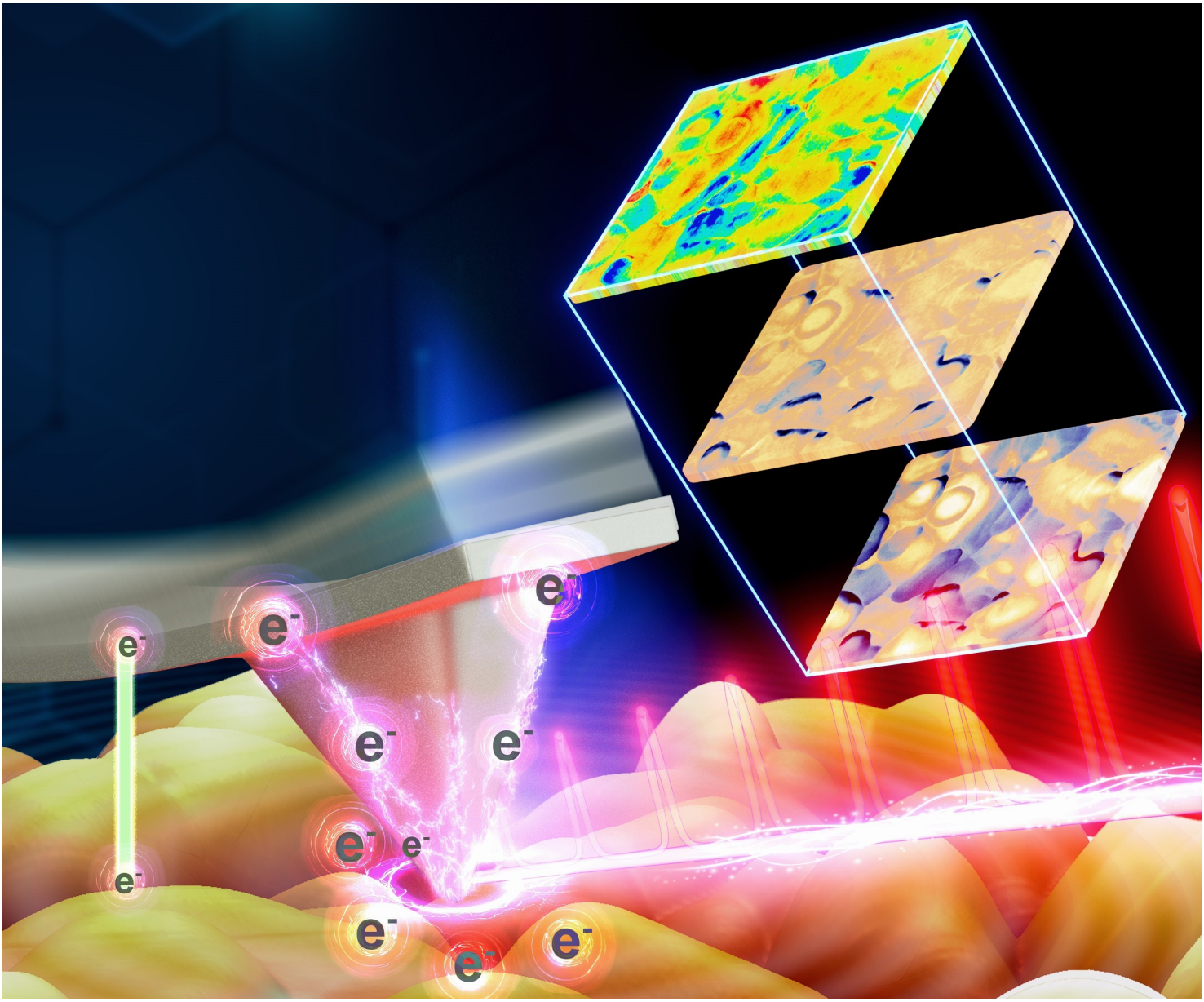
Summer 2025 Newsletter

No. 54

Mudd IN YOUR EYE

Department of Chemistry • Lehigh University

"Great importance is given to chemistry as an elementary branch of learning," — Lehigh Register 1866



LEHIGH UNIVERSITY | DEPARTMENT OF CHEMISTRY

Lehigh Department of Chemistry

Contributing to the success of the college, university, and our students

After seven years as department chair, I'll be returning to the regular department faculty on July 1st, and our very capable colleague, Damien Thévenin, will begin as chair. On the same date, we'll welcome two excellent new faculty members --Associate Professor Peng Li from West Virginia University and Assistant Professor Daniel Laverty, who is currently a postdoctoral fellow in Harvard's School of Public Health. During the past year, we also welcomed Jamerson Baynard as our new Business Manager and Peggy Buckley as our new Faculty Coordinator.

The past year has been one of well-deserved faculty promotions: Elizabeth Young and Lisa Fredin became our newest tenured Associate Professors; Jebrell Glover and Damien Thévenin were promoted to Full Professor; Andy Ho was promoted to Teaching Full Professor; and Nathan Richey was promoted to Teaching Assistant Professor. We also learned about three prestigious national awards: Professor David Vicic was selected as the 2025 recipient of the American Chemical Society Award for Creative Work in Fluorine Chemistry (https://onfirstup.com/lehigh/theperch/contents/38897244); Associate Professor Xiaoji Xu was named one of this year's winners of the ACS's Richard Van Duyne Early Career Award, which recognizes his outstanding contributions in experimental physical chemistry as a young investigator (https://cas.lehigh.edu/articles/xiaoji-xu-honored-2025-acs-richard-van-duyne-early-career); and graduate student Domenica Fertal (Elizabeth Young's group) was named one of this year's winners of the ACS Women's Chemist Committee's WCC Merck Research Award. Congratulations to them all!

The current spring semester has been unprecedentedly challenging for higher education in the U.S., and Lehigh has been no exception. Nonetheless, our classes met and grades were assigned, faculty searches continued, and research kept pushing forward. That ability to maintain a high level of focus on our dual missions of teaching and research, despite threatening uncertainties beyond our control, is a credit to our faculty, staff, and students. Check out the details in the newsletter updates section!

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ON THE COVER: From Dr. Xiaoji Xu's Research: Multimodal Scanning Probe Microscopy Reveals Chemical, Mechanical, and Electrical Properties of Materials at the Nanoscale

In This Issue

2 Chair's Update

3 Faculty Awards

5 Faculty News

13 Faculty Promotions

16 New Faculty & Staff

17 Jim Roberts' Retirement

19 Student News

LEHIGH CHEMISTRY

Stay in Touch

Lehigh Chemistry alums can be found all across the globe--using their degrees to address issues that impact the world community.

Your Lehigh Department of Chemistry would like to stay in touch. We love hearing about where your degree has taken you.! Send your stories -- professional or personal -- to inchem@lehigh.edu.

David Vicic wins the 2025 ACS Award for Creative Work in Fluorine Chemistry

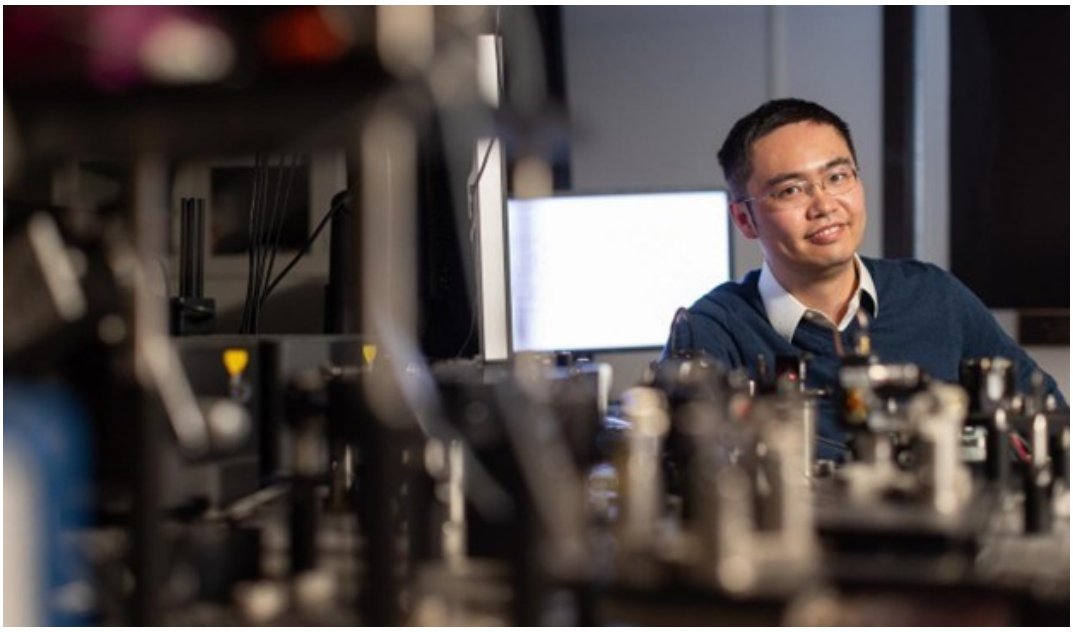
David Vicic accepts the 2025 ACS Award for Creative Work in Fluorine Chemistry from ACS President Dorothy Phillips and Fluorine Division Councilor David Dixon at the 2025 Spring ACS Meeting in San Diego.

