical researcher.

Dr. M. Elizabeth (Betty) Derrick Award **Kaylee O'Quinn**

Provides a scholarship to an outstanding female student majoring in Chemistry.

We asked each awardee to tell us their future plans, favorite VSU class, and their extracurricular activities. Here are their responses.

Michael Rice, Polymer Chemistry in Organic Chemistry Award

Michael will start the Doctor of Pharmacy program at Campbell University in North Carolina in Fall 2023. His favorite classes were Organic Chemistry I & II with Drs. Gupta & Sreenilayam. He is a coffee lover so he especially enjoyed the experiment for extraction of caffeine.

Danielle Sauls, Undergraduate Award in Inorganic Chemistry

Danielle is double majoring in Chemistry and Biology. She serves as President of the student chapter of the American Chemical Society (SMACS), she is a peer mentor with the college's GUIDES program, and she tutors at the Academic Support Center, and.

Larra Williams, Undergraduate Award in Biochemistry

Larra plans to gain lab experience in a medical diagnostic lab. Her favorite class was Biochemistry Lab taught by Dr. Gosnell. Her favorite part of Chemistry is chromatographic techniques.

Jason Phillips, Undergraduate Award in Analytical Chemistry

Jason is seeking an environmentally sustainable job and will pursue a Chemistry PhD later. He especially enjoyed Inorganic Chemistry and Quantitative Analysis and working with Dr. Linda de la Garza. The most exciting thing about Chemistry is being able to create new and interesting things.

Yeong Hun Jeong, Undergraduate Award in Physical Chemistry)

Yeong graduated in December 2023 and returned to South Korea to work at the Korea Hydro & Nuclear Power Company. He thanks Drs. Sreenilayam and de la Garza for everything that he learned in their classes.

Thomas Mancil, American Institute of Chemists Award and the Outstanding Chemistry Senior Award

Thomas plans to earn a Master's degree in Biology then pursue a PhD in Chemistry. He enjoyed his Inorganic Chemistry course because the lab experiments were a lot of fun. His favorite faculty are Dr. Gosnell and Dr. Sreenilayam. Thomas enjoys learning about new chemical reactions, especially those that involve reactions of medications in our bodies.

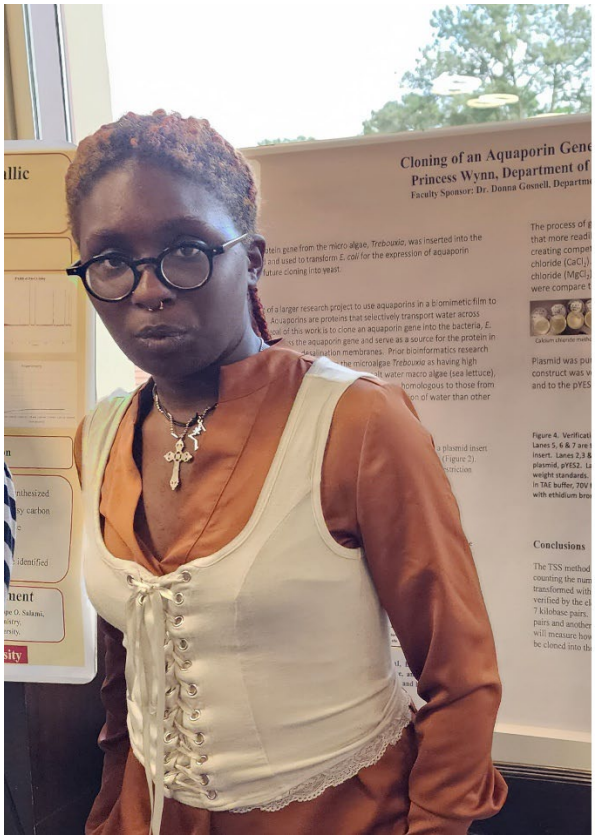
Katie Copenhaver, Outstanding Freshman Chemistry Award

Katie plans to earn a Doctorate in Pharmacy (PharmD) and work as a pharmacist. Her favorite class is Dr. Gupta's Organic Chemistry. Katie enjoys learning about chemistry within our bodies.

Carlton Francis, Southwest Georgia ACS Optima Chemistry Award

Carlton plans to earn a Master's degree in Chemistry then begin a career in forensics. His favorite class was Quantitative Analysis with Dr. de la Garza because writing the lab reports helped him improve his writing and the experiments were fun. He is impressed that chemistry can explain so many different phenomena, especially for identifying samples in forensic analysis.

