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Fall 2019 Newsletter

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

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global ... Every Molecule Counts

The coming years will bring unprecedented challenges to the globe, which chemistry can help solve

- C&EN (April 15, 2019) "The Future of Chemistry"

DEPARTMENT OF CHEMISTRY

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ADAPTING THE DEPARTMENT OF CHEMISTRY TO MEET STUDENT NEEDS

Contributing to a "Prominent" campus by providing strong foundations and new avenues for learning

As the cooler fall weather arrives in the Lehigh Valley, we can take a few moments to reflect on where we've been and where we're going. Wow--it's been an eventful year! On the

personnel front, Dr. Lisa Fredin joined the faculty as an Assistant Professor, and Dr. Yang Yang joined the faculty as a Visiting Professor. Both colleagues did a fantastic job in their roles, teaching the foundations of the field in General Chemistry and building on that research foundation in Quantum Chemistry. Their time as our newest faculty members, however, was short-lived because in August, we welcomed Dr. Oriana Fisher as an Assistant Professor and Dr. Yang stepped into his new role as a Professor of Practice. Dr. Fisher's research area is biochemistry/ biophysics with a particular focus on the role of metal ions in bacterial proteins. Professor Fisher will occupy labs on the sixth floor of the Mudd Building. Dr. Yang will continue to support our growing student population by providing outstanding chemistry fundamentals.

The 2018–19 academic year was one of transition with a new graduate/ undergraduate coordinator and a new department chair learning how to do those jobs--as well as the impending retirement of our administrative associate. The coming year will bring its own changes, beginning with practical matters like where we park our cars and the construction of a new College of Health building in what was once the Whitaker parking lot. The fall 2019 semester also commences the University's 5-year plan to increase undergraduate enrollment by approximately 20%, which brings with it the logistical challenges of teaching many of those students General and Organic Chemistry. Nonetheless, our dedicated faculty and staff continue to be a source of confidence looking forward.

As always, we welcome your thoughts and ideas about the department-please stay in touch! We are always delighted to hear from our alumni and would be happy to welcome you for a visit if you have the time.



Department of Chemistry Seeley G. Mudd Building 6 E. Packer Avenue Bethlehem, PA 18015 Phone: (610) 758-3470 Fax: (610) 758-6536 https://chemistry.cas2.lehigh.edu

Department Chair Gregory S. Ferguson 610-758-3462 gf03@lehigh.edu Undergraduate & Graduate Coordinator Kerry Livermore 610-758-3471 kjl212@lehigh.edu

Faculty Coordinator (Newsletter Editor) Mary Roberson 610-758-3470 mwr217@lehigh.edu

You can e-mail the newsletter editor at mwr217@lehigh.edu.

Contact information for the faculty and previous newsletters are available on the department website:

https://chemistry.cas.lehigh.edu



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Lehigh Chemistry alums can be

found all across the globe-using their degrees to address universal 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 mwr217@lehigh.edu

Congratulations to Marge Sawyers on an Outstanding Career and Well-Deserved Retirement Adventures

After nearly 40 years of providing Lehigh University with outstanding and dedicated service, Marge Sawyers retired on August 30, 2019.

Arriving on the campus in 1970, she originally joined the Lehigh University family by accompanying her husband, Dr. Ken Sawyers, on his journey from a research position at Stanford Research Institute in Menlo Park, California, to his new position as an Assistant Professor in the Department of Mechanical Engineering & Mechanics. They soon began meeting numerous other faculty and families through the Lehigh University Women's Club. These connections led to many social interactions, including events held on the Lehigh campus. It was at one of these that Dr. Henry Leidheiser asked Marge if she would consider working for the Center for Surface and Coatings Research. Although she was just getting her two young children launched into their elementary educations, she was drawn to contributing to the world of academia and so joined that group in November 1979. From coordinating presentations across the campus, to processing voluminous paperwork, and even spending late nights helping to type theses, Marge thoroughly enjoyed working with Dr. Leidheiser and the faculty and graduate students in the Center.

By 1995, with the arrival of new technologies, change was in the air and Marge was at the forefront--ready for some new challenges. In July, she moved to the Department of Chemistry to serve as the Administrative Associate. The job she inherited 24 years ago bears little resemblance to the duties she performed in 2019. Tracking grants and transferring funds between indexes is now done with one click--but that click can move information so quickly and efficiently that experience and accuracy are paramount. Her attention to detail, professional oversight, and steady focus are just the beginnings of why she has been the linchpin in the smooth functioning of the Department of Chemistry. Further enhancing her administrative skills, Marge's keen sense of humor coupled with her great pride in the department make her the perfect administrator.