This award, which recognizes outstanding contributions to the advancement of fluorine chemistry, is given once annually. ACS National Awardees are given a prize, a symposium in their honor at an ACS-sponsored meeting, and are highlighted at an awards ceremony at an ACS National Meeting. David's award symposium took place at the 2025 ACS Winter Fluorine Conference in Clearwater, FL. Write-ups of this achievement have been published by Lehigh (visit the article here) and by the student newspaper *The Brown and White* (visit the article here). David's research is centered on the many aspects of Fluorine Chemistry – particularly in the following two sub-areas:

A) Organic Methods Development: Simple fluorinated functional groups play important roles in the life sciences and materials fields, as well as in discovery chemistry in general. For example, the percentage of fluorinated pharmaceuticals among the total number of registered synthetic drugs is extraordinary (43% in 2019). Likewise, the percentage of fluorinated agrichemicals is equally impressive (53% from 1998 to 2020). As such, the development of more effective strategies to introduce fluorinated groups into organic substrates is a high priority in chemical synthesis. The long-term goal of the Vicic group's efforts is to develop *practical* strategies to incorporate small, fluorinated groups into organic scaffolds using earth-abundant metal catalysts.

B) Development of a Sustainable Refrigerant Lifecycle: Heating, ventilation, air conditioning, and refrigeration (HVACR) are essential to human quality of life but exact a significant environmental toll. Most current refrigerants are high-global-warming-potential (GWP) hydrofluorocarbons (HFCs) with up to 4,000 times the impact of CO_2. High HVACR-associated energy consumption and HFC leaks account for 7.8% of total greenhouse-gas emissions. HFCs' chemical stability, combined with challenges associated with separating HFC blends into components, make sustainable recycling and repurposing difficult. The Vicic group has begun an interdisciplinary project seeking to develop solutions to deal with the reclamation and repurposing of high-global warming potential (GWP) legacy refrigerants. These solutions are needed to prevent millions of metric tons of high-GWP refrigerants from leaking and illegally venting into the atmosphere.

Xiaoji Xu Honored with ACS PHYS Van Duyne Award and NAI Senior Membership



Photography By
Douglas Benedict,
Academic Image

Dr. Xiaoji Xu was recently awarded the prestigious 2025 Richard Van Duyne Early Career Award in Experimental Physical Chemistry by the American Chemical Society's Physical Chemistry Division (ACS PHYS) and was inducted as a Senior Member of the National Academy of Inventors (NAI). These accolades highlight Xu's groundbreaking contributions to nanoscale spectroscopy and his innovative spirit in advancing chemical physics.

The Richard Van Duyne Early Career Award, presented by the American Chemical Society (ACS)'s Division of Physical Chemistry (PHYS) yearly, recognizes outstanding contributions in experimental physical chemistry by an early-career investigator. Named after late Professor Richard Van Duyne, a luminary in physical chemistry and surface enhanced Raman spectroscopy, the award celebrates Xu's innovative research in nanoscale chemical imaging and spectroscopy. Xu's selection for the 2025 award highlights his development of novel techniques, such as peak force infrared microscopy, pulsed force Kelvin probe force microscopy, and AFM-2DIR that push the boundaries of material science and analytical chemistry. The award includes a presentation at the Fall 2025 ACS National Meeting in Washington, DC, where Xu will share his latest research works.

The National Academy of Inventors, a prestigious organization comprising U.S. and international universities, governmental agencies, and non-profit research institutes, recognizes Senior Members for their innovation and tangible impact on society. Senior Membership is an exclusive honor awarded to inventors affiliated with NAI Member Institutions who demonstrate exceptional achievements in creating or facilitating inventions that enhance quality of life, economic development, and societal welfare. Xu's induction, announced in Spring 2025, underscores his pioneering work in developing scanning probe microscopy techniques as evidenced by his multiple U.S. patents. His contributions align with the NAI's mission to foster innovation and mentor the next generation of inventors, a commitment reflected in his mentorship of PhD students like Qing Xie, who recently won the 2024 ACS PHYS Graduate Student Award, and his former PhD student, Haomin Wang, who recently won the 2025 ACS PHYS Young Investigator Award as a postdoctoral fellow after graduation from Lehigh.

Greg Ferguson

Since our last newsletter, our group has published two additional papers in the gold electrochemistry area, with Zahed as the first author:

"Mechanistic Analysis of Anodic Oxidation of Gold in KOH (0.1 M) Solution Using the Point Defect Model," Z. Ghelichkhah, D.D. Macdonald, G.S. Ferguson, *Corros. Mater. Degrad.* **2024**, 5(4), 450-475; https://doi.org/10.3390/cmd5040021. {Chosen by the journal as an issue cover.}

"Mechanistic Analysis of Hydrogen Evolution Reaction on Stationary Polycrystalline Gold Electrodes in H_2SO_4 Solutions," Z. Ghelichkhah, D.D. Macdonald, G.S. Ferguson, *Corros. Mater. Degrad.* **2024**, 5(2), 241-264; https://doi.org/10.3390/cmd5020010.

Fatema Amin has completed a manuscript, recently submitted, describing her work on the parameters that control the angle a surface needs to be tilted to cause a liquid droplet to begin to move –a technologically important problem with a rich theoretical and experimental history dating back a century or more! She has also written a draft of a manuscript describing the solvent-related rate enhancement of an autocatalytic hydrolysis reaction. Professor Ferguson recently had the opportunity to share some of the group's research in seminars at Virginia Commonwealth University, where his father taught economics (!) and West Chester University.

Lisa Fredin

The Fredin Group kept busy this year! Our second PhD student, Zach Knepp, successfully defended his thesis in April and will be starting as an Assistant Professor at Alfred University this fall! Allen Chen, an undergraduate physics major, graduated in May with high research honors in chemistry (and honors in physics and Eckardt Scholar). We had a visiting master's student from Japan in the group last year, as well as a new postdoc and multiple new graduate and undergraduate students join the lab. Our science portfolio remains large and we enjoy collaborating with experimental colleagues to translate some of our predicted properties in new materials and spectroscopic studies!

Four papers were published with work from the PURE (Photochemistry Undergraduate Research Experience) program. Two have undergraduates from the program as first authors:

Chen, R.H.; Knepp, Z.J.; Guzman, C.A.; Young, E.R.*; Fredin, L.A.*, Intramolecular Subtleties in Indole Azo Dyes Revealed by Multidimensional Potential Energy Surfaces. PhysChemChemPhys, 2025, 27, 6430-6437. (DOI: 10.1039/D5CP00110B)

Thongchai, I.A.; Knepp, Z.J.; Fertal, D.R.; Flynn, H.; Young, E.R.*; Fredin, L.A.*, Acid Violet 3: A Base Activated Water-Soluble Photoswitch. J. Phys. Chem. A, 2024, 128, 785-791. (DOI: 10.1021/acs.jpca.3c07128)

And two with PURE graduate mentors as first authors:

Knepp, Z.J.; Hamburger, R.C.; Thongchai, I. A.; Englehart, K.; Sorto, K.; Jaffer, A.; Young, E.R.*, Fredin, L.A.*, Pinning Down Small Populations of Photoinduced Intermediates Using Transient Absorption Spectroscopy and Time-Dependent Density Functional Theory Difference Spectra to Provide Mechanistic Insight into Controlling Pyridine Azo Dynamics with Protons. J. Phys. Chem. Lett., 2024, 15, 9593-9600. (DOI: 10.1021/acs.jpclett.4c02155) with Supplementary Cover (J. Phys. Chem Lett 15 2024) (toc/jpclcd/15/38)

Lisa Fredin (Cont'd)

Martin, S.M.; Hamburger, R.C.; Huang, T.⊥; Fredin, L.A.*; Young, E.R.*, Controlling Excited-State Dynamics via Protonation of Naphthalene-Based Azo Dyes. PhysChemChemPhys, 2024, 26, 10804-10813. (DOI: 10.1039/D4CP00242C)