Princess Wynn Chemistry Undergraduate Research Award



Princess is a member of Dr. Donna Gosnell's research group. Princess will pursue a graduate degree in biochemistry, work for a biotech company, and eventually teach chemistry. She enjoyed Dr. Manning's General Chemistry II class the most. She enjoys chemistry because a molecule's different functional groups can explain so much about a material.

Karli Icard, Chemistry Undergraduate Research Award

Karli is a member of Dr. Tolu Salami's research group. She will attend medical school to specialize in Radiology. Her favorite professor is Dr. Salami. She is fascinated by the way that Chemistry works and fits in ways that make people unique.

Congratulations to our outstanding 2022-2023 student award winners!

Kaylee O'Quinn, Dr. M. Elizabeth (Betty) Derrick Award

Kaylee plans to attend dental school after graduation. She enjoyed Dr. Sreenilayam's Organic Chemistry 2 class the most because of all the extra help that he provides for his students. Kaylee loves being in the lab. Such small atoms and molecules that we cannot even see react with each other based on specific rules. She says that Chemistry is a good field for curious minds and that is why she enjoys it.

Chemistry Faculty Updates

Chemistry faculty engage in teaching, scholarship, and service to VSU, their profession, and the Valdosta community. We want to share with you our latest accomplishments.

Dr. Linda de la Garza

Dr. Linda de la Garza, Valdosta State University Associate Professor of Chemistry, received her doctorate in Chemistry from Arizona State University in Tempe, AZ. She worked as a post-doctoral appointee at Argonne National Laboratory, located in the Southwest Chicago suburbs.

Dr. de la Garza is the co-principal investigator of the Southwestern Georgia STEM Pathways Louis Stokes Alliance for Minority Participation (LSAMP) program sponsored by the National Science Foundation. During 2022-2023, the program served eight students in the

College of Science and Mathematics, including two Chemistry majors and two students pursuing Chemistry minors. The LSAMP group at VSU attended the 2023 Conference of the Louis Stokes Regional Center of Excellence in October 2022 (Chicago, IL) and the Alliance Summit in February 2023 (Columbus, GA) to present their research. During 2022-2023, Dr. de la Garza's own research students presented five posters at local and regional meetings on their work on the methods of water and drug analysis.

Dr. de la Garza and SMACS students hosted a mentoring luncheon for chemistry majors in September 2022 with guest speaker Clarice Phelps. The event was sponsored by the American Chemical Society Southwest Georgia Local Section and attended by students and faculty from VSU, Columbus State University, Abraham Balwin Agricultural College, and Georgia Southwestern University. Dr. de la Garza was awarded the 2023 Outreach Volunteer of the Year Award by the American Chemical Society, nominated by the Southwest Georgia Local Section (SOWEGA), because of her dedication towards performing chemistry demonstrations, organizing visiting speakers, and setting up hands-on activities for local K-12 students.

In the Spring of 2023, Dr. De la Garza offered a new course on Forensic Chemistry with laboratory activities, and the students attended a tour of the Regional Crime Laboratory in Valdosta.

Dr. de la Garza is a Governor's Teaching Fellow (2021-2022), a VSU Leadership Academy Scholar (2019-2020), past President (2019-2020) of MESA, a faculty and staff group focused on Hispanic/Latinx students at VSU, and is currently serving as SMACS advisor, and SOWEGA Councilor (2021-2023).

Dr. Dean Duncan

Dr. Dean Duncan teaches first-year Chemistry courses for science majors and the General, Organic, and Biochemistry (GOB) courses for Allied Health Science majors. In consultation with the VSU Nursing program, he and Dr. Winkelmann are restructuring the GOB courses to better serve the needs of these students.

Dr. Duncan's research addresses fundamental questions on chemical bonding, reactivity, and dynamics in molecular metal-oxides and supra-molecular assemblies.

Dr. Ligia Focsan

Three undergraduate students, Maria V. Alvarez, Lizette Rubio, and David B. Vasquez, presented posters and talks on extraction of carotenoids using green solvents at the VSU Undergraduate Research Symposium and the Georgia Undergraduate Research Conference. We collaborate with Dr. Sreenilayam who has great expertise in organic chemistry and extraction methods with green solvents prepared in his lab.

