

Chemistry & Environmental Science Newsletter

Winter 2025 Vol. 7



Interim's Chair Message

by Zeyuan Qiu, Professor and Interim Chair

Greetings, CES Alumni, Faculty, Staff, Students and Friends!

I want to start my message with an exciting news about our college. The College was renamed as Jordan Hu College of Science and Liberal Arts (HCSLA) in 2024 in recognition of a historic gift from our college alumni Jordan Hu '89!

The department has experienced two leadership transitions in the past year. Dr. Wunmi Sadik, our former CES chair and the Distinguished Professor of Chemistry, took the position of the inaugural Vice

Provost for Faculty Affairs in the Office of Provost at NJIT in August 2024. She joined CES as the chair in Fall 2019 and had led and transformed the department into a vibrant learning and research community. Dr. Bhavani Balasubramanian, our former CES Program Director for Undergraduate Studies, took the position of the Associate Dean for Undergraduate Education of HCSLA in January 2025. Since joining the CES in Fall 2009, Dr. Balasubramanian has led and transformed our undergraduate programs in chemistry and biochemistry and freshman chemistry education. We greatly miss their leadership and knowledge of chemistry education and research. Fortunately, both Drs. Sadik and Balasubramanian are still on campus and will continue help and guide the department in their respective new roles!

The department welcomed several new members in the past year. Dr. Guillermo Jimenez-Aleman joined CES as tenure-track assistant professor in Fall 2024 and brings an exciting new expertise in chemical ecology. His research focuses on using non-vascular plants to study small molecule signaling pathways governing plant interactions with the environment. Dr. Yong Pu rejoined CES as Instrument Repair Specialist and Ms. Chunyan Liu joined CES as Laboratory Stockroom Technician in Fall 2024. Additionally, I want to congratulate Dr. Yuanwei Zhang for his promotion to Associate Professor with tenure and Dr. Kevin Parmelee for his transition from Professor of Practice to Senior University Lecturer in forensic science!

CES faculty has been one of the most research active faculty groups at HCSLA in terms of the research proposal submission and grants awarded in the past year. Our research active faculty secured 12 grants with external funding exceeding \$1.3 million from some prestigious funding agencies in the last year. I want to congratulate Dr. Farnaz Shakib (NSF), Dr. Yuanwei Zhang (NIH), Dr. Mengyan LI (USGS), Dr. Som Mitra (industrial and academic partners), Dr. Lijie Zhang (USGS) and Dr. Zeyuan Qiu (FEMA) for their success! There is also some fantastic news from Dr. Hao Chen's research group (read more in the newsletter)! The department successfully hosted our annual CES Research Day on November 14, 2025 (read it more in the newsletter). I want to thank Drs. Farnaz Shakib and Pier Alexandre Champagne and Ms. Genti Price for organizing the event, Dr. Victor Batista, John Gamble Kirkwood Professor of Chemistry from Yale University, our Keynote Speaker for making the event so inspiring, and the generous support from the Offices of HCSLA Dean, Graduate Studies and Sponsored Research at NJIT for making the event possible.

CES graduate and undergraduate students continue receiving regional, national and international recognition for their success. Yaqoob Sumbel received the prestigious NSF Graduate Research Fellowship. Jose Diaz Antunes received the Hudson River Foundation Graduate Fellowship. Three Ph.D. students received the New Jersey Water Resources Research Institute Grants-in-Aid fellowship. Congratulations to our three CES Outstanding Graduate Student Awardees (Yukiang Shi in Research, Diana Castaneda Bagatelia in Teaching and Sumbel Yaqoob in Service). Many of our undergraduate students also won various fellowships and awards as you may read more from the Newsletter. I am very proud of the vibrant learning and research environment created by our dedicated faculty and staff, which will continue provide the success to our students.

I want to use this opportunity to Thank Dean Kevin Belfield for placing his trust on me to lead the department

and CES faculty and staff for their support during the CES leadership transition. It has been a great honor to serve as Interim Chair of the department to know our faculty, staff and students in much greater extent! I also want to thank Drs. Chris DeSantis and Mieke Peels for their consistent effort for bringing the success stories of our faculty, staff and students to us through the newsletter in the past years!

Wish you a healthy and successful year in 2025!