In addition, two papers on inorganic defects and catalysis were published:

Khayata, D. ‡; Repa, G. M.†; Fredin, L. A.*, Adsorption and Disproportionation of Carbon Monoxide on Faceted-Gold Surfaces and Edges. Surf. Sci., 2024, 748, 122533. (DOI: 10.1016/j.susc.2024.122533)

Repa, G.M.†; Knepp, Z.J.†; Fredin, L. A.*, A-Site Doping to Alter Oxygen Vacancy Diffusion in SrTiO3. ACS Omega, 2024, 9, 26719-26723. (DOI: 10.1021/acsomega.4c04099)

As well as a new model to predict vibronically corrected transport in organic crystals:

Knepp, Z.J.; Fredin, L. A.*, Finite Displacement Boltzmann Transport Theory (Δ-BTE) Reveals the Detrimental Effects of High Frequency Phonons on Mobility. Phys. Rev. B, 2024, 109, 094307. (DOI: 10.1103/PhysRevB.109.094307)

Jebrell Glover

The Glover Lab currently has two active grants, one from the NSF entitled "Biophysical Studies of Lipid Droplets and their Associate Proteins" and one from the NIH entitled "Biophysical Studies of Caveolin." The Glover Lab currently has five graduate students: Katrina Brandmier, Jesika DeDonato, Sanaz Hashemipour, Khansaa Alshaloug, and Tyler Jones. Links to recent publications can be found on the Glover Lab web page: https://sites.google.com/lehigh.edu/glover-research-lab-lehigh/publications

Kai Landskron

The Landskron group continued its work on Supercapacitive Swing Adsorption (SSA) as a universal technology for carbon capture and removal. Graduate student Muhammad Bilal showed that SSA is greatly enhanced in the presence of oxygen, but energy consumption is also increased. By adjusting the voltage, an optimal trade-off between the two metrics can be achieved. Bilal graduated in May 2024 with a PhD degree, and is now a staff researcher at UCLA.

Graduate student Jiajie Li worked on SSA for direct air capture applications where CO_2 is much more dilute (0.04%). She showed that the CO_2 sorption capacity is still 20% of the amount adsorbed at a CO_2 partial pressure of 0.15 atm. Although improvements need to be made to the amounts of the CO_2 adsorbed, and the adsorption rates, the work shows potential for practical applications. Jiajie successfully defended her PhD thesis in February 2025, and she graduated in May 2025.

Further, graduate student Fareed Ul-Haq Khan worked on the investigation of the SSA mechanism, and showed that the pH undergoes significant changes as the electrodes get charged. The results explain why CO_2 gets adsorbed at the negative electrode, and desorbed at the positive electrode. He also worked on in-situ IR spectroscopic investigations of the SSA mechanism in collaboration with Dr. Xiaoji Xu. While this arm of research was plagued with some corrosion problems, it is hoped that the first relevant data can be collected in the near future. Fareed also first-authored a review on our SSA technology.

Adeel Hashmi joined the group in fall 2024. His primary responsibility is to improve the adsorption kinetics of SSA. Currently, we cannot make full use of the fast charge-discharge rates achievable with the supercapacitor,

Kai Landskron (Cont'd)

because of the slow adsorption. Adeel's work aims at a >10-fold increase of the rates that will reduce cycle times to a few minutes.

Postdoc Dr. Sanmi Adeodu worked on the development of a fully automated SSA system that processes a continuous gas stream and collects the separated gases. He demonstrated the feasibility of such a system comprising two SSA modules which are operated in semi-batch mode, with module one charging and adsorbing, and the other one discharging and desorbing. The system is fully operational now.

References:

1. Khan, Ul-Haq; Bilal, Muhammad; Li, Jiajie; Xu, Xiaoji; Landskron, Kai, Supercapacitive Swing Adsorption of CO_2: Advances and Future Prospects, Trends in Chemistry (2025), 7, 43-55.

2. Bilal, Muhammad; Li, Jiajie; Kumar, Neelesh; Mosevitzky, Bar; Wachs, Israel; Landskron, Kai, Oxygen-assisted Supercapacitive Swing Adsorption of Carbon Dioxide, Angew. Chem. Int. Ed. (2024), 63, e202404881.

3. Li, Jiajie; Bilal, Muhammad; Landskron, Kai; Supercapacitive Swing Adsorption For Direct Air Capture, ChemRxIV (2024), https://doi.org/10.26434/chemrxiv-2024-xb82b.

In our collaborative effort with the Pimputkar group in the Department for Materials Science and Engineering, graduate student Jacob Dooley continued to work on the solubility of boron nitride in ammonothermal environments. He was able to achieve growth of hexagonal and rhombohedral boron nitride. He also worked on the decommissioning of autoclaves suitable for crystal growth under acidic conditions. Hopefully, these autoclaves will allow for much higher solubility of BN leading to faster growth, and growth as c-BN phase.

Damien Thévenin

Professor Damien Thévenin was promoted to Full Professor and continued serving as Associate Editor of *The Journal of Membrane Biology*. During the Spring semester of 2025, Prof. Thévenin took a sabbatical to expand his research horizons, submit new funding proposals, and collaborate internationally. He spent part of this period at EPFL (Swiss Federal Institute of Technology Lausanne), working closely with Prof. Patrick Barth's research group, a leader in computational methods to predict and engineer membrane protein structures for synthetic biology and therapeutic applications.

Prof. Thévenin's graduate students also had a notably successful year: Emily Ankrom earned her PhD, Sophie Rizzo was recognized with the 2024 Student Research Achievement Award at the Annual Biophysical Society Meeting, and alongside Leah Knepper, their hard work was reflected in multiple significant publications, including studies on selective antibody recruitment to cancer cells, targeted acidosis-mediated antigen delivery, enhancing anti-cancer immune responses using acidosis-sensitive nanobodies, and microfluidic measurements of lipid-anchored proteins in collaboration with Prof. Aurelia Honerkamp-Smith (Physics, Lehigh University) (see next page for list of publications).

Additionally, the lab welcomed two new graduate students, Vinnie Andrews from Indiana University Bloomington (B.S. in Biochemistry) and Chad Propst from Moravian University (B.S. in Chemistry). They have already demonstrated strong dedication and enthusiasm, actively contributing fresh perspectives and hard work to our ongoing research initiatives.

Damien Thévenin (Cont'd)

Kelly, Joey J., Emily T. Ankrom, Sarah E. Newkirk, Damien Thévenin, and Marcos M. Pires. "Targeted Acidosis Mediated Delivery of Antigenic MHC-Binding Peptides." Frontiers in Immunology 15 (2024). doi: 10.3389/fimmu.2024.1337973.

Ankrom, Emily T., Brianna Dalesandro, Marcos M. Pires, and Damien Thévenin. "Selective Recruitment of Antibodies to Cancer Cells and Immune Cell-mediated Killing via In Situ Click Chemistry." ChemMedChem 19, no. 23 (2024): e202400356. doi: doi.org/10.1002/ cmdc.202400356.

Knepper, Leah E., Emily T. Ankrom, and Damien Thévenin. "Enhancing Anti-Cancer Immune Response by Acidosis-Sensitive Nanobody Display." The Journal of Membrane Biology 257 (2024): 391–401. doi: 10.1007/ s00232-024-00322-3.

Sasidharan, Sreeja, Leah Knepper, Emily Ankrom, Gabriel Cucé, Lingyang Kong, Amanda Ratajczak, Wonpil Im, Damien Thévenin, and Aurelia Honerkamp-Smith. "Microfluidic Measurement of the Size and Shape of Lipid-Anchored Proteins." Biophysical Journal 123, no. 19 (2024): 3478–89. doi: 10.1016/j.bpj.2024.08.026.

David Vicic

David Vicic was co-PI on an NSF Engineering Research Center entitled *"Environmentally Applied Refrigerant Technology Hub (EARTH)."* This high-profile award, totaling $26,000,000 over five years (to be shared with six universities), is renewable for another five years. Only four ERCs were funded nationally in 2025, with over 300 applications. David was one of the five founding members of the team, a co-PI, and was responsible for bringing in the minority-serving institution (University of Hawaii). Initial discussions about team building for this project began in January of 2021, and the final proposal was submitted in May of 2023. The team had to participate in site-visits and reverse site-visits before a funding decision was made by NSF in 2024. A link to a write-up about this ERC award, published by Lehigh, is provided here. Faculty members Lisa Fredin, Elizabeth Young, Jessecae Marsh, and Todd Watkins are also leading researchers of the Lehigh team.