In November 2022, I attended the Southeastern Magnetic Resonance Conference (SEMRC) in Tallahassee, where I presented a poster on high field measurements taken at National High Magnetic Field Lab that are described in my forthcoming book “Chemistry of Carotenoid Radicals and Complexes.” I wrote this book during my Fall 2022 sabbatical. It will be published soon.

In June, I coauthored a review “The Endless World of Carotenoids — Structural, Chemical and Biological Aspects of Some Rare Carotenoids” in the International Journal of Molecular Sciences. My coauthors are N. E. Polyakov (Institute of Chemical Kinetics and Combustion, Novosibirsk, Russia), Y. Gao (Nanjing Agricultural University, Nanjing, China), and L. D. Kispert (University of Alabama). The Scholarly Community Encyclopedia featured part of this review in their entry "Electron transfer and Proton Loss of Conventional Carotenoids.”

In July I attended the 19th International Symposium on Carotenoids in Toyama, Japan where I presented two of my collaborators’ posters based on the review above, and I gave a talk to describe the chemistry of carotenoid radicals and complexes that we learned about in the past 30 years, all compiled in my upcoming book.

Dr. Donna Gosnell

I've had the pleasure of working with some great undergraduates this year and am pleased to again be a mentor for a student in the Louis Stokes Alliances for Minority Participation (LSAMP) program. The overall goal of the LSAMP program is to increase the number of degrees awarded to populations historically underrepresented in STEM fields. I am personally very committed to this goal and am on my third mentoring relationship through LSAMP. I have continued my research on aquaporin proteins and in the summer of 2022 a student and I were successful in cloning an algal aquaporin gene into E. coli. We are in the process of cloning into yeast and are hopeful one of these systems will produce enough aquaporin to begin designing biomimetic membranes for the desalination of water. In my teaching, I have had some new challenges including teaching Pchem I lab for the first time ever and Biochemistry 2, which I haven't taught since 2012. One thing I love about my job at VSU is that there is always something new to do and learn. The students always help me to be as dedicated to teaching as ever.

Dr. Shipra Gupta

I am excited to successfully finish my second year here at VSU. I have been fortunate to have many positive experiences in the department in my initial two years. As per the opinions shared by many students, I am happy to report that I am bringing a gradual change to the image of "dreaded" organic chemistry to "rewarding and fun." I was selected to attend the ACS New Faculty Workshop in November 2022 which equipped me with many resources and information needed to start off stronger as a new faculty.

I attended ACS Leadership Institute in January 2023 in order to prepare to serve as the Chair for SOWEGA, the local ACS Chapter. Starting this year, we revived the ACS Speaker series to include speakers from various fields of chemistry. This kind of event is a great opportunity for our undergraduates to make new connections and seek graduate school and job opportunities and for faculty members to forge new collaborations. As a result of our first seminar of the series by Dr. Caroline F. Liu (FSU), our undergraduates will be visiting FSU under the guidance of Dr. de

la Garza and will have an opportunity to become a graduate student at FSU. As SOWEGA chair, I also co-organized the ACS Student Awards Ceremony with Optima Chemicals to celebrate the outstanding chemistry students in South Georgia. To promote chemistry as a basic sciences subject, we also organized the ACS National Illustrated Poem Contest for local elementary, middle, and high school students.

I am honored to be selected as a Governor's Teaching Fellow to represent VSU at week-long GTF Summer 2023 Symposium held at UGA. I will learn various strategies and techniques to improve my course delivery. I plan to use many of these strategies in my course in the coming semester to enhance the learning experience of my students and make Organic Chemistry more enjoyable and less daunting.

Two of my very brilliant students, Hope Smith and Lanier Baker, presented posters about our two research projects in April at VSU Undergraduate Research Symposium. I am also excited to have received a Blazer Summer Research Institute grant. I attended the BSRI Faculty Workshop where I learned how to enhance students' summer research experience. We are excited that we are able to make progress despite some unexpected research challenges. Lanier Baker will present this research at the BRSI Commencement and the Georgia Undergraduate Research Symposium in Fall 2023.

During this summer, I was a part of the highly successful Chemistry Summer Camp. I loved interacting with the students and feedback from students showed that they loved the science and the interaction as well. I was amazed how impressionable the younger minds are and how much potential we as faculty hold to make a true difference in many aspects of science education through them. I hope to continue availing myself of such meaningful opportunities in future.