Zeyuan Qiu
Professor and Interim Chair
Department of Chemistry and Environmental Science

The CES Newsletter is posted on the Department website: <https://chemistry.njit.edu/ces-newsletter>

Dr. Omowunmi Sadik Selected as Vice Provost for Faculty Affairs; Dr. Zeyuan Qiu Named Interim Chair of the Department of Chemistry & Environmental Science

Dear CSLA Community,

We would like to inform you that Dr. Omowunmi Sadik, Distinguished Professor of Chemistry & Environmental Science, has been selected as NJIT's inaugural Vice Provost for Faculty Affairs (VPFA). While her appointment as Chair of the Department of Chemistry & Environmental Science comes to a conclusion on August 2, 2024, her new role commences on August 5, 2024.

In this new position, Dr. Sadik will join the Provost's leadership team to shape the experience of the faculty at NJIT. Working closely with the Provost, the Faculty Senate, leadership of the NJIT Professional Staff Association, Inc./AAUP, the Chief Diversity Officer, the Women Faculty Advisory Committee, and many others, the VPFA will play a pivotal role in developing short and long-term plans for faculty excellence and diversity.

We are pleased to announce that Dr. Zeyuan Qiu will serve as the interim Chair of the Department of Chemistry & Environmental Science. Dr. Qiu, a Professor in the department with a joint appointment in the Martin Tuchman School of Management, has been a member of the NJIT faculty since 2002. He is a nationally recognized expert in water resources management and precision conservation. Dr. Qiu has significantly contributed to faculty development, faculty governance, strategic planning, and the research enterprise development on campus. He most recently served as Chair of the University Promotion and Tenure Committee and developed a graduate course entitled Chemistry, Sustainability, and the Circular Economy. His extensive experience and leadership make him well-suited for this interim role.

Dr. Sadik joined the department in a period of growth and on the heels of the launch of the B.S. Forensic Science program. During her term as Chair, numerous tenure-track faculty, instructional staff members, departmental staff, and a Professor of Practice were hired. She helped oversee the department's transition to online instruction during the COVID-19 pandemic and a revision of departmental committees to provide smoother operations with an emphasis on diversity and shared governance. During this time, the department experienced an increase in enrollment in the department's degree programs and in external research funding. The department also achieved a major milestone in the last academic year by securing full accreditation of the B.S. Forensic Science degree program from the Forensic Science Education Programs Accreditation Commission (FEPAC) of the American Academy of Forensic Sciences.

Dr. Sadik also became a Fellow of the American Chemical Society and the National Academy of Inventors. We are confident she will excel in her new role as Vice Provost for Faculty Affairs.

Please join us in congratulating Dr. Sadik on her new position and welcoming Dr. Qiu in his new role as the interim Chair of the Department of Chemistry & Environmental Science.

Sincerely,

Kevin D. Belfield
Dean, College of Science & Liberal Arts
Distinguished Professor, Department of Chemistry & Environmental Science
Becton Dickinson Research Professor
Fellow of the ACS and AAAS, FRSC

CES Announcement for the Transition of Program Director for Undergraduate Studies

Dear CES Community,

Dr. Bhavani Balasubramanian will leave the position of Program Director for Undergraduate Studies in CES

and take the position of Associate Dean for Undergraduate Education in the Jordan Hu College of Sciences and Liberal Arts starting on January 1, 2025. I want to congratulate Dr. Balasubramanian for her new role and took this opportunity to thank her for her long term and dedicated services to the department. In her time at CES, she has transformed our undergraduate programs in chemistry and biochemistry and freshman chemistry education, and helped develop and enhance our undergraduate programs in environmental science and forensic science. We will greatly miss her for her knowledge of chemistry education and her boundless energy and devotion to the development and growth of the CES undergraduate programs. Fortunately, Dr. Balasubramanian is not going anywhere else. She will continue to help the department in her new role and will also continue representing the department in the University Committee on Undergraduate Education.