David gave invited talks at Bristol Myers Squibb Co. (New Brunswick), Imperial College (United Kingdom), the 21st European Symposium on Fluorine Chemistry (Lisbon, Portugal), the 2025 ACS Winter Fluorine Conference (Clearwater, FL), Fluorine Frontiers: A Symposium Honoring the Legacy of Boris Žemva, Jožef Stefan Institute (Ljubljana, Slovenia), Halchem XI Conference, Johns Hopkins University (Baltimore), 2024 Fall ACS Meeting (Denver), 2024 ACS Mid-Atlantic Regional Meeting (Penn State), 28th Green Chemistry & Engineering Conference (Atlanta), and the 2024 South African Fluorine Symposium (Sun City).

Since the last newsletter, the Vicic group published the following scholarly works:

"Pyridine vs. Thiazole in Cyclometalated N^C^N Ni(II) Complexes" Kletsch, L.; Jordan, R.; Strippel, J.; Vicic, D. A.; Klein, A. *Inorganics* **2025**, *13*, 41.

"Nickel Perfluoroalkyl Complexes Supported by Simple Acetate Co-Ligands" Ravidas, C. M. T.; Shreiber, S. T.; Kletsch, L.; Klein, A.; Vicic, D. A. *Organometallics* **2024**, *43*, 706-712.

"Scrutinizing Formally Ni^{IV} Centers through the Lenses of Core Spectroscopy, Molecular Orbital Theory, and Valence Bond Theory" DiMucci, I. M.; Titus, C. J.; Nordlund, D.; Bour, J. R.; Chong, E.; Grigas, D. P.; Hu, C. -H.; Kosobokov, M. D.; Martin, C. D.; Mirica, L. M.; Nebra, N.; Vicic, D. A.; Yorks, L. L.; Yruegas, S.; MacMillan, S. N.; Shearer, J.; Lancaster, K. M. *Chem. Sci.* **2023**, *14*, 6915-6929.

Nathan Wittenberg

The Wittenberg Lab had a productive 2024-2025. In March, Aarshi Singh defended her PhD thesis (*Insights into Gram Negative Bacteria: Model Membrane and Secreted Vesicles*) before beginning a new job at a biotech startup in Philadelphia. Four graduate students (Aarshi Singh, Adeyemi Odudimu, Brett Berger, and Dane Santa) presented their research at the 2024 Biophysical Society annual meeting in Philadelphia. Aarshi also presented her work at the Eastern Analytical Symposium in Princeton, NJ, and Adeyemi presented at PittCon in Boston. In 2025, the Wittenberg Lab welcomed a new graduate student, Nick Manidis, to the group. Nick joins us after receiving his B.S. in Chemistry from Desales University. The past two spring semesters we have welcomed undergraduate researchers from Lehigh Carbon Community College. The research undertaken by these students was supported by Dane Santa's NSF Graduate Research Fellowship. The involvement of community college students in our research has served as a springboard for broader efforts at Lehigh, including the creation of the Research Experience at Lehigh (RE@L) program, which is administered by the Institute for Functional Materials and Devices (I-FMD). Undergraduate researcher Tiffany Ye graduated with a B.S. in Biochemistry and a B.A. in Chinese in the spring of 2025. Next fall, Tiffany will start in the Master's program in Laboratory Animal Science at Stanford University. After Stanford, Tiffany will enter the Doctor of Veterinary Medicine program at the University of Illinois.

The Wittenberg lab has recently published the following papers:

D.E. Santa, T.P. Brown, W. Im, N.J. Wittenberg. Atherosclerotic Oxidized Lipids Affect Formation and Biophysical Properties of Supported Lipid Bilayers and Simulated Membranes. *Journal of Physical Chemistry B* 2024, 128, 11694 - 11704.

A.N. Singh, M. Wu, T.T. Ye, A.C. Brown, N.J. Wittenberg. Engineering Planar Gram-Negative Membrane Mimics Using Bacterial Outer Membrane Vesicles. *Langmuir* 2024, 40, 23289 - 23300.

B.A. Berger, H.M. Vietor, D.W. Scott, H. Lee, S. Hashemipour, W. Im, N.J. Wittenberg, K.J. Glover. Physicochemical Properties of Seed Oil Blends and Their Potential for the Creation of Synthetic Oleosomes with Modulated Polarities. *ACS Omega* 2024, 9, 43193 - 43202.

J.L. Cawley, D.E. Santa, A.N. Singh, A.T. Odudimu, B.A. Berger, N.J. Wittenberg. Chaotropic Agent-assisted Supported Lipid Bilayer Formation. *Langmuir* 2024, 40, 20629 - 20639.

A.S. Feix, E.Z. Tabaie, A.N. Singh, N.J. Wittenberg, E.H. Wilson, A. Joachim. An In-depth Exploration of the Multifaceted Roles of EVs in the Context of Pathogenic Single-Cell Microorganisms. *Microbiology & Molecular Biology Reviews* 2024, 8, e00037-24.

A.N. Singh, J.B. Nice, M. Wu, A.C. Brown, N.J. Wittenberg. Multivariate Analysis of Individual Bacterial Outer Membrane Vesicles Using Fluorescence Microscopy. *Chemical & Biomedical Imaging* 2024, 2, 352 - 361.

S. Gee, K.J. Glover, N.J. Wittenberg, W. Im. CHARMM-GUI Membrane Builder for Lipid Droplet Modeling and Simulation. *ChemPlusChem* 2024, 89, e202400013.

T.P. Brown, D.E. Santa, B.A. Berger, L. Kong, N.J. Wittenberg, W. Im. CHARMM GUI Membrane Builder for Oxidized Phospholipid Membrane Modeling and Simulation. *Current Opinion in Structural Biology* 2024, 86, 102813.

Xiaoji Xu

Dr. Xu has given eight invited talks at conferences and universities in 2024-2025, and the Xu lab has published the following articles:

Qing Xie and Xiaoji G. Xu "Action-Based Two-dimensional Infrared Spectroscopy on the Horizon" The Journal of Chemical Physics, 162, 100901 (2025) (Featured perspective, editor's pick, front cover)

Hui Fang, Anupma Thakur, Amirhossein Zahmatkeshsaredorahi, Zhenyao Fang, Vahid Rad, Ahmad A. Shamsabadi, Claudia Pereyra, Masoud Soroush, Andrew M. Rappe, Xiaoji G. Xu, Babak Anasori, and Zahra Fakhraai "Stabilizing $Ti_3C_2T_x$ MXene flakes in air by removing confined water" Proceedings of the National Academy of Sciences, 121, 28, e2400084121 (2024)

Amirhossein Zahmatkeshsaredorahi, Devon S. Jakob, and Xiaoji G. Xu "Pulsed Force Kelvin Probe Force Microscopy—A New Type of Kelvin Probe Force Microscopy under Ambient Conditions" The Journal of Physical Chemistry C, 128, 24, 9813–9827 (2024) (Featured article)

Qing Xie, Yu Zhang, Eli Janzen, James H. Edgar, and Xiaoji G. Xu "Atomic-force-microscopy-based time-domain two-dimensional infrared nanospectroscopy" Nature Nanotechnology, 19, 1108-1115 (2024)

Former group member of the Xu lab, Dr. Haomin Wang started a tenure-track faculty position at Fudan University.

Elizabeth Young

Professor Young was promoted to Associate Professor with tenure in May 2024 (more details elsewhere in the issue). The Young Lab continues to grow and support learning and success among our graduate and undergraduate students. This spring, Domenica Fertal was awarded the prestigious ACS WCC Merck Research Award (more details elsewhere in the issue) and Nabeel Rifai won best talk for his talk at the 88th Intercollegiate Student Chemists Convention (ISCC) on March 29, 2025 at Muhlenberg College (more details elsewhere in the issue).

Professor Young was this year's Friend E. Clark Lecturer at West Virginia University. Since 1950, the Friend E. Clark Lecture Series has been co-sponsored by the Tau Chapter of Phi Lambda Upsilon and the C. Eugene Bennett Department of Chemistry at WVU. The long list of past Clark Lecturers includes Nobel laureates and prominent research scientists who have made diverse contributions to the field of chemistry. The visit to WVU involved two talks over a two-day visit and lots of interactions with the faculty and students in the chemistry department. Prof. Young's talks were entitled: "Chasing the Sun: Why it's Critical to Understand Light-Driven Charge Transfer for Efficient Solar Conversion" and "From Photodynamic Therapy to Controlling Excited-State Dynamics with Protons: Photophysics of Pd(II)biladiene, Azo Dyes, and Re(I)carbonyl complexes".