Dr. Tom Manning

Hello alumni! We had a book chapter published by Springer Nature on our inhalation work we completed with new Tuberculosis. Five students and two collaborators from UGA and Texas A&M are co-authors. We submitted a second book chapter, this time with five different students and one alumnus who is in medical school now. It focused on our COVID work during the pandemic and an equation we developed that allows you to predict how far a drug will penetrate into the lung's sputum for a patient with COVID that might have experienced a bradykinin or cytokinin storm.

A student and I have a Nobel Laureate puzzle collection growing by one entry every month, on the ACS ChemEdX website.

This past year we had two new cancer drugs and 12 variations of a

Cowpox/Smallpox drug enter pre-clinical trials at NIH. The pox drug was first designed by students in the fall Med Chem class using QSAR.

We received permits from the state of Florida and the US Army Corp of Engineers to deploy a demonstration of our oyster restoration approach. Oysters are environmental machines, filtering water, stabilizing shorelines and serving as a Keystone species. Worldwide, their populations are down by over 90%. A student and I drafted the applications and pushed them through the six-month approval process.

Several students and Dr. Manning co-authored a recently published book chapter entitled *Inhalation Therapy in Pulmonary Tuberculosis*. The book title is *Tuberculosis: Integrated Studies for a Complex Disease*. Two students, Taylor Taylor and Madelyn Adair, were selected to present their research on anti-viral medications at the Georgia State Capitol. They developed a novel molecule that was tested by NIH against variola virus (smallpox) and cowpox with results encouraging enough to go to a second round of testing. Five students (Taylor Taylor, Madelyn Adair, Akshil Patel, Capri Persaud, and Paige Bland) were selected to present their work with COVID as the hour-long Spotlight at the VSU Undergraduate Symposium. Their work with Dr. Manning was accepted as a book chapter entitled *Ethanol Inhalation as a Method to Denature the spike protein of SARS-CoV-2*.

Dr. Tolulope Salami

Dr. Salami's research is featured in the Faculty Spotlight section of this issue.

Dr. Gopeekrishnan Sreenilayam

Gopeekrishnan (Gopee) Sreenilayam completed his Ph.D. with Prof. Gregory Friestad in 2011 (synthetic organic chemistry) from the University of Iowa. He then did postdoctoral research with Prof. William Wuest (currently at Emory University) at Temple University, Philadelphia in medicinal chemistry from 2011-2013 and a second postdoc with Prof. Rudi Fasan at University of Rochester in biocatalysis from 2014-2017. Gopee started his independent academic career as a visiting assistant professor at Indiana University South Bend from 2017-2018 and moved to Valdosta State University during the fall 2018 as a tenure-track assistant professor.

At Valdosta State University, Dr. Sreenilayam teaches Organic Chemistry I and II, Survey of Chemistry I, and Senior Seminar courses. He will teach a new upper-level course called Advanced Spectroscopy in the Fall 2023 semester.

Undergraduate research is still very active in Dr. Sreenilayam's laboratory. Three students David, Isabella, and Lizett worked on the natural products

extraction project in the Spring 2023 semester, In collaboration with Dr. Focsan. All of them presented their work at the annual VSU undergraduate symposium. David and Lizettt's 3-minute video made it to the final round of competition. We are very excited for the Fall 2023 research as 6-7 undergraduate students expressed their interest in joining the group working on multiple projects! We also started another collaboration with Dr. Salami for the extraction of pharmaceutically relevant compounds from plants.

Dr. Kurt Winkelmann

I am excited to begin my third year at VSU. I continue to teach introductory chemistry for non-majors and I am teaching our seminar for first-year students for the first time this fall. Serving as Department Head keeps me very busy so I really enjoy the opportunity to leave my office and interact with students.

The Winkelmann research group continues our investigation of toxicity of silver nanoparticles on common baker's yeast. Our plan is to develop a novel experiment for first-year Chemistry students to perform in their lab course. Research student Julia Higdon presented her findings at two local research conferences: the Georgia Undergraduate Research Conference in November 2022 and the VSU Undergraduate Research Symposium in April 2023. Experiments like the one we are developing help students learn about chemistry and nanotechnology in new ways. Nanotechnology education is a growing field of study and one that I explored in three book chapters that I wrote for a book *Nanochemistry for Chemistry Educators*, published by the Royal Society of Chemistry.