As the faculty who have spent so many years with her can attest, Marge has basically seen and heard it all. Dr. Ned Heindel, who has worked with her for her entire tenure in the Department of Chemistry, shared his thoughts: "Academia has become complicated, bureaucratic and legalistic in recent years, and Marge has helped professors and researchers navigate the complexities of appointments, expenditures, and closing grant years. We can't thank Marge enough for the countless times she has solved thorny financial problems for all of us. She will be sorely missed!"

Former Department Chair David Vicic noted that he would have been unable to do his job without her help. David shared that "Marge served with the highest standards of professionalism. She was able to plan and execute complicated and high-level tasks, as well as manage a range of unforeseen issues on a daily basis for the benefit of the Department. She will be greatly missed!"

Dr. Bob Flowers (former chair and current deputy provost) who worked with Marge for 11 years noted, "Marge has been a valued and exceptional contributor to the department. She was instrumental in assisting during the rebuilding of the department. From managing department grant budgets and startup packages, to finding housing for new postdocs and students, no task was too small--or too big--for Marge. Her efforts on behalf of the department will be missed and I wish her the best in retirement."

(Continued on Page 5- "Congratulations Marge")

XU LAB SHEDS LIGHT

Ability to reveal and characterize 3-D shape of polaritons around a nanostructure opens doors for optical communications and disease prevention/treatment.

Named in 2018 as one of only ten recipients of the prestigious Beckman Young Investigator Award, Dr. Xiaoji Xu is using the \$600K grant awarded by the Arnold and Mabel Beckman Foundation to support the development of a new and unique infrared microscopy technique.

According to a press release from the newswire service run by the American Association for the Advancement of Science (AAAS), Xu is developing a new infrared microscopy technique that "... bypasses the two current limitations of the current method: low spatial resolution due to the diffraction limit and incompatibility with the aqueous phase measurement due to the strong infrared attenuation from the water." Dr. Xu is leading his lab into advanced research on the 3-D shape of the polariton interaction around a nanostructure; thereby, empowering chemists and materials scientists to collect even more extensive information at the nanoscale level. Xu briefly shared some of the current endeavors of his lab with the editor of this newsletter:

Discoveries at the nanoscale are facilitated by superresolution microscopy that provides spectroscopic information with high spatial resolution. However, the optical diffraction limit bounds traditional microscopy techniques to approximately one half of the wavelength of the light.

AT NANOSCALE LEVEL

Despite the broad success of super-resolution fluorescence microscopies that bypass the diffraction limit, super-resolution spectroscopic

> microscopies without extrinsic labels remain to be fully developed. Dr. Xu's research group aims at developing super-resolution infrared imaging methods with < 10 nm spatial resolution without extrinsic fluoro-

phore or chemical labels. Their research extends in two main areas: (a) scattering-type near-field microscopy, and (b) peak force infrared microscopy. We have developed several imaging methods for different types of materials and samples.

Imaging and non-photonics manipulations of nanophotonic materials with peak force scattering-type near-field microscopy

Peak force scattering-type near-field microscopy (PF-SNOM) is a new type of scattering near-field

microscopy invented by Dr. Xu's group. PF-SNOM measures the three-dimensional near-field responses of nano-optical structures that contain information on the energy-mentum dispersion relations as well as extrinsic resonances. As nearfield microscopy, it is particularly useful for characterization of structures made of twodimensional polaritonic materials. This capability opens a new door for studying the structurefunction relationships of nanophotonics structures of two-dimensional materials made of graphene, hexagonal boron nitride, and transition metal dichalcogenides.



Further development and applications of peak force infrared microscopy

The second area, peak force infrared (PFIR) microscopy, was also invented by Dr. Xu's group at Lehigh University. It is an action-based microscopy with mechanical detection of photothermal expansion using atomic force microscopy (AFM) operated in the peak force tapping mode. PFIR provides simultaneous chemical and mechanical imaging with ~6-nm spatial resolution. It is particularly suitable for soft matters such as: structured block copolymers and polymer cells blends; biological with heterogeneous distributions of chemical compositions; anthropogenic aerosols; and organic matter embedded in an inorganic matrix, such as oil shale rocks. In the coming years, they are planning on collaborating with other researchers to characterize their samples.