During 2024, Professor Young gave seminars at the University of Maryland, The College of New Jersey, University of Connecticut, Juniata College and the University of New Mexico.

Elizabeth Young (Cont'd)

Prof. Young with the PLU board members who organized and hosted the WVU visit

Over the summer, Professor Young and Professor Fredin continued the fourth year of the PURE program (Photochemistry Undergraduate Research Experience), which combines computation and experimental physical chemistry research. Five Lehigh undergraduate students participated in the summer program and continued their research projects during the 2024-2025 academic year. Since 2021, 16 Lehigh undergraduates have participated in the PURE program and 3 have graduated with Research Honors in Chemistry so far! Some other numbers about the program include: 28% of PURE students have continued to Graduate PhD programs; 17% have gone to Medical or Dental School; and 23% have found a job in Scientific Industry! See https://wordpress.lehigh.edu/younglablehigh/pure/ for more details.

Prof. Young (left), Nabeel Rifai (IDEAS '27), Domenica Fertal (grad), Sabine Dalias (Engineering '27), Allen Chen (Physics '25), Christian Guzman (grad), Matt Reeves (Chem '26), Vanessa Elias (Engineering '27), Prof. Fredin (right)

Elizabeth Young (Cont'd)

A few recent publications include:

Chen, A.H.; Knepp, Z.J.; Guzman, C.A.; **Young, E.R.***; Fredin, L.A.* "Intramolecular Subtleties in Indole Azo Dyes Revealed by Multidimensional Potential Energy Surfaces." *Physical Chemistry Chemical Physics* **2025**, *27,* 6430– 6437. (https://doi.org/10.1039/D5CP00110B)

**Part of the themed collection: Celebrating International Women's day 2025: Women in physical chemistry **

Knepp, Z.; Hamburger, R.C.[§]; Thongchai, I.A.[†]; Englehart, K.[†]; Sorto, K.[†]; Jaffer, A.[†]; **Young, E.R.***; Fredin, L.A.* "Pinning Down Small Populations of Photoinduced Intermediates Using Transient Absorption Spectroscopy and Time-Dependent Density Functional Theory Difference Spectra to Provide Mechanistic Insight into Controlling Pyridine Azo Dynamics with Protons." *Journal of Physical Chemistry Letters*. **2024**, *15,* 9593-9600. (https://doi.org/10.1021/acs.jpclett.4c02155)

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Martin, S.M.[§]; Knepp, Z.; Thongchai, I.A.[†]; Englehart, K.[†]; Jaffer, A.[†]; Sorto, K.[†]; Fredin, L.A.*; **Young, E.R.*** "The Doorstop Proton: Acid-controlled Photoisomerization in Pyridine-based Azo Dyes." *New Journal of Chemistry*. **2023**, *47, 11882-11889*. (https://doi.org/10.1039/D2CP04572A) [IF: 3.925, Cite: 0]

NJC Outstanding Paper Award 2023

Professor Elizabeth Young's Successful Tenure Decision

Professor Young was promoted to Associate Professor with tenure in May 2024.

Prof. Young is a photochemist who uses ultrafast and nanosecond laser spectroscopy to measure photophysics and photochemistry that occur on the picosecond (ps) to microsecond (μs) times scales. She earned her PhD at M.I.T. working with Prof. Daniel G. Nocera where she advanced the field of excited-state proton-coupled electron transfer (PCET) using a wide range of fascinating inorganic complexes. She was then an NSF-ACC postdoctoral fellow in the Electrical Engineering group of Prof. Vladimir Bulovic at M.I.T., where she learned how engineers tackle problems and developed intuition about solid-state materials and organic films in devices. Prof. Young began her independent career at Amherst College in 2012 and moved to Lehigh University in 2017.

Since she arrived at Lehigh in 2017, Prof. Young has used time-resolved spectroscopic techniques to uncover photophysics critical to a wide range of chemistry. At the center of her research efforts is transient absorption spectroscopy (TAS). TAS allows her and her research group to instantaneously (0.1 ps) initiate a chemical event and monitor (with sub-ps resolution) the progress of a reaction to identify the fates of photogenerated species. Research in her laboratory has:

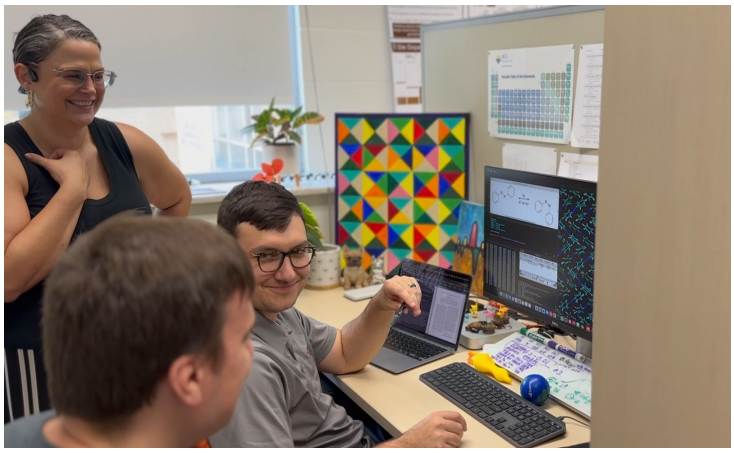
(1) quantified photoinduced charge-transfer dynamics and developed models for charge carrier mechanisms operative in thin films of light-absorbing materials used in solar cells;
(2) identified and controlled photoisomerization reactions of azo dyes known to convert photonic energy to potential energy, and developed reactions to degrade azo dye pollution released from the textile industry;
(3) uncovered new photophysical pathways in designer porphyrinoid moieties that can be used for a wide range of applications including photodynamic therapy; and
(4) designed excited-state proton-coupled electron transfer reactions in which the movement of both electrons and protons can lead to new reaction mechanisms and more facile reaction kinetics.

On her path to tenure, Prof. Young advised 5 PhD students, 1 M.S. student, 1 international M.S. student, 2 postdocs, and 18 undergraduate students. She also hosted two senior research fellows. Her first PhD student graduated in 2023. Prof. Young has had the privilege of being invited to present the research accomplishments of her group at more than 35 events, including national and international scientific conferences as well as academic seminars. In 2022, Prof. Young was awarded the Lehigh Early Career Award for Distinguished Teaching.

Prof. Young has been invited to take on leading service roles in her field. Upon invitation by the then-president of I-APS, Jim McCusker (MSU), she co-organized the Inter-American Photochemical Society's (I-APS) Winter Conference that took place on January 2-5, 2020 in Sarasota, FL. The conference attracted over 100 participants (from the U.S., Canada, and South America) and included 27 talks, 48 posters from research-intensive universities and National Labs. The conference program included a line-up of invited speakers covering a large range of topics in photochemistry and two evening poster sessions. She helped raise $22,000 in support from academic, industry, and publishing partners. As a result, she served as the co-editor of a special issue of *Photosynthetic Research* and wrote an introduction piece that highlighted I-APS and the importance of the photochemistry presented at the conference. In the fall of 2017, Prof. Young joined the leadership team of the Chemistry Women Mentorship Network, Chem WMN on which she continues to serve. The goal of the ChemWMN is to create a national network of women in academic chemistry to provide support, encouragement, and mentorship for young women considering careers in academia. ChemWMN sends out a comprehensive yearly newsletter, as well as three shorter quarterly newsletters to highlight relevant articles and promote discussion topics for women in chemistry. Her work with ChemWMN is a service to the community that supports women in STEM and elevates the visibility of Lehigh in this area. The Leadership Team published an invited editorial in 2019 to promote their work that was published jointly in *Inorganic Chemistry*, *Chemistry of Materials*, and *ACS Central Science*. The leadership team was invited to run an interactive, virtual workshop during Empowering Women in Organic Chemistry (EWOC) meeting (June 2023) that they entitled "Building Strong Mentoring Relationships and Finding Your Mentoring Team".

Professor Lisa Fredin Promoted to Associate Professor with Tenure

Professor Fredin was promoted to Associate Professor with tenure in May 2025.