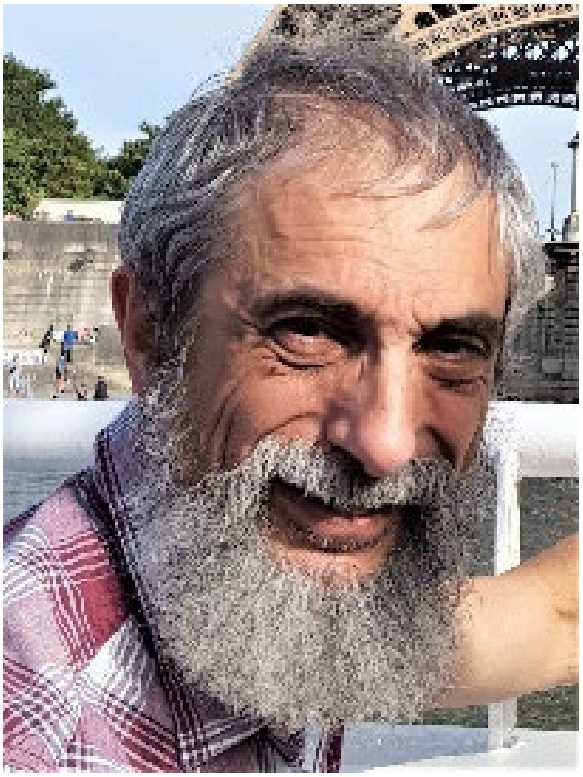
We also study ways that physical chemistry faculty convey supportive, learner-centered attitudes to students through their syllabus. We found that many faculty overlook the fact that a syllabus is part of a student's first impression of the class, as well as an informational document. In many cases, physical chemistry syllabi improved after the pandemic due to faculty becoming more aware of students' needs for technology support and better communication with their professors. Collaborators presented our findings at the 2022 Biennial Conference on Chemical Education and the Florida Undergraduate Research Conference.

Work is keeping me busy. With the support of our friends and local favorite places like Georgia Beer Company and Wild Adventures, my family and I are enjoying our life in Valdosta.

Dr. Yakov Woldman

Hello, reader! My name is Yakov Woldman. I got my undergraduate and graduate degrees in Chemistry from Novosibirsk State University, one of the leading Russian universities in Natural Sciences. I am teaching at VSU now for 19 years, biochemistry and general chemistry lecture and lab courses. My teaching principles are based on my belief that chemistry is an experimental science so experiments go first, only later to be explained by theory. From here is my attention to experimental in teaching laboratory and my love of laboratory work with students. I continue to collaborate with faculty at West Virginia University to develop a technique for detecting aggressive short-lived molecules in living organisms. These molecules play an important role in an organism's chemical warfare against invading bacteria and

viruses. They are also involved in inflammation, Alzheimer's, and Parkinson's diseases.



Every semester, several students work with me on research projects; their work is always presented on the Undergraduate Research Symposium at VSU and sometimes at regional and national research conferences.

Dr. Xiaomei Zheng

Dr. Xiaomei Zheng received her PhD in Chemistry from Wesleyan University in Middletown, Connecticut. Before joining VSU, Dr. Zheng was a faculty member at Albany State University (ASU) and served as a laboratory and research skills trainer for the NIH RIMI program, as well as a co-leader for an NSF supplemental grant to the Targeted Infusion program at ASU.

She joined VSU in 2017 as a lecturer in chemistry, and currently teaches both Principles of Chemistry I and II, and Survey of Chemistry I and II labs. She is the lab coordinator of the Chemistry Department. In this role, she coordinates lab activities for first-year chemistry courses and she mentors and supervises stockroom student assistants to provide essential services for faculty teaching and student learning.

Dr. Zheng's research interests are in synthesis, characterization, and antiviral/antibacterial activity of phenoxyimine Schiff Base ligands and their transition metal complexes. She has applied Schiff Base (salen) transition metal complexes along with ZnO nanoparticles in dye sensitized solar cells to improve solar cell efficiency.

Chemistry Faculty Spotlight

VSU's Chemistry faculty embody the dual purposes of a university: to share knowledge (teaching) and create it (research). Learning in a classroom is obviously important but participating in research - the creation of knowledge that did not exist before - is another critical component of an undergrad student's education. In each Newsletter, we will take a deep dive into the research of a faculty member so that you can learn how students are contributing to the research mission of our Department and VSU.

This year, we highlight **Dr. Tolu Salami**. His research focuses on inorganic chemistry and he has been very busy with a new collaboration with Dr. Andrew Bocarsly at Princeton University. Dr. Salami and several of his research students spent summer 2022 performing research in Dr. Bocarsly's lab at Princeton and Dr. Salami is returning there for the entire 2023 fall semester. Here are some of his current research activities.