With Dr. Balasubramanian's departure, Dr. Christopher DeSantis will serve as the Interim Program Director for Undergraduate Studies and Dr. Mieke Peels as the Interim Undergraduate Advisor for Chemistry and Biochemistry for the department beginning on January 1, 2025. Dr. DeSantis holds a Ph.D. in Organic Chemistry from The Ohio State University and joined CES as University Lecturer in Fall 2019. Dr. Peels has her Ph.D. in Theoretical Chemistry from Penn State University and joined CES as University Lecturer in Fall 2022. In addition to their teaching responsibilities, Dr. DeSantis will take a leadership role in developing chemistry and biochemistry programs and directing undergraduate chemistry education, and Dr. Peels in advising undergraduate students in chemistry and biochemistry and directing the chemistry tutoring center.

Sincerely,

Zeyuan Qiu, Ph.D.
Professor of Environmental Science
Interim Chair, Department of
Chemistry and Environmental Science



The Chemistry and Environmental Science Research Day Turned Quantum For Its Third Edition

On November 14th, 2024 was held the third yearly edition of the Chemistry and Environmental Science (CES) Research Day. Over 200 NJIT faculty members, graduate and undergraduate students gathered in the Agile Strategy Lab for this event, which celebrates research at NJIT's CES Department through a keynote lecture by a renowned scientist and a lively poster session. This year, Prof. Victor Batista (pictured second left) from Yale University and member of the Yale Quantum Institute presented about exciting applications of quantum computing for chemical research. Following this presentation, faculty members from the CES Department hosted a poster session where

they introduced their research to an eager crowd of curious students looking for opportunities.

During the CES Research Day event, Dr. Zeyuan Qiu presented Dr. Wunmi Sadik the CES Inaugural Appreciation Award for her outstanding service as the CES department chair from 2019 to 2024. In his introduction, Dr. Qiu praised Dr. Sadik being a consistent force of stability and change and thanked her for growing and transforming the department into a vibrant community. Dr. Farnaz Shakib presented Dr. Sadik a Thank You card signed by CES faculty and staff.

The CES Department wishes to thank the Office of Graduate Studies and the Center for Translational Research for their financial support of this year's event, in addition to all members of the Department who have helped make the event a success.





NJIT Students Build Shoe Print Database to Help Solve Crimes in NJ and Beyond

by Jesse Jenkins

Forensic science students at New Jersey institute of Technology are giving criminal investigators a step up on solving cases, and they're doing it by enlisting the campus community's help through an enticing offer — “lend your soles” for free pizza.

The university's **Forensic Science Student Association (FSSA)** is hosting pop-up events on campus to collect shoe impressions from willing volunteers in an effort to expand NJIT's Shoeprint Image Capture and Retrieval (SICAR) database — one of only two forensic footwear databases in New Jersey.

The database uses advanced imaging and machine learning algorithms to match recovered shoe prints from crime scenes with specific shoe models and brands, encompassing far more than your classic loafers, Dr. Martens, Chuck Taylors or Air Jordans, according to FSSA President Pranav Prabhu. With thousands of shoe makes and models registered since its launch last year, the database requires constant updates to help law enforcement keep pace with the flurry of fresh shoe styles (and new shoe print patterns) released each year.

“Footwear impressions are often overlooked but are a valuable source of evidence that can narrow investigations, generate new leads and potentially establish a direct link between a suspect and a crime scene,” said Prabhu '26, a **forensic science major** from Edison, NJ who got involved in NJIT's SICAR project last spring. “By keeping our database active and expanding it with new entries, we're hoping to give investigators a continuously growing resource that assists them in solving cases more efficiently. The more diverse the entries, the more effective the database becomes.”

The project began in 2022, when NJIT's Forensic Professor of Practice Kevin Parmelee learned that the nationally used SICAR footwear database was no longer being updated.

Seeing an opportunity to aid criminal investigations in N.J. and beyond, Parmelee connected with a collaborative group of footwear examiners from around the U.S. and Canada — known as the Footwear Reference Collaboration Group (FRCG) — and proposed that NJIT forensic students help collect and document new footwear examples for establishing and expanding the university's own database.

The collaboration was a perfect fit.

“A benefit of organizing this group at NJIT is it can provide local law enforcement agencies with a footwear database that they may use as an investigative tool. Only the New Jersey State Police and NJIT have such a database in the state currently,” said Parmelee, a former Somerset County (N.J.) detective. “However, any agency can send the NJIT Footwear Collaboration Group a digital image of a footwear impression and we can run it through our database.