Prof. Fredin is a computational materials chemist, interested in how geometric structure influences the electronic structure and therefore the measured properties of materials. She earned her B.S. in Chemistry, Biochemistry, and Applied Mathematics with a minor in Computer Science from the University of Texas at Austin. After taking advantage of undergraduate research opportunities in fields from microbiology to synthetic inorganic chemistry, she went to graduate school at Northwestern University, where she completed a joint computational-experimental PhD in the groups of Mark A. Ratner and Tobin J. Marks, synthesizing molecules, measuring material properties, and modeling devices of hybrid organic-inorganic dielectrics. Choosing to focus on theoretical chemistry, she accepted a postdoctoral associateship at Lund University in Sweden with Petter Persson, where she modeled the photochemistry of transition-metal complexes for light-harvesting. Dr. Fredin's research portfolio, initiated in 2015 as a National Research Council Research Associate at the National Institute of Standards and Technology in Gaithersburg, MD, draws on her background combining experiment and theory to develop computational and theoretical models of fundamental electronic properties to design materials with targeted properties. She moved to Lehigh University in 2018.

At Lehigh, the Fredin group develops models for a broad range of surface science applications, bridging physical chemistry, material science, nanoscience, and computation; as well as, probing the boundaries of the particle and wave approximations of electrons in materials. Prof. Fredin's research solves important problems in (i) interfacial and (ii) photochemistry using (iii) accurate structurally disordered models using quantum descriptions of electronic structure.

Prof. Fredin's contributions to the fields of theoretical and computational chemistry, photochemistry, and materials physics have garnered multiple awards including a 2024 Sloan Research Fellowship, as well as a "Rising Talent" talk at the American Conference on Theoretical Chemistry and a GRC Photochemistry "poster talk;" and led to more than 56 invited presentations at other universities, national and international scientific conferences.

As an Assistant Professor, Prof. Fredin advised four PhD students, two M.S. students, two postdoctoral researchers, and 18 undergraduate students. Her first PhD student graduated in 2024 and the second graduated in 2025; both students secured jobs in their chosen fields of patent law and as a tenure track faculty member at a primarily undergraduate university (Photo Above). In addition, two MS students have secured jobs in industry and as a teacher. Five undergraduate researchers have earned a Bachelor of Science with chemistry departmental research honors. Undergraduate students from the Fredin group have continued on to top-ten chemistry PhD programs (4 students), dental school (3), medical school (1), and other scientific positions (3).

Prof. Fredin focuses her professional and University service on providing professional development and skills training opportunities as early as possible in one's career. She co-pioneered an immersive yearlong research experience for early-career undergraduates (PURE) to increase the number of students who have experience with physical chemistry research. She runs an annual (~ 30 attendees/year) Quantum Chemistry Workshop that trains students who have at least completed general chemistry how to understand, run, and analyze the results of standard molecular and material density functional theory calculations.

Lisa Fredin (Cont'd)

In addition, during the pandemic she developed and organized the Photochemistry Spotlight symposia, expanding exposure for young faculty. This work lead to a symposium at a national American Chemical Society meeting and co-organizing the 2025 Inter-American Photochemical Society's (I-APS) Winter Conference.

Faculty Promotions

Dr. Andy Ho Promoted to Teaching Full Professor

Made official during the spring semester of 2025, Dr. Andy Ho has become the Department of Chemistry's first Teaching Full Professor! Andy joined the department at the start of the Fall 2009 semester as the general chemistry lab manager. During this time, his duties included teaching the CHM 31 & 41 labs, while also ensuring all of the general chemistry labs ran smoothly. In January 2013, he changed roles and became a Professor of Practice and Director of General Chemistry. In this new position, he was responsible for taking the lead in CHM 30 – in addition to teaching the course, he was in charge of the administrative side of the lecture component. Due to Lehigh introducing a new set of teaching faculty ranks in 2022, Andy's title changed to Teaching Associate Professor, though his responsibilities remained the same. Starting in Fall 2024, Andy became the department's associate chair. In addition to his departmental responsibilities, Andy also serves as a nonmajor advisor to incoming first year students.

Dr. Nathan Richey Earns Promotion to Teaching Assistant Professor

Congratulations to Dr. Nathan Richey on his promotion to Teaching Assistant Professor! Nathan obtained his B.S. in Chemistry at the University of Arizona, where he participated in undergraduate research studying the "total synthesis" of inorganic nanoparticles with Prof. Jeffrey Pyun. This led to an interest in inorganic chemistry and he went on to obtain his PhD in Inorganic Chemistry from the University of Florida with Prof. Lisa McElwee-White, where he worked on the synthesis of single-source precursors for thin film depositions. Taking time away from synthesis, he brought his knowledge of mechanistic chemistry to a chemical engineering lab at Stanford University, under Prof. Stacey Bent. There he learned more about vapor-phase deposition techniques, and he worked on atomic layer deposition of metals, semiconductors, and metal-organic thin films.

Before joining Lehigh University in 2024, he worked for several years at Lam Research, a leading semiconductor equipment manufacturer, as a process engineer. At Lam, he worked on developing plasma enhanced atomic layer deposition processes for dielectric materials used in microelectronic devices. He also participated in several collaborations between Lam and academic institutions during his time there.

At Lehigh, Nathan has enjoyed teaching introductory chemistry, which gives him a chance to influence students' perspective of chemistry at the very start of their collegiate journey.

Welcome New Faculty & Staff

Dr. Suzanne Fernandez joined our faculty as a Visiting Assistant Professor, beginning on August 15, 2024! Suzanne earned her PhD in Organic Chemistry at the University of Utah and has built a career as an experienced and accomplished educator at several colleges and universities. No stranger to the Lehigh campus, she was an excellent Professor of Practice in the department during the 2015-2018 period. Suzanne teaches the Organic I and II lectures (and runs their recitation sections). Welcome back, Suzanne!

In the summer of 2025, the Department of Chemistry will welcome Dr. Peng Li as an Associate Professor. Prof. Li received his PhD in Chemistry from Texas Tech University and did his postdoctoral research at Penn State University. Since 2016, Prof. Li has led a productive research group in analytical chemistry at West Virginia University. His multifaceted research program is at the forefront of new developments in mass spectrometric ionization sources, acoustofluidics in 3D printed microfluidic devices, and high-throughput point-of-care diagnostics. Peng's research output has been recognized with an NSF CAREER Award, the Rapid Communications in Mass Spectrometry Beynon Prize, and an Eli Lilly Young Investigator Award.

Dr. Monica Rieth will join our faculty as a Visiting Assistant Professor for the fall semester! Monica earned her PhD in Professor Jebrell Glover's group in 2013, followed by a postdoc with Professor Michelle O'Malley at UC Santa Barbara, and then began her independent career as an assistant professor at Southern Illinois University. She is currently a member of the Editorial Board of *Frontiers in Synthetic Biology*. Monica will be teaching the Elements of Biochemistry I (CHM 371) and Lipids and Membranes (CHM 373/472). Monica was also born and raised in the area, so she looks forward to catching up with family and friends while she's here.

Jamerson Baynard joined the Department of Chemistry as the Business Manager in July of 2024. Jamerson oversees all accounting aspects of the department and supports research and education in a variety of ways. He helps manage departmental activities and provides support for staff, faculty and students. He manages all the financial aspects of the department, maintains personnel files, works with students to meet their educational goals, and helps faculty manage and utilize grants and other funding. Prior to Lehigh, he worked as a department coordinator and service project manager. He holds an Associate degree in Management from Lehigh Carbon Community College, a Bachelor's degree in Business Management and Economics from Kutztown University, and a Master's degree in Business Administration from Cedar Crest College. Jamerson comes from a military background, serving 8 years in the United States Air Force. Additionally, he has over 20+ years of leadership, customer service, and organization experience. He enjoys traveling, music, outdoors activities, trying new restaurants, and spending time with his family and friends. Jamerson has been an American Red Cross Volunteer for over twenty years.

Peggy Buckley joined the Department of Chemistry as the Faculty Coordinator in January of 2025. Prior to her start at Lehigh, she spent twenty years working at the Bethlehem Area Public Library in the Circulation and Administration-Finance Departments. Lehigh University has been a part of her life for as long as she can remember. Several family members are alumni, and her maternal grandmother was a secretary in the Psychology Department during the 1970s-1980s. Peggy holds a B.A. in Spanish and English from Albright College. When she's not working, she enjoys exercising, baking, reading, and chasing after her four-year old son, Luca.

Professor Jim Roberts Retires… At Some Level

Jim Roberts formally retired from Lehigh on August 31, 2024, after 39 years as a member of the Department of Chemistry faculty.