Developing new AFM-based nanoscale spectroscopic tools

With support from the Arnold and Mabel Beckman Foundation and the National Science Foundation, Dr. Xu's group is developing a suite of new imaging tools beyond the existing techniques. Those new imaging tools provide additional chemical, mechanical, and electrical information of sample at the nanoscale with spatial resolutions at < 10 nm.

In the coming semester, Dr. Xu's research group is looking forward to the arrival of a new Yb:KGW femtosecond laser system with an optical parametric amplifier to provide a wide range of optical frequencies as well as time resolving capability for AFM-based laser spectroscopy and microscopy.

A native of Beijing, China, Xiaoji received his BS degree from Peking University and his PhD from the University of British Columbia. He served as a postdoctoral researcher at the University of Toronto under the supervision of Gilbert C. Walker and at the University of Colorado-Boulder working with Physicist Markus Raschke. He joined Lehigh University in 2014 as an Assistant Professor and quickly established a productive and ground-breaking laboratory. As noted by department chair, Greg Ferguson, " . . . he exemplifies the creativity and rigor valued by Arnold O. Beckman, one of the namesakes of the granting foundation, when he said 'There is no satisfactory sutbsitute for excellence.' "

Congratulations, Marge (Continued from Pg. 3)

In announcing her retirement to the faculty who depended on her skills and wisdom so regularly, current Department Chair Greg Ferguson stated, "Marge has been a pillar of stability and continuity in the department through the years, providing invaluable advice and assistance for our faculty, staff, and students, and helping to disentangle countless difficulties we have encountered along the way. The chairs of the department, in particular, have relied on her institutional knowledge, resourcefulness, organization, dedication, and attention to detail, especially regarding financial and personnel matters. We wish her the very best in her future adventures!"

With a deep devotion to the University, Marge and Ken were both thrilled to become Lehigh "P's" when their son (Clark) received his BS in Mechanical Engineering and their daughter (Karin) completed her BS in Chemical Engineering--and both now reside in Pennsylvania.

Although some choose to slow down upon reaching retirement, Marge and Ken look forward to finally having the time to visit extended family scattered across the US and also reconnect with the friends they made during their sojourns from Boston to San Francisco, and beyond. But as they have both proved in the last 49 years, there's no place like home! Which is exactly where they also plan to spend more time with their own family including their three pre-teen and teenage grandchildren.

Dr. Bob Syvret, a Research Fellow in the Vicic Lab and Chief Scientist of Electronic Fluorocarbons, LLC, received the flagship award of the ACS Division of Fluorine Chemistry – namely the 2020 ACS Award for Creative Work in Fluorine Chemistry. The award will be presented to Dr. Syvret for his broad contributions to industrial and inorganic fluorine chemistry at the Spring National ACS meeting in Philadelphia in March 2020.

Bob has had a major impact on fluorine chemistry. For example, he developed and commercialized important reagents that provide convenient fluorination tools to the international scientific community, ranging from the bench discovery chemist to scale-up process chemistry. He also developed key new process technologies involving emerging chemical substituents such as SF5 and OSF5.



Mark Chen

The Chen Lab has had a productive year in their efforts to develop new organic electronic materials by exploring open-shell (radical) character. In the coming year they plan to build on findings they published as an article in the Journal of the American Chemical Society (Wehrmann JACS, 2019, 141, 3240) regarding a new synthetic strategy for accessing rationally-designed, air-stable, open-shell compounds. In it they

describe how both neutral and ionic open-shell, π -conjugated molecules can be synthesized from commercial starting materials in 5-8 steps. Significantly, they developed a previously unreported π -radical cation (PCPL) that displays intermolecular electronic coupling in two dimensions within crystals that display electrical conductivities (10-2 S/cm) near levels of commercial organic materials. These compounds and their process are disclosed in an international patent application filed by the Lehigh Office of Technology Transfer. Prof. Chen presented these findings at the Crystal Engineering Gordon Research Conference in Newry, ME in June 2018, and at the Charles E. Kaufman Symposium in Pittsburgh, PA in October 2018. The Chen Lab, in collaboration with the Biaggio Lab in the Department of Physics, was also awarded a Collaborative Research Opportunity (CORE) Grant from Lehigh to investigate the unique optoelectronic properties of these compounds.