“If it is in our system, we can offer the agency the make and model shoe descriptions, and they can then use that information when searching for potential suspects.”

NJIT's forensic students have been crucial to the operation — photographing shoes, creating exemplar impressions and preparing digital files for footwear examiners to encode.

During September's National Forensic Science Week, the organization held its first shoe print collection event of the fall.

“We invite students to 'lend us their soles' in exchange for pizza,” said Prabhu. “While they enjoy their slice, we'll coat the shoe sole with liquid silicon and press it onto paper over a foam pad to create a detailed impression. The print is then enhanced with magnetic powder to highlight patterns, which are photographed and submitted to our SICAR contact for coding and inclusion in the database.”

According to Parmelee, the student-collected files are expected to be shared with labs across North America by 2025, enhancing the database's usefulness in investigations. The project is not the first time **NJIT's forensic program has involved its students in real-world forensic work.**

“There are four of us on this project. ... It's such a unique hands-on opportunity that gives us practical skills directly applicable to forensic work,” said Prabhu.

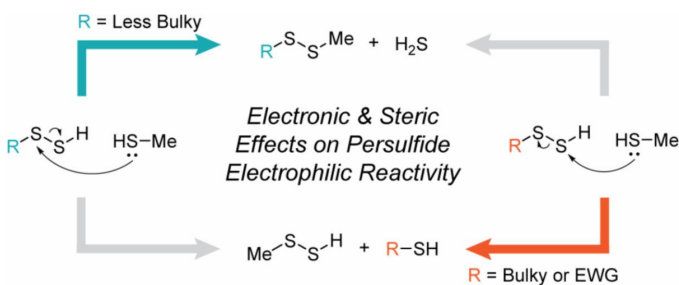
For now, Prabhu says to check the **FSSA's website** for details on their upcoming collection events in the Campus Center, where you can score a free slice of pizza.

"We're encouraging the NJIT community to lend their support during our next collection events. Hopefully, we can continue to raise awareness about the importance of forensic science and inspire more people to contribute, ensuring the SICAR database continues to expand."



News From Dr. Hao Chen's Groups

Dr. Hao Chen's lab had an outstanding year, highlighted by acquiring significant industry research collaboration with Agilent Technologies and receiving a new \$1million high resolution QTOF LC/MS for ultrafast antibody drug digestion research (pictured bottom left). His PhD student Timothy Yaroshuk completed a 6-month co-op at Merck Co. with a \$50k stipend and earned satisfactory performance. Another PhD student Mengyuan Xiao (pictured top left) received an offer of \$50k from Colgate-Palmolive for 1 year co-op training starting from January 2025. Besides, in collaboration with Prof. Zeyuan Qiu, the group also received a \$25k CERT grant from NJIT to investigate pollution issues at Cupsaw Lake, and received two \$40k grants from Colgate-Palmolive to study Sn(II) stability and teeth whitening mechanisms. Dr. Chen also received NJIT Nexus of Excellence Award in Graduate Advising and Mentoring and was invited to serve on the Editorial Advisory Board for one ACS journal, ACS Measurement Science Au.



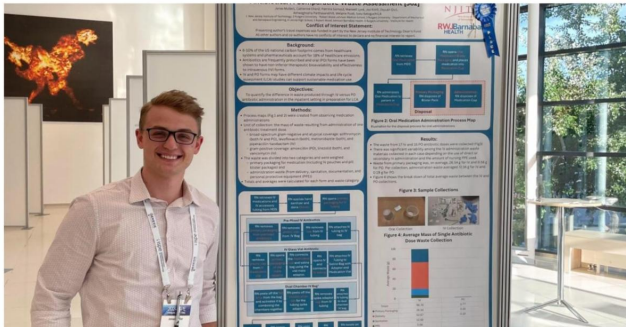
NJIT Team Elucidates the Intrinsic Reactivity of Persulfides