My diverse educational background in analytical chemistry, environmental science, and inorganic/material chemistry has shaped my interest in functional materials over the years. Functional materials are broadly defined as materials that are responsive to electrical, magnetic, optical, or chemical stimuli. Functional materials can be any type of material (inorganic, organic, bioinorganic etc.) with a specific function.

Early in my career I worked with porous inorganic materials (layered compounds), with the goal of synthesizing novel layered materials, characterizing the new materials, and testing their catalytic, magnetic, and absorbent properties. However, my focus and approach to functional materials research has changed with time.

At VSU, where we have the dual role of teaching and conducting research with undergraduate students, research must be rigorous as well as simple and interesting enough to engage students. Here, I have conducted research with undergraduates to use porous materials as drug delivery agents. Our group modified porous materials using halochromic dyes and successfully adhered the hybrid material to a fabric in order to develop a fabric sensor. We are also working with Dr. Sreenilayam's lab, using customized deep eutectic solvents (DESs, green solvents) to extract phytocompounds from tropical plants.

Currently we are in collaboration with Dr. Andrew Bocarsly at Princeton University, working on developing bimetallic and trimetallic alloys towards the electrolytic reduction of carbon dioxide to useful fuels. Reduction of CO_2 is important because the levels of carbon dioxide are ever increasing due to human activities. Thus, we want to develop ways of reducing the CO_2 in the atmosphere. Researchers have found that electro-chemical CO_2 reduction holds the potential to be a key part of the sustainable production of fuels and other chemical compounds.

Therefore, our research focus is to develop an electrocatalyst that effectively reduces carbon dioxide to C_{2+}, C_{3+}, and C_{4+} alcohols. We currently study trimetallic and bimetallic alloy systems such as Pd-Co, Pd-NI, Pd-Cr, Pd-Ni-Co, and Pd-Ni-Cr. Our synthetic process uses cyanogels as a precursor for the synthesis of the alloys.

What are cyanogels? Cyanogels are an inorganic sol-gel system that results from the polymerization reaction that occurs when a chlorometalate and cyanometalate are combined in aqueous solution. When combined, two of the chloride ligands on the chlorometalate are replaced by the nitrogen end of a cyanide ligand on the cyanometallate, creating a cyanide bridge. This reaction results in a cyanide linked transition metal polymer that is negatively charged and an alkali chloride salt (Figure 1).

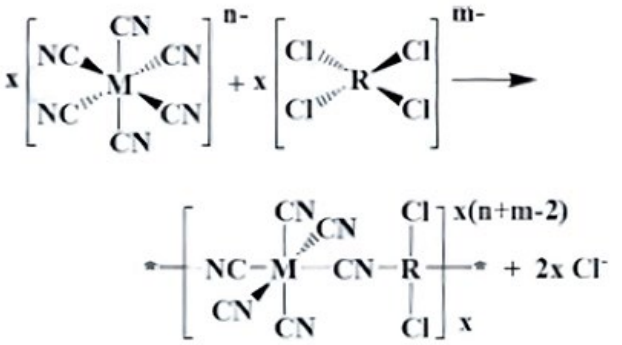


Figure 1: Schematic of cyanogel formation.

The cyanogel can then be heat treated in a tube furnace with flowing argon gas to form alloys (Figure: 2). This process has many advantages, one of them being that various alloy combinations can be synthesized faster at a relatively lower temperature when compared to traditional alloy synthesis.

Alloy synthesis is the first step. However, there are many other questions (both chemical and engineering) that need to be answered. For example, how do you adhere the alloy to the electrode surface? How do you utilize the synthesized alloy in electrolysis? We have tried to answer those questions by utilizing various configurations of electrodes and different methods of adhesion such as direct gelation on electrode surface, dipping the electrode during gelation, and the drop-casting method (Figure 3).

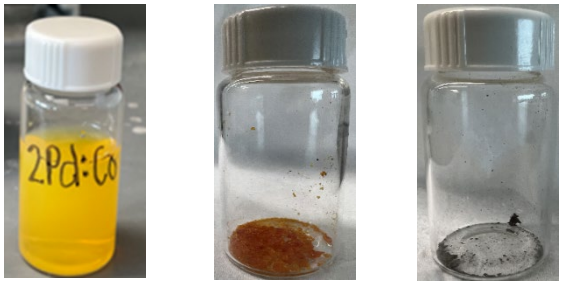


Figure 2: (i) Pd-Co cyanogel; (ii) air-dried cyanogel forming xerogel; (iii) Alloy formed from heat treatment of cyanogel.