In the past few months his graduate students, Caleb and Imran, have made intriguing findings extending from the previous work, which thet are currently preparing as manuscripts to be published in the coming months. Briefly, Imran is in the process of characterizing a nitrogen analogue of PCPL that is not only electrically conductive, but also displays photoluminescence. Although luminescent radicals have promise for more efficient light emitting diodes (LEDs), very few are air stable, and this would be the first of its molecular class. Meanwhile, Caleb is using the PCPL compound to generate conductive films via spin-coating that are showing conductivities even higher than were observed in a single crystal. Additional data suggests that PCPL composite is a rare example of a water-processable, air-stable, electron transport (ntype) organic material. Prof. Chen presented these new results at the Physical-Organic Chemistry Gordon Research Conference in Holderness, NH in June 2019 and at the 18th International Symposium on Novel Aromatic Compounds (ISNA-18) in Sapporo, Japan in July 2019.



Greg Ferguson

Professor Ferguson's group had a great year, fascinated by their research on the electrochemistry of gold metal and its oxide, synthetic surface chemistry on oxide-coated silicon wafers, and the question of whether the "roll-off angle" of a liquid droplet on surface depends on its adhesion to the surface. Their most recent paper was published earlier this year in the Journal of the Electrochemical Society (2019, 166, H47-H53) and

provides detailed study of the open-circuit behavior of anodic gold oxide. Another manuscript was recently accepted on the silicon surface chemistry project. In personnel news, senior group member, Kiran Khadka, will be finishing his PhD in the near future, and they welcomed a new member, Zahed Ghelichkhah in January.



Robert Flowers

Robert Flowers gave two invited lectures at Brown and Cornell Universities entitled: "Follow the Thread: The Role of Proton-Coupled Electron Transfer in Substrate Reduction by Sm(II)-Water Complexes." He also gave invited lectures at international conferences, including the Inorganic Reaction Mechanisms Gordon Research Conference, on "Inorganic Reaction Mechanism of Substrate Reduction by Sm(II)-Water Proton Donor Complexes." Bob was also selected as a Fellow of the Royal Society of Chemistry in November 2018.

His group published the following papers during the past academic year:

Chciuk, T.V.; Anderson, W.R.; Flowers, R.A., II "The Interplay between Substrate and Proton Donor Coordination in Reductions of Unactivated Carbonyls by SmI2-Water Through Proton-Coupled Electron-Transfer" J. Am. Chem. Soc. 2018, 140, 15342-15352.

Ramírez-Solís, A.; Bartulovich, C.O.; Chciuk, T.V.; Hernández-Cobos, J.; Saint-Martin, H.; Maron, L.; Anderson, W.R.; Li, A.M.; Flowers, R.A., II "On the Aqueous Solvation of SmBr2 and the Mechanistic Impact of Substrate Reduction" J. Am. Chem. Soc. 2018, 140, 16731-16739.

Maity, S.; Flowers, R. A., II "Mechanistic Study and Development of Catalytic Reactions of Sm(II)" J. Am. Chem. Soc. 2019, 141, 3207-3216.

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Lisa Fredin

The Fredin Group is now up and running with over a million computing hours per year from a combination of Lehigh's HPC and NSF XSEDE. Two Lehigh undergrads and a Physics summer REU student joined the group this year modeling a variety of photo- and catalytic chemistries, including light-driven faceted-metal nanoparticle catalysis, conduction in open shell organic materials, and supported biomass catalysts

The group is building computational methodologies bridging physical chemistry, material science, and nanoscience to study a broad range of materials as they are used experimentally, including disorder. In addition to fundamental discoveries, they are realizing the technological potential of the research by collaborating with synthetic chemists and material scientists, spectroscopists, and engineers.



Jebrell Glover

Dr. Glover traveled to Le Pouliguen – La Baule, France in May to give a talk at the "Caveolae and Nanodomains: Translating Structural Principles and Dynamics into Function" conference. His graduate student, Jeffrey Julien, presented a poster.

The Glover group published a collaborative paper in the *Journal of Computational Chemistry* entitled "U-shaped Caveolin-1 Conformations are Tightly Regulated by Hydrogen Bonds with Lipids" with the group of Dr. Wonpil Im. Former Glover lab member Jinwoo Lee accepted a tenure track position at University of Maryland, College Park.