Persulfides (RSSH) are biologically important reactive sulfur species that are endogenously produced, protect key cysteine residues from irreversible oxidation, and are important intermediates during different enzymatic processes. Despite this broad importance, the intrinsic reactivity of these compounds is

difficult to study due to their instability. In a recent [article](#) in the prestigious Journal of the American Chemical Society, Assistant Professor Pier Alexandre Champagne (NJIT) joined forces with Michael Pluth (University of Oregon) to elucidate a key component of persulfide reactivity: their reference for H₂S release or for transpersulfidation. Using computational tools, the team highlighted the effects of substituents on the reactivity of persulfides, specifically demonstrating that sterically-hindered persulfides cannot release H₂S directly but must first undergo transpersulfidation with less bulky thiols, such as cysteine. Building on those insights, they have experimentally monitored and measured transpersulfidation from a bulky penicillamine-based persulfide to a cysteine-based thiol, in what is the first direct observation of transpersulfidation between low-molecular-weight species. Taken together, these combined approaches highlight how the properties of persulfides are directly impacted by local environments, providing a key advance in understanding the complex chemical biology of these reactive species.

CES Celebrates Its Outstanding Graduate Students At Annual Award Ceremony

On December 13, the CES Department held the annual winter gathering to celebrate a year of dedicated service by the faculty, staff, and students. This gave the Department an opportunity to appreciate the hard work of our PhD students. Yuliang Shi (top) received the outstanding graduate student award in research. Furthermore, Diana Castaneda Bagatella (middle) received the outstanding graduate student award in teaching category while Sumbel Yaqoob (bottom) was honored with the outstanding graduate student award in service. We are very proud of our students and looking forward to their continuous success in the future.



NJIT Undergrad Earns Acclaim Abroad for Antibiotic Waste Research

By Jesse Jenkins

Biochemistry major Jonas Muller '27 has earned plaudits abroad this summer after unveiling surprising findings on the environmental impact of antibiotic drugs during a poster competition at the International Society for Pharmacoepidemiology (ISPE) annual conference — one of the world's premier events

in drug safety research.

Muller recently traveled to this year's conference site of Berlin to deliver his poster presentation, "Climate Impact of Intravenous versus Oral Antibiotics: A Comparative Waste Assessment," which was judged as one of

"I was one of the youngest students at the ISPE conference ... it was an incredible experience to be a part of," said Muller, an Albert Dorman Honors College student. "I wasn't expecting the judges to select my presentation as the winner in its category, especially given the caliber of research there."

"Our research group's work stood out because of its environmental focus, whereas most research presented seemed to focus on drug effectiveness," added Muller. "We've shown, through data, just how much waste is produced when drugs are delivered to patients intravenously. It's fairly shocking, so I can see how it would attract attention."

In January, Muller joined researchers from Rutgers Robert Wood Johnson Medical School to study the difference in environmental waste produced from intravenous (IV) and oral (PO) antibiotic therapies after being led to the project by his mentor Zeyuan Qiu, interim chair of NJIT's Department of Chemistry and Environmental Science and professor of environmental science and policy.

The nine-member team would reach an unexpected discovery — that IV antibiotics generate over 120 times more residual waste than antibiotics delivered to patients orally.

"We expected IV antibiotics to produce more waste, but the magnitude of difference caught us by surprise," said Muller, who is involved in data analysis on the project. "So far, we've made our assessment based on sheer weight. IV antibiotics require more supplies and precautions during administration, like gloves and sanitation materials, which adds up fast."

Muller says the team's next steps involve conducting an environmental lifecycle assessment and creating models to study waste generated by IV and oral antibiotics across the U.S., which could provide actionable data for healthcare providers and policymakers to minimize climate impact from such waste.

According to the team's study, healthcare systems currently account for 8-10% of the national carbon footprint in the U.S. and pharmaceuticals account for 18% of healthcare emissions.

"IV antibiotics have clear benefits in delivery speed, but the risks of infection and the environmental waste they generate can be significant, so we should weigh these factors in deciding how to administer antibiotics," said Muller. "What this study highlights is that perhaps we should consider where we might be overutilizing IV antibiotics. Shifting to oral forms, when possible, could greatly reduce waste."

About the ISPE Conference and Spotlight Poster Competition:

The ISPE conference brings together leading researchers from around the world to share the latest findings on the safe and effective use of medications in real-world settings. The spotlight poster competition is a highlight of the event, featuring short oral presentations and Q&A sessions with the top-scoring poster presenters as judged by the conference program committee.