Born and raised outside of Chicago, Jim attended the University of Illinois at Urbana, earning both Bachelor of Science in Chemistry with High Distinction and Bachelor of Arts in Physics degrees. A James Scholar (an Honors program that is discipline independent), he wrote two honors theses – one for his chemistry research with Professor Theodore L. Brown on nuclear quadrupole resonance, and a second on higher educational methods for the James Scholar program. He also spent two summers at Argonne National Laboratory in the high energy physics group before attending graduate school in chemistry at Northwestern University. Under Professor Brian Hoffman, his research involved electron paramagnetic resonance (EPR) and electron nuclear double resonance (ENDOR), continuing his development in magnetic resonance techniques. A postdoctoral appointment at the Massachusetts Institute of Technology Francis Bitter National Magnet Laboratory under Professor Robert Griffin completed his training, this time in solid-state nuclear magnetic resonance (NMR) spectroscopy. He was awarded an NIH National Service Research Award for his postdoctoral work. In August of 1985, he joined Lehigh as an Assistant Professor of Chemistry. In February of 1986, Jim was awarded a National Science Foundation Presidential Young Investigator Award.

Under Department of Chemistry Chair Doyle Daves, Lehigh was developing a partnership with Air Products and Chemicals Inc. to form a new, joint laboratory in NMR spectroscopy. Jim became a key player in that arrangement which lasted over 20 years, and ultimately helped bring three different modern NMR instruments to Lehigh. Two of them were shared with Air Products under the agreement.

During his Lehigh career, Roberts supervised 9 PhD graduates, three of which were jointly supervised by other faculty members. All but one of them had a major portion of their research involving NMR spectroscopy. With the advent of the Distance Education Program in 1991, he ultimately supervised approximately 50 M.S. students performing an independent research project at their respective companies. His first focus at Lehigh was on research. He ended his career with 68 published peer-reviewed journal articles, plus one book chapter.

Jim often said that he knew in high school that teaching would be an important part of his life. While at Lehigh, he taught 21 different courses (counting lecture and lab as separate entries). At various times, he taught both first and second semester general chemistry lectures, was the person in charge of both accompanying general chemistry laboratory segments, and for many years he was considered THE analytical chemist in the department. As such he taught the undergraduate-level analytical chemistry lecture and lab courses. After only a few years at Lehigh, he convinced the Chemistry Faculty to change the 1-credit analytical laboratory course into a 2-credit instrumental analysis lab and add a simultaneous 2-credit lecture course to accompany it. After about 15 years, Roberts updated the sequence again, combining these two courses and the advanced organic lab 2-credit course into the current year-long integrated sequence of two 3-credit lectures plus labs courses titled Advanced Chemistry Laboratory I and II..

Jim also taught several courses at the graduate level, including full lecture courses in NMR spectroscopy, chemometrics, and analytical method validation – the latter course was conceived primarily for the distance education audience, but on campus graduate students were able to take it also. He also developed several 1-credit graduate courses on the current analytical chemistry literature, NMR spectroscopy, EPR spectroscopy, electrochemistry, and chromatography. Some of these were based on American Chemical Society audio courses and were used when full-time graduate students took 10 credits each semester. While overseeing the American Chemical Society approval process for the Bachelor of Science in Chemistry degree program, Jim conceived, developed, and taught the 2-credit Professional Development Seminar to add missing required elements to the degree program. Based on this course, he then updated the graduate level Chemistry seminar course and taught it for several years.

Jim Roberts (Cont'd)

Service to others is a concept that Jim learned as a Boy Scout in his youth and has been reinforced by his 30 years as an adult volunteer in the Scouting program. He served two terms as Associate Chair in the Department of Chemistry, totaling almost half his time at Lehigh. He took on numerous additional responsibilities, including Safety Officer while still an Assistant Professor, and at various times he was the Faculty Graduate Coordinator and Advisor, TA Training Supervisor, Undergraduate Advisor, and performed many other roles. In the mid-1990s, Jim was elected to the University level Graduate and Research Committee, becoming Chair in the last year of his 3-year term. During that year, the decision was made to eliminate the Dean of the Graduate School position and distribute those responsibilities to the individual colleges. In the Fall of 1997, he was appointed as the co-Head Faculty Usher, becoming the Head Faculty Usher ten years later, and is continuing in that appointed position into retirement. Jim served on the Lehigh University Laboratory Safety Committee from its inception in 2003 until after retirement. For 15 years, he was the head of the Polymer Science Education Committee, has been a First Year Faculty Advisor since the changes started in 2015, and routinely continues to participate in events for prospective and accepted students for the College of Arts and Sciences. As the faculty advisor to Alpha Phi Omega, a co-ed non-residential fraternity based on the principles of leadership, friendship, and service, Jim actively participated in their meetings and service events for over 20 years. He was the Club Advisor of the year in 2014 for his work with APO. In 2017, Dean Hall awarded Jim the CAS Dean's Faculty Service Award for his contributions to Lehigh University, the College of Arts and Sciences, and the Department of Chemistry.

In the professional realm, Jim was the first "non-New Jersey" chair of the Northern New Jersey American Chemical Society NMR Topical Group in 1991. He organized 9 monthly meetings during the academic year, bringing in guest lecturers for dinner and a lecture presentation to an audience of between 35 and 100. He was the Treasurer for the Experimental NMR Conference for five years, before being elected to the three-year sequence of Chair-elect, Chair (1997), and Past Chair. This conference is still the preeminent international conference that covers all aspects of NMR spectroscopy. With the major vendors in the field participating, attendance in those years was between 1,300 and 1,600. Jim served on two NIH special panels, and on the NSF Chemistry Graduate Fellowship Panel from 2001 – 2003. He was also the Chair of the 5th Graduate Polymer Research Conference sponsored by the Polymer Division of the American Chemical Society. This conference was at Lehigh in 2003 and honored Professor Les Sperling of Lehigh.

In retirement, Jim is planning to continue his extensive musical activities on both French Horn and Cornet, which includes extending his 35 years as a member of the Lehigh Symphonic band and 26 years in the Lehigh Philharmonic Orchestra. He also plays in several other local groups and performs in public over 40 times per year with at least ten different groups. But if you ask him, he might say he is failing retirement. In Fall 2024, he taught a course at Lehigh and continues to fill six different limited roles at Lehigh, including cleaning out several laboratories so they can be prepared for new faculty members. Jim is also continuing his work in Scouting, primarily at the Council level after completing 26 years as a Scoutmaster. Spending more time with family is on the agenda, especially since his first grandchild was born in mid June.

Finally, Jim would be happy to hear from any former students. Lehigh keeps faculty email addresses active for retired faculty, so you may email him at james.roberts@lehigh.edu. He has also set up an endowment fund for the Department of Chemistry, to support undergraduate research and events that help develop the sense of community within the department. For more information or to contribute to this fund, contact the Department's Faculty Coordinator at 610-758-3470 or inchem@lehigh.edu.

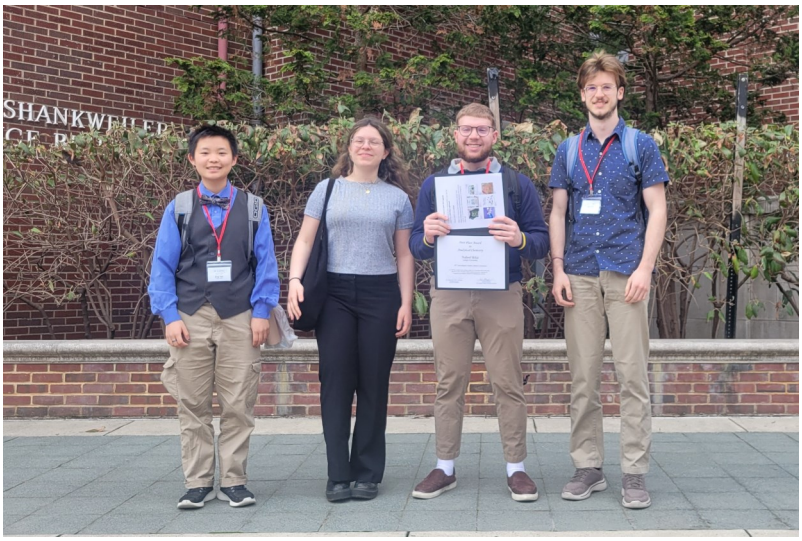
PhD Candidate Domenica Fertal Wins ACS WCC Merck Research Award

Domenica Fertal, a fourth-year graduate student in Professor Young's research group, was a 2025 recipient of the American Chemical Society's Women Chemists Committee (WCC) Merck Research Award. This award recognizes Domenica's research accomplishments and provides an opportunity to present her work at an awards symposium held during the upcoming Fall National Meeting of the ACS. You can learn more about the award at the award website (https://acswcc.org/awards/merck-research-award/) and about Domenica and her research in this Lehigh article (https://cas.lehigh.edu/articles/phd-candidate-domenica-fertal-wins-prestigious-acs-wcc-merck).