Dr. Glover was also awarded a NSF MRI award to upgrade the aging departmental 500 MHz NMR instrument with a new console and a cryoprobe.



Kai Landskron

Dr. Landskron, in conjunction with Siddha Pimputkar (Materials Science and Engineering), received a NSF award for the ammonothermal growth of cubic boron nitride single crystals for ceramics and microelectronics applications. In addition, Landskron and his lab have published the following papers thus far in 2019:

Murialdo, M.; Weadock, N.J.; Liu, Y.; Ahn, C.C.; Baker, S.E.; Landskron, K.; Fultz, "B. High-Pressure Hydrogen Adsorption on a Porous Electron-Rich Covalent Organonitridic Framework." *ACS Omega* **2019**, *4*, 444–448.

Najiba, S.; Juhl, S.J.; Mandal, M.; Liu, C.; Durygin, A.; Chen, J.; Fei, Y.; Alem, N.; Landskron, K. "Synthesis of Nanopolycrystalline Mesoporous Diamond from Periodic Mesoporous Carbon: Mesoporosity Increases with Increasing Synthesis Pressure" *Scr. Mater.* **2019**, *162*, 350–354.

Stepniowski, W.J.; Paliwoda, D.; Chen, Z.; Landskron, K.; Misiolek, W.Z. "Hard Anodization of Copper in Potassium Carbonate Aqueous Solution" *Mater Lett* **2019**, 252, 182-185.

Zhu, S.; Li, J.; Toth, A.; Landskron, K. "Relationships between Electrolyte Concentration and the Supercapacitive Swing Adsorption of CO2" ACS Applied Materials & Interfaces **2019**, *11*, 21489–21495.



Marcos Pires

During the past year, the Pires laboratory continued to push the boundaries of integrating chemical probes to better understand cell surface composition and assembly. Dr. Pires presented invited talks at the American Chemical Society spring conference, where he also chaired a session. Dr. Pires also chaired a session at the American Peptide Symposium. His research group had the following publications:

Feigman, M.J.S. and Pires, M.M. "Synthetic Immunobiotics: A Future Success Story in Small Molecule-Based Immunotherapy?" *ACS Infect Dis.* **2018**, *4*, 664–672.

Kim, S.; Pires M.M and Im, W. "Insight into Elongation Stages of Peptidoglycan Processing in Bacterial Cytoplasmic Membranes." *Sci Rep.* **2018** *8*, 17704.

Pidgeon, S.; Nelson, J.; Shaku, M.; Pavelka, M.; Kana, B. and Pires, M.M. "L,D-transpeptidase Specific Probe Reveals Spatial Organization of Peptidoglycan Crosslinking" *ACS Chemical Biology* **2018** *In Press.*



Steve Regen

Professor Regen and his group published the following papers:

Wang, C.; Almeida, P. F.; Regen, S.L. "Net Interactions That Push Cholesterol Away From Unsaturated Phospholipids Are Driven By Enthalpy" *Biochemistry* **2018**, *57*, 6637-6643.

Pramanik, N.B.; Tian, C.; Stedronsky, E.R.; Regen, S.L. "Layer-By-Layer Assembly Modulated By Host-Guest Binding" ACS *Appl. Polym. Mater.* **2019**, *1*, 141–144.

Pramanik, N.B.; Regen, S.L. "Layer-By-Layer Assembly of a Polymer of Intrinsic Microporosity: Targeting the CO2/N2 Separation Problem" *Chem. Commun.* **2019**, *55*, 4347–4350.



David Vicic

Since the last newsletter, David gave invited talks at: Princeton University; the 24th ACS Winter Fluorine Conference in Clearwater, Florida; the ACS National Meeting in Orlando, FL; and at the International Conference on Fluorine Chemistry in Himeji, Japan. During the summer he gave invited talks at the 19th European Symposium on Fluorine Chemistry in Warsaw, Poland as well as at the International

Symposium on Fluorous Technologies in Shanghai, China. David was elected to serve as Chair of the 2023 ACS Winter Fluorine Conference. Undergrad Renee Fang and David Vicic received a 2019 Moissan Summer Undergraduate Research Fellowship from the ACS Division of Fluorine Chemistry. The fellowship provided a stipend for Renee and funds for materials to perform research during the summer. The Vicic group published the following papers:

Yang, Y.; Zhou, Q.; Cai, J.; Xue, T.; Liu, Y.; Jiang, Y.; Luo, G.; Chung, L.W.; and Vicic, D.A. "Exploiting the Trifluoroethyl Group as a Precatalyst Ligand in Nickel-Catalyzed Suzuki-Type Alkylations" *Chem. Sci.* **2019**, in press.