Charles Grant, CES Undergraduate Student, Wins 2024 ACS Division of Analytical Chemistry Undergraduate Award

Recipient of the 2024 Undergraduate Award in Analytical Chemistry is Charles Grant (Biochemistry '25). This award, sponsored by the Analytical Chemistry division of the American Chemical Society, includes one year access to the monthly Analytical Chemistry newsletter.

Charles Grant was a student in Chem 222, Analytical Chemistry during the Spring 2024 semester. He also held a full time job. Charles consistently stood out for his dedication and strong work ethic. In class, Charles asked clarifying questions and actively participated in group activities. Dr. Gregory Edens says, "Charles emailed to ask questions about homework problems, thoughtfully worked through my feedback, and rechecked his answers to ensure accuracy. He was polite and courteous both in email and in person, always arriving on time to class and never missing a lecture."

In Chem 221, Analytical Methods lab, Charles demonstrated solid preparation, precision, and accuracy. "His work was always high quality, and he had a thorough understanding of experimental procedures," says Dr. Pin Gu. "Charles excelled in analyzing data and presenting clear, concise conclusions with correct calculations."

Arti43rd Regional Meeting on Kinetics and Dynamics Held At NJIT.

On January 25 2025, NJIT hosted the 43^d Regional Meeting



meeting was hosted by NJIT in 2017.

The organizers would like to thank the CES Department and HCSLA for their financial support, and also Genti Price and Egor Demidov who have helped make the event a success.

on Kinetics and Dynamics (<https://rmkd.edemidov.com>). Over 25 participants gathered in the Life Sciences and Environmental Center to exchange their research findings in the field of experimental and theoretical reaction kinetics and dynamics. The participants were greeted by HCSLA Dean Dr. Kevin Belfield.

This 1-day event has been in existence for nearly half a century, providing an excellent opportunity to expose Ph.D. students to the broader scientific community, including the top research schools in the Northeast, including Brown, UMass Amherst, Columbia, Northeastern, and MIT. Previously, the



Dr. Sara C. Zapico Delivered the Keynote Speaker Address at the Latin American Association of Forensic Anthropology

In October 2024, Sara C. Zapico was invited to give one of the plenary lectures at the XIX Congress of the Latin American Association of Forensic Anthropology, in Panama City, Panama. Her lecture focused on the applications of DNA methylation to one of the main issues in forensic anthropology: the accurate age estimation in adult skeletons, which also impacts the correct identification of human remains. Sara gave an overview of the state-of-the-art in the field, highlighting her current research on

tooth samples funded by the University of Alabama Birmingham and Oklahoma Nathan Shock Centers on Aging. Her findings were received with high interest by forensic anthropologists from different Latin American countries, based on its potential application to their unidentified remains, opening the door to future collaborations.

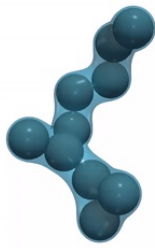


CES Welcomes Its Newest Faculty Member Dr. Guillermo Jimenez-Aleman

Dr. Jimenez-Aleman completed his PhD training in *Bioorganic Chemistry* at the Max Planck Institute for Chemical Ecology (W. Boland's group), in Jena, Germany. After his PhD, he received a DFG postdoctoral fellowship to study *Jasmonate Signaling* at the National Centre for Biotechnology (R. Solano's group), in Madrid, Spain. He continued his career at the Boyce Thompson Institute for Plant Research (G. Jander and F.W. Li Labs) in Ithaca, New York. In September 2024, Dr. Jimenez-Aleman joined NJIT to pioneer plant research at the institution. His laboratory will use non-vascular plants to study small molecule signaling

pathways governing plant interactions with the environment. Moreover, the JA-Lab will explore the biosynthesis and chemical biology of seedless plant natural products.