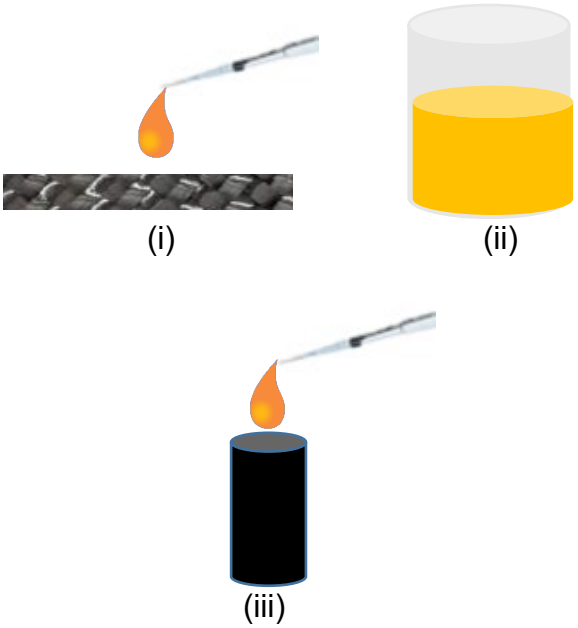


Figure 3: Adhesion of gel to electrode surface by (i) drop-casting on carbon cloth; (ii) dipping glassy carbon plate in gel; (iii) drop-casting and gel formation directly on glassy carbon rod.

The method we eventually adopted is the direct gelation on a glassy carbon-rod. The chlorometalate and the cyanometalate are drop-casted directly on the glassy carbon rod in the correct ratio and allowed to gelate. The glassy carbon is then heat treated and used as a working electrode using the configuration in Figure 4. Ultimately the working electrode is used for CO_2 reduction in a three-electrode system.

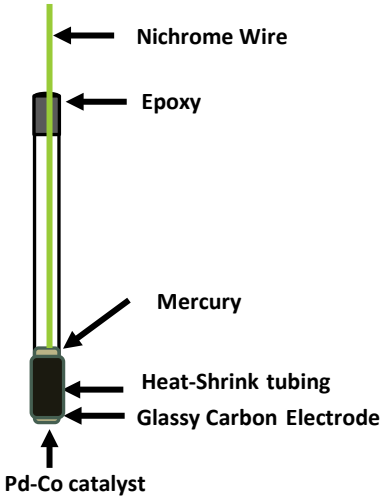


Figure 4: Working electrode configuration.

Many methods of analysis are utilized in this project. Students working on this project are introduced to FTIR (ATR-FTIR), scanning electron microscopy (SEM) and the scanning electron microscopy-energy dispersive x-ray analysis (SEM-EDX), powder x-ray diffraction (PXRD), and NMR, just to mention a few (Figure 5).

Students are also introduced to many concepts in electrochemistry, inorganic chemistry, and material chemistry while trying to find solutions to a real-life problem.

Our results have been encouraging. The Pd-Co, Pd-Ni, and Pd-Cr have successfully been utilized in reducing carbon dioxide to acetone and methanol. Although ethanol and propanol have been identified as potential products for the Pd-Co catalyst, further analysis is required. Our trimetallic Pd-Ni-Co and Pd-Ni-Cr are under investigation. We have presented our results at local, regional, and national conferences (Figure 6). I will be on a sabbatical at Princeton University in Fall 2023 where I will continue working on this project.

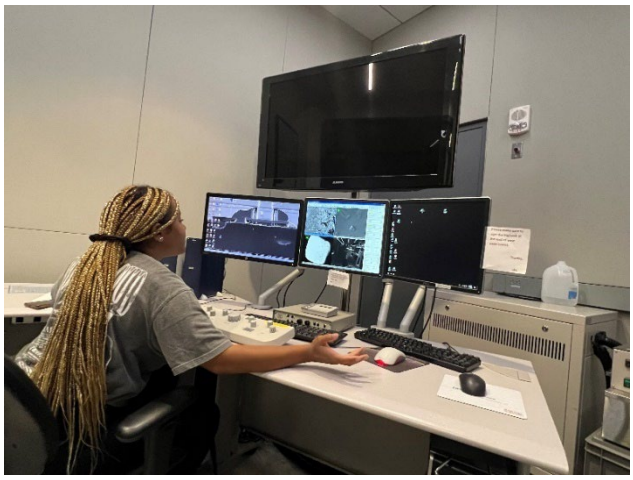


Figure 5: Jodeci Mitchell (‘23) studying an electrode surface with SEM at the Imaging and Analysis Center (IAC), Princeton University (Summer 2022).