Kosobokov, M. D.; Xue, T.; Vicic, D. A. "Synthesis of an Anionic Derivative of the Terpyridine Ligand" *Polyhedron* **2018**, 155, 366-369.



Nate Wittenberg

Nate Wittenberg was once again awarded the Lehigh Class of '68 Faculty Fellowship to support research activities. His research has lead to invitations to give an invited lecture at Elizabethtown College, present research at the Eastern Analytical Symposium in Princeton, NJ, and present a poster at the Annual Meeting of the Biophysica Society in Baltimore, MD.

Three graduate students from the Wittenberg Lab have also presented research during the past year. Ashley Baxter gave an oral presentation of her research at PittCon 2019, while Megan Blauch and Jennie Cawley also presented posters at the conference which was held in Philadelphia. PittCon is the world's leading annual conference on laboratory science.

Dr. Wittenberg has recently published the following papers:

Ryu, Y.S.; Jordan, L.R.; Wittenberg, N.J.; Kim, S.M.; Yoo, D.; Jeong, C.; Warrington, A.E.; Rodriguez, M.; Oh, S.H., Lee, S-D. "Curvature Elasticity-Driven Leaflet Asymmetry and Interleaflet Raft Coupling in Supported Membranes" *Advanced Materials Interfaces* **2018**, *5*, 1801290

Vala, M.; Jordan, L.R.; Warrington, A.E.; Maher, L.J., III; Rodriguez, M.; Wittenberg, N.J.; Oh, S-H. "Surface Plasmon Resonance Sensing on Naturally Derived Membranes: A Remyelination–Promoting Human Antibody Binds Myelin with Extraordinary Affinity" *Anal Chem* **2018**, *90*, 12567 – 12573.

Ertsgaard, C.T.; Wittenberg, N.J.; Klemme, D.J.; Barik, A.; Shih, W-C.; Oh, S-H. "Integrated Nanogap Platform for Sub-Volt Dielectrophoretic Trapping and Real-Time Raman Imaging of Biological Nanoparticles" *Nano Letters* **2018**, *18*, 5946 – 5953.



Xiaoji Xu

Dr. Xu has been granted a CAREER award from the National Science Foundation for the development of a new type of spectroscopic scanning probe microscopy.

His lab has published the following papers:

Jakob, D.S.; Wang, L.; Wang, H.; and Xu, X.G. "Spectro-mechanical Characterization of Aromaticity and Maturity of Kerogens in Oil Shale at 6 nm Spatial Resolution" *Analytical Chemistry* **2019**, (doi.org/10.1021/acs.analchem.9b00264)

Jakob, D.S.; Wang, L.; Wang, H.; and Xu, X.G. "Spectro-Mechanical Characterizations of Kerogen Heterogeneity and Mechanical Properties of Source Rocks at 6 nm Spatial Resolution" *Analytical Chemistry* **2019**, *9*1, 8883–8890

Wang, L.; Wang, H.; Vezenov, D.V. and Xu, X.G. "Direct Measurement of Photo-Induced Force for Nanoscale Infrared Spectroscopy and Chemical-Sensitive Imaging" *The Journal of Physical Chemistry C* **2018**, 122, 23808



Liz Young

Summer was a busy time in the Young Lab. They welcomed two undergraduate research students for summer fellowships: Hannah Rarick from Willamette University was part of the Physics REU program and Brianna Maslonka from Lehigh was part of the HHMI-funded Biosystems Dynamic Summer Institute. Lena Nguyen joined the Young Lab for part of her Master's work from the University of Erlangen in Germany. Their

post-doctoral Researcher, Dr. Amanda Oldacre, obtained a tenure-track position at St. Lawrence University in Canto, NY and left the group at the end of July. We all wish her the best of luck.

The Young Lab studies how molecular structure influences the properties of molecules, specifically molecules that absorb visible light and use that energy to carry out interesting reactions. The lab designs model systems for photo-induced proton-coupled electron transfer reactions, characterizes the photo-physics of molecules and materials for solar cells, and is developing effective photosensitizers for photodynamic therapy for cancer treatment.