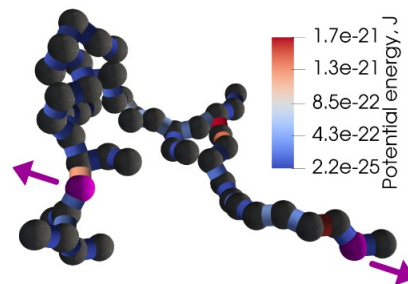
"I am a bio-organic chemist interested in natural product biosynthesis and signaling, driven by a curiosity and passion for science. I joined NJIT in the Fall Semester of 2024. Research in my lab integrates multidisciplinary approaches including molecular biology, biochemistry, synthetic and analytical chemistry, and synthetic biology to explore ecological questions both in the lab and the field. We focus on understanding plant-environment interactions, with a particular emphasis on "seed-free" plants, including the model non-vascular plant *Marchantia polymorpha*. Our work aims to better understand how small airborne molecules, i.e. volatiles, mediate plant interactions with the surroundings. We are also investigating the cannabinoid biosynthesis pathway in *Radula* species, which uniquely produce cannabinoids similar to those found in *Cannabis* despite over 400 million years of evolutionary divergence. By leveraging interdisciplinary approaches, we aim to generate insights that drive sustainable innovations in medicine, agriculture, and industry."



NJIT Researchers Develop a New Model for Soot Aggregates

The black smoke emitted by diesel engines and forest fires is made of submicron soot particles, which themselves are fractal aggregates of even smaller carbon spheres. This airborne soot represents a major air pollutant and can travel long distances in the atmosphere, extending the scope of its impacts. As soot travels, trace pollutants co-emitted during combustion or generated photochemically from other chemicals condense on the aggregates, further changing their properties and environmental impacts. For instance, the surface tension of condensed liquids causes the aggregates to restructure and assume a more compact form. PhD student

Egor Demidov led by Profs. Alexei Khalizov and Gennady Gor developed the first computational model to simulate surface-tension-driven soot restructuring, which enables to study the mechanism and timescale of this process and more accurately predict the impact of soot on climate. The model has been [published in Physical Review E](#) with more refinements and extensions underway. Using this model, in an article recently published in [the Journal of Aerosol Science](#), the Khalizov group has shown that shear stress produced by the surface tension in soot aggregates is nearly thousand times higher than tensile stress, and most of that stress is focused on a few junctions, resulting in their fracture. An important implication of this work is that even a small amount of liquid condensate, such as delivered by capillary condensation, can result in significant compaction of soot aggregates. Accordingly, the Khalizov group incorporated the previously unaccounted mechanism of capillary condensation into an [atmospheric model](#). To promote the findings and allow experimental groups to make quick estimates, the group released [a web application for capillary condensation modeling](#), created by Egor.



EVSC Majors Finding Success Inside and Outside the Classroom

Ligaya Manalastas has received a valued scholarship award from the NOAA Ernest F. Hollings undergraduate Scholarship Program. This is a prestigious opportunity for undergraduate students interested in fields related to oceanic and atmospheric sciences, marine biology, and meteorology. Administered by the National Oceanic and Atmospheric Administration (NOAA), this competitive scholarship provides financial assistance, as well as practical experience, to selected scholars.

CES Alum **Britanny Rojan** was awarded and participated in a post-bacc SPARC RaMP research project at Penn State: This is a new research and mentoring program for post baccalaureates funded by the United States National Science Foundation (NSF). The goals of the program are "to train individuals for a range of potential career pathways in the biological sciences including: research-focused M.S. or Ph.D. graduate programs; entry-level positions in industry, federal, tribal, or state agencies, education and research centers, or not-for-profit science-based organizations; or other STEM careers."

NJIT's new student Chapter of the AAEES (American Academy of Environmental Engineers and Scientists) prospers with many activities and meet-ups. Co-founded last year by CES EVSC majors, **Alexander Millo** and **Sabrina Gerace** (now President), and today actively co-piloted by VP Brock Shaninian. Alex graduated last year and started a job as a professional geologist at TRC with plans to study now for his PG license.

Emma Bitar completed another year of internship at Langan Engineers as she continues successfully in her BS/MS program at NJIT having transitioned to Civil Engineering with strong interests in environmental matters.

Tiernan Hall



By Michael Bonchonsky

As our dreams of new facilities for CES evolve and develop, I hope that we continue to remember the namesake and benefactor of our Department's Center and recall how important the work of Martin F. Tiernan is to environmental science, chemistry and to dramatic improvements in public health in the U.S.