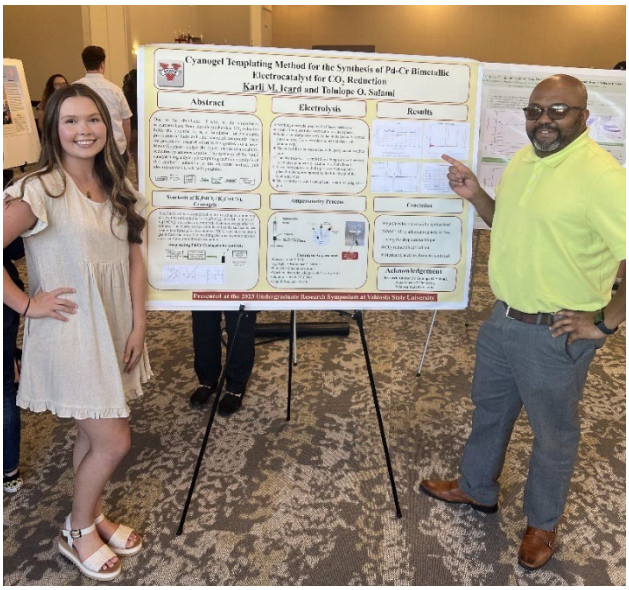


Figure 6: (left) Karli Icard (‘25) Presenting her research at the 2023 annual Undergraduate Research Symposium; (right) Dr. T. O. Salami.

Congratulations to Our Graduates!

We celebrated four Chemistry students becoming our newest alums in the spring! A Chemistry degree is challenging enough but these students also persevered through a pandemic that disrupted learning and campus activities for over a year. We are very proud of them!

Students were exuberant about their achievement, parents thrilled (relieved?) that their children reached this milestone, and faculty were gratified that they really did pay attention in class after all. There was even a noisy chemistry demonstration afterwards, otherwise known as a fireworks show.

Larra Williams, ACS Chemistry

Tanasha Starks, Pre-Professional

Cade Cooper, Pre-Professional

Janantae Wright, Pre-Professional

Congratulations!

Show your Support

Would it be a department newsletter without an appeal for your support? You can make a difference with VSU Chemistry. Giving is easy and all donations benefit our students. Donations from generous alums like you provide financial support for student awards, fund undergraduate research projects, and enable students to attend research conferences. These are just some examples of how your giving positively impacts our students. Imagine all the ways that your donation can help.

To make a donation, visit VSU's website valdostastate.org/give. In the Designation section of the form, select Other and indicate the Chemistry Account number and name in order for your donations to help the Chemistry Department. Here are some giving options:

#20063 Chemistry is our main donation account. It supports student awards, travel to research conferences, outreach events like Science Saturday, and other important activities.

#20067 Manning Chemistry Research Fund supports research by Dr. Tom Manning and his students.

#20070 SMACS supports the Student Members of the ACS.

#20066 Dr. M. Elizabeth (Betty) Derrick Scholarship Fund provides an annual award to outstanding female Chemistry majors. The fund was established in memory of Chemistry Professor Emeritus Dr. Elizabeth (Betty) Derrick.

#20071 Jim and Judy Baxter Chemistry Student Scholarship Endowment will fund annual scholarships for academically talented, first-year Chemistry students. Scholarship funds come from the interest and earnings of this this endowment so that the principal remains, allowing it to fund new scholarships each year. *Dr. and Mrs. Baxter are generously matching every donation to this fund, up to $10,000.*

No donation is too small - just $10 per month allows us to give a nice award each year to an excited and deserving Chemistry student. Donating $15 per month pays for a student's hotel room at a research conference. It does not take much to make a difference.

I am sure that you have lots of great ideas for helping our students and improving their experience at VSU. Please share them with me or your favorite faculty member. We look forward to working with you to support our students.

Thank you for reading! I hope you have enjoyed learning about the activities and accomplishments of students, alumni, and faculty. Please stay in touch and Go Blazers!

Kurt Winkelmann

Professor and Department Head