Professor Young and her lab published several articles this past year on her work with proton-coupled electron transfer and the photo-physics of several interesting donor-acceptor systems. Included in the publication list is a perspective piece in *Science* on how to design first-row transition metal complexes for photochemical reactions.

Strahan, J.; Popere, B.C.; Khomein, P.; Pointer, C.A.; Martin, S.M.; Oldacre, A.N.; Thayumanavan, S. and Young, E.R. "Modulating Absorption and Charge Transfer in Bodipy-Carbazole Donor-Acceptor Dyads through Molecular Design." *Dalton Transactions* **2019**, *48*, 8488-8501.

Oldacre, A.N.; Pointer, C.A.; Martin, S.M.; Kemmerer, A. and Young, E.R. "Anthracene-Based Azo Dyes for Photo-Induced Proton-Coupled Electron Transfer" *Chemical Communications* **2019**, *55*, 5875–5877.

Drolen, C.; Conklin, E.; Hetterich, S.J.; Krishnamurthy, A.; Andrade, G.A.; Dimeglio, J.L.; Martin, M.I.; Tran, L.K.; Yap, G.P.A.; Rosenthal, J. and Young, E.R. "pH-Driven Mechanistic Switching from Electron Transfer to Energy Transfer between [Ru(bpy)3]2+ and Ferrocene Derivatives." *J. Am. Chem. Soc.* **2018**, *140*, 10169–10178.

Young, E.R. and Oldacre, A.N. "Iron Hits the Mark." Science 2019, 363, 225–226.

The Young lab group at a summer BBQ at Prof. Young's home to welcome Hannah, Brianna, and Lena and to bid farewell to Dr. Oldacre.



From L to R: Shea Martin, Liz Young, Craig Pointer, Lena Nguyen, Brianna Maslonka, Amanda Oldacre and her fiancé, Jim Burdick

Faculty News



Oriana Fisher Assistant Professor

Dr. Oriana Fisher earned a B.S./M.S. in Biochemistry at Brandeis University and also completed a second major in English and a minor in Chemistry. There, she developed an interest in biochemistry and structural biology while working as an undergraduate researcher in the joint laboratory of Dr. Gregory A. Petsko and Dr. Dagmar Ringe. She then went on to earn a Ph.D. in Pharmacology from Yale University. Her graduate research in the laboratory of Dr. Titus J. Boggon used Xray crystallography to determine the first structures of a disease-associated protein called CCM2 and elucidated the basis by which it interacts with its protein binding partners.

Prior to coming to Lehigh, Dr. Fisher was an NIH NRSA postdoctoral fellow at Northwestern University in the laboratory of Dr. Amy C. Rosenzweig, where she expanded her technical expertise to include bioinorganic chemistry and bacterial genetics. Her postdoctoral research focused primarily on a copper-binding protein produced almost exclusively by methane-oxidizing bacteria, and included the discovery of a unique copper center within it that is critical for cellular viability under copper-replete conditions.

At Lehigh, the Fisher group will use approaches including X-ray crystallography, bioinformatics, bioinorganic chemistry, and bacterial genetics to tackle questions about enzymes and metalloproteins involved in bacterial copper homeostasis and signal transduction.

Yang Yang Professor of Practice

Dr. Yang Yang obtained his Ph.D. in Theoretical Chemistry from the Department of Chemistry at the University of Wisconsin-Madison (UW-Madison), followed by joint postdoc training at the NASA Astrobiology Institute, the Department of Geoscience, and the Department of Chemistry at UW-Madison. Dr. Yang enjoys teaching and research, and wants to share his deep understanding of chemistry with Lehigh's students. Before joining the University, Yang taught a broad range of chemistry courses at various institutions--from introductory general chemistry to advanced theoretical chemistry at the graduate level. Yang's research focuses on understanding molecular behaviors with theoretical and computational approaches. He looks forward to getting to know new students and sharing fun chemistry concepts at Lehigh!

Yang published the following papers during the past academic year:

Yang, X.; Wang, M.; Yang, Y.; Cui, B.; Xu, Z.; Yang, X. "Physical Origin Underlying the Prenucleation-clustermediated Nonclassical Nucleation Pathways for Calcium Phosphate" *Phys. Chem. Chem. Phys.* **2019**, *21*, 14530-14540 (available online and selected to be featured on the journal back cover).