The US Center for Disease Control (CDC) has cited "Chlorination and other treatments of drinking water began in the early 1900's and became widespread public health practices, further decreasing the incidence of waterborne diseases" (CDC MMWR, Oct 1999). Perhaps most significant in this remarkable public health achievement was the early innovative work of two young engineers still in their twenties: Martin F. Tiernan and Charles F. Wallace. These men were involved in the early academic study of sanitary science and engineering and focused their research efforts on new engineering technologies aimed at mitigating waterborne disease, the scourge of our cities at the turn of the Century. Mr. Tiernan graduated from the Rochester Institute of Technology in 1906 and studied afterward at the Massachusetts Institute of Technology. At their early professional start, he suggested to his friend and colleague, CF Wallace, that the two young creative scientists combine their talents and technical skills to form the soon to be renowned Wallace and Tiernan Company.

Wallace created a device that he and Tiernan called the "Chlorinator", a device used to disinfect drinking waters with chlorine gas. It became so successful that within a few years it was implemented in half the world's water supply. Its first application was in nearby Jersey City and led to successful growth the two could only have dreamed of at their humble start. The deadly enteric bacterial disease, typhoid fever, was soon nearly eliminated in the US by chlorination and other wastewater treatment.

The Wallace and Tiernan Company exhibited their greatest early growth right here in New Jersey. The chlorinator was manufactured then in Belleville, NJ, just north of our NJIT campus and many of their products bore the label "Wallace and Tiernan, Newark, New Jersey". NJIT had many decades of relations with Wallace and Tiernan. In fact Robert W. Van Houten, President (1947-1971) of our university, (then Newark College of Engineering) worked as an intern at Wallace and Tiernan. When I started at the USEPA as an environmental engineer in 1971 and later at a start-up environmental laboratory many of my colleagues had their start in environmental science and chemistry at New Jersey's Wallace and Tiernan Company. Many variants of the wastewater systems implemented then and now were rooted in the creative work of Wallace and Tiernan. So, I leave you with the hope as we advocate for new buildings, renovations, and research objectives, that we remember how much of our work today at CES has deep roots in the achievement and generosity of Martin F Tiernan.



CES Researchers Visit Cupsaw Lake

On October 7, 2024, a team of CES research researchers along with Lakeland Regional High School Science Team (pictured below) visited the beautiful Cupsaw Lake located deep in the New Jersey Highlands right above the Wanaque Reservoir that supplies drinking to three million people in North New Jersey. The CES researchers (pictured left) included Drs. Hao Chen, Yifan Ding (a postdoctoral fellow in Dr. Lijie Zhang's research group), and Zeyuan Qiu and Yongqing Yang (a Ph.D. student in Dr. Hao Chen's group). Despite its natural beauty, the lake is plagued by harmful algae bloom due to excessive phosphorus loading from the onsite wastewater treatment systems (OWTS) used by the property owners around the lake. Working with the lake community, CES researchers are conducting interesting research to understand the fate and transport of phosphorus, a limiting nutrient resulting in algae bloom in the watershed and the lake. The research efforts are parts

of a broad collaborative Save the Lake initiative between NJIT and the Cupsaw Lake community.



NJIT Forensic Students See Real World Application of Forensic Chemistry During Visit to DEA Laboratory

Students from Prof Chen's Forensic Chemistry class and Prof Fisher's Introduction to Forensic Science class visited the Drug Enforcement Administration's (DEA) Northeast laboratory in Manhattan on a brisk Thursday morning in November. During the tour, they saw how Forensic Chemists use different analytical instruments (i.e. GC/MS, FTIR, and NMR) can be used to analyze and identify controlled substances. The DEA Laboratory System provides scientific support to DEA Special Agents and other

law enforcement personnel. This encompasses a wide variety of duties and forensic disciplines, including analysis of suspected controlled substances and related substances, crime scene investigation, latent fingerprint identification and photographic development, analysis and evaluation of digital (computer) evidence, development, monitoring, and processing of hazardous waste cleanups at clandestine laboratory investigations and disposals, and expert witness testimony. Typically, controlled substance analyses consist of two steps. The first step involves a qualitative analysis in which controlled substances are identified, as well as other non-controlled components. The other step involves determining the amount of controlled substance present, i.e., its purity.




FORENSIC SCIENCE

Join us on our course abroad to Toronto
Montreal, and Ottawa Canada.

FRSC 498 ST: Int'l Perspectives in Forensic Science

- ✓ Visit major cities and sights.
- ✓ See historic and cultural sites.
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