Lehigh Undergrad Wins First Place in Analytical Chemistry at Annual ISCC Convention

By Domenica Fertal, 2021 PhD Candidate

The Intercollegiate Student Chemists Convention (ISCC) is an annual convention that recognizes and celebrates research done by talented undergraduate researchers. Each discipline in chemistry is represented by students from various universities in the northeast. This year, Matthew Reeves (Chemistry '26), Vanessa Elias (Chemical Engineering, '27), Nabeel Rifai (IDEAS '27), and Jing Yan (IDEAS '27) presented their work at the ISCC that was hosted at Muhlenberg College. Matthew Reeves presented his work on the synthesis of a coumarin azo dye, Vanessa Elias and Nabeel Rifai presented their individual work on excitation wavelength-dependent azo dye photodegradation, and Jing Yan presented their work on the chemistry of Si/SiO2 interfaces explored computationally. They all put in a lot of work to make coherent and intriguing presentations, and the hard work paid off! Nabeel Rifai took home the First Place Award in Analytical Chemistry for excellence achieved in undergraduate research. We are proud of the work these students have done and look forward to more semesters with them in the lab!!

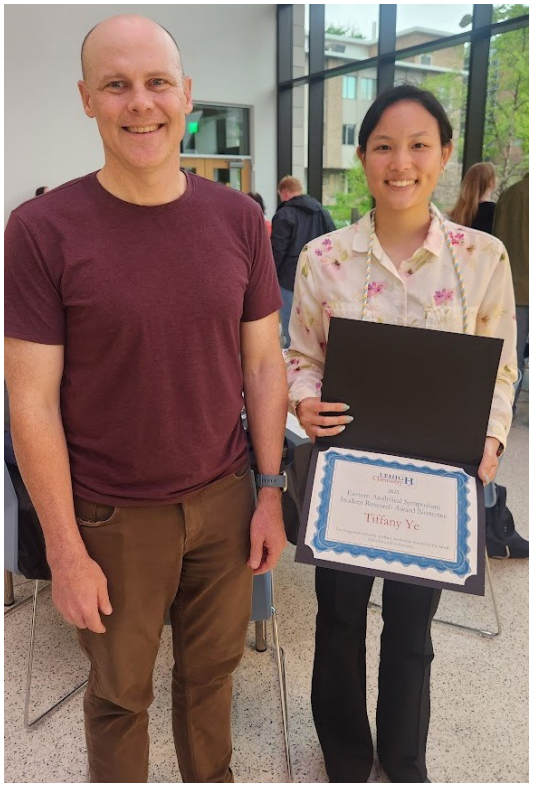


Pictured from Left: Undergraduate Students Jing Yan, '27, Vanessa Elias, '27, Nabeel Rifai, '27, Matt Reeves, '26

2025 Undergraduate Senior Excellence Awards Ceremony

The annual end of year celebration honoring the 2025 senior class from the Department of Chemistry was held on May 5th. The event, organized by Academic Coordinator Kerry Livermore and UAC Chair Professor Elizabeth Young, highlighted the accomplishments of various Chemistry and Biochemistry majors from Lehigh's class of 2025, along with the underclassmen who earned the highest GPA in their respective classes. Professor Young also took the opportunity to announce the re-establishment of Lehigh's Undergraduate Chemistry Club! Many of the department's faculty and staff joined in the festivities to show their appreciation for the hard work and dedication of their students.

PHOTO CREDIT: Jamerson Baynard



Photos: Top Right- Professor Elizabeth Young hands Brielle Byerley her award, Bottom Left - Professor Nate Wittenberg & Tiffany Yeh, Bottom Right - Tahmina Raisa & Lauren Boyle, Opposite Page - Graduating Chemistry & Biochemistry Majors

Awards Ceremony (Cont'd)

2024 - 2025 Undergraduate Awards

ACS Award	Jake Haber
ACS Division of Physical Chemistry	Zach Groner
American Institute of Chemists	Dan Wise
ACS Inorganic Chem. Award	Lorelai Lee Swanek
ACS Organic Chem. Award	Lauren Boyle
Biochemistry Award	Brielle Byerley
Harry M. Ullmann Chem. Prize	Dan Wise
William H. Chandler Chem. Prize (Senior)	Jake Haber
William H. Chandler Chem. Prize (Junior)	Matt Reeves
William H. Chandler Chem. Prize (Sophomore)	Jeremy Sumner
Alpha A. Diefenderfer Award / ACS Analytical Chem. Award	Julia DeAngelis
Eastern Analytical Symposium Student Research Award Nominee	Tiffany Ye
Royal Society of Chemistry Certificate of Undergraduate Excellence	Tahmina Raisa

2024 - 2025 Advanced Degrees

PhD - Chemistry:

Emily Ankrom - *The pH (Low) Insertion Peptide Selectively Delivers Immunotherapeutic Agents to Tumor Cells and Induces Immune Cell-Mediated Killing*

Muhammad Bilal - *Advancing Supercapacitive Swing Adsorption of Carbon Dioxide through Electrode Design, Charging Protocols, and Oxygen Stability Studies*

Zachary Knepp - *Modeling Excited States and Charge Transport with Density Functional Theory*

Jiajie Li - *Supercapacitive Swing Adsorption of Carbon Dioxide: Bipolar Stacks Scaling and Direct Air Capture Application*

Ugochinye (Nancy) Obioha - *Titanocene Redox Catalysis: A Sustainable System for Organic Radical Transformations*

Gil Repa - *A Deeper Understanding of Material Properties Through Computational Model Development*

Aarshi Singh - *Insights into Gram Negative Bacteria: Model Membrane and Secreted Vesicles*

Qing Xie - *Combining Atomic Force Microscopy with Infrared Lasers for High-Resolution Surface Analysis*

Master of Science - Chemistry:

Paria Aminroaia

Kimberly Maricle

Jessica Mickno

Welcome New 2024 Postdoc

Dr. L. Nambi Mohanam, Postdoctoral Research Associate, Fredin Group, PhD from University of California, Irvine

2023 - 2024 Teaching Assistants of the Year

Lydia Emswiler and Luc Mauro, TA Award Winners

This award was created to recognize those individuals who, through their dedication to academic rigor and student success, have distinguished themselves as outstanding teaching assistants.

It documents the high regard with which these two TAs are held by both the teaching faculty and the students they have supported in their learning endeavors throughout the year.

Welcome New 2024 Graduate Students

Oluwatoyosi (Naomi) Adelola, University of Medical Sciences, Ondo City, Nigeria

Cristabella Fortna, Drew University, Fredin Group

Adeel Hashmi, Lahore University of Management Sciences, Lahore, Pakistan, Landskron Group

B. Kumar, University of Kentucky, Xu Group

Nicholas Manidis, DeSales University, Wittenberg Group

Anthony Paolo, Marist College, Young Group

Jordan Polvere, Bucknell University, Young Group

2023 - 2024 Graduates Bachelor's Degrees

NAME	MAJOR
Nina Bautista	Biochemistry
Alice Chen	Biochemistry
Casey Conboy	Biochemistry
Kevser Dayi	Biochemistry
Simone Keck	Biochemistry
Drew Macensky	Biochemistry
Gabe Masso	Chemistry
Rosa Medina	Biochemistry
George Merrifield	Chemistry
Alex Meyer	Biochemistry
Mike Nah	Biochemistry
Roy Ndebvudzemene	Biochemistry
Robert Nedoluha	Chemistry
Kevin Sun	Biochemistry
Ing Thongchai	Chemistry
Raymond Yedlock	Biochemistry

2024 - 2025 Graduates Bachelor's Degrees

NAME	MAJOR
Perry Axelrod	Chemistry
Ashley Bishop	Biochemistry
Lauren Boyle	Chemistry
Brielle Byerley	Biochemistry
Clark Cui	Chemistry
Zach Groner	Biochemistry
Jack Grotke	Pharmaceutical Chemistry
Jake Haber	Chemistry
Shane Hall	Biochemistry
Aubrey Hunt	Biochemistry
Amelia Kennedy	Biochemistry
Lorelai Lee Swanek	Chemistry
Caroline McDowell	Biochemistry
Samantha Nassim	Biochemistry
Colin Panchelli	Chemistry
Amanda Pearson	Chemistry
Tahmina Raisa	Biochemistry
Dan Wise	Biochemistry
Tiffany Ye	Biochemistry
Maggie Zasowski	Biochemistry

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