Wang, X.; Wang, M.; Wei, Q.; Yang, X.; Yang, Y.; Cui, B.; Yang, X.; Xu, Z. "Modulation of Solid-water-peptide Interfacial Properties towards Surface Adsorption/Bioresistance" *Applied Surface Science* **2019**, 483, 373-382.

Undergraduate Student Awards - 2019

American Chemical Society Award Presented to the outstanding senior majoring in chemistry: Weng Si Chan

American Chemical Society Inorganic Chemistry Award Presented to the outstanding senior majoring in inorganic chemistry: Dominick Falcon

American Chemical Society (Organic Division) Organic Chemistry Award This award recognizes a senior student who displays a significant aptitude for organic chemistry and encourages further interest in the field.: Guanwei Zhou

American Chemical Society (Physical Division) Organic Chemistry Award Presented to the outstanding senior majoring in physical-organic chemistry: John Scudder

American Institute of Chemist's Award For an outstanding senior majoring in chemistry or biochemistry: Guanwei Zhou

Alpha A. Diefenderfer Analytical Award

Presented to the highest-ranking junior in analytical chemistry, sponsored by the ACS Division of Analytical Chemistry: Cayse Coachys

Biochemistry Award Given to the highest-ranking junior or senior biochemistry major: **Brooke Lichak**

Harry M. Ullmann Chemistry Prize

Awarded to the highest-ranking senior in chemistry: Guanwei Zhou

William H. Chandler Senior Prize

Established in 1920 by Mrs. Chandler and presented to the highest-ranking Chemistry Department senior: Guanwei Zhou

William H. Chandler Junior Prize Presented to the highest-ranking Junior in the Chemistry department: Giorgos Hiotis

William H.Chandler Sophomore Prize

Presented to the highest-ranking sophomore in the Chemistry Department: Joseph Saba

Graduate Student Fellowships - 2019-2020

Hornor Fellowship: Devon Jakob University Fellowship: Gil Repa Fulbright-Pakistan Scholar (2017-2019): Muhammad Imran

Department of Chemistry • Page 1

Fall 2018

Ph.D. Graduates

Sean Pidgeon – "Bacterial Cell Surfaces: Exploiting the Antibiotic Resistant Pathway" (November 20, 2018)

Dr. Pidgeon received the 2019 Elizabeth V. Stout Dissertation Award for the College of Arts & Sciences. The College may grant one Stout Award each year to recognize significant scholarly achievement in a dissertation project.

Spring 2019

Janessa Gerhart – "Inducing Cancer Cell Cytotoxicity with Selective Peptide Therapeutics" (April 18, 2019)

Summer 2019

Le Wang - "Nanoscale Infrared Microscopy via Atomic Force Microscope (July 18, 2019)

Master's Graduates

Ryan Charlton – Chemistry Md Reaid Hasan – Chemistry Lucie Loftus – Chemistry Chengshuo Tian – Chemistry Amanda Rennig – Biochemistry Laura Rae Taylor – Biochemistry Darian Waugh – Chemistry

Bachelor's Graduates

BA Chemistry: Anthony Varshavskiy

BS Chemistry: John Scudder

BS Biochemistry: Joseph Belcastro, Maxine Derrick, Lana Fabia, Dominick Falcon, Brooke Lichak, Anmol Madaan, Ian Mason, Lauren McKinley, Kaitlyn Rodriguez, Daniel Weaver, Guawei Zhou,

BS Pharmaceutical Chemistry: Weng Chan, Ashini Patel, Long Ting Shao, Eunice You

"What you get by achieving your goals is not as important as what you become by achieving your goals."

-Henry David Thoreau



Congratulations 2019 Teaching Assistant Award Winners Alexis Apostolos and Bil Leon This award is given in recognition of

graduate students who, through dedication to academic rigor and student success, have distinguished themselves as outstanding teaching assistants



It is good

 \mathbb{U}^{T} It is the journey that matters

to have an end to journey towards;



While Dr. Jebrell Glover was an invited speaker this past May at a conference that was focused on caveolae and nanodomains (hosted by EMBO [European Molecular Biology Organization] in Le Pouliguen, France), his graduate student, **Jeff Julien**, also attended this conference and presented a poster titled "Evaluation of the Oligomeric State of Caveolin-1." The poster presentation was an exciting opportunity for Jeff to to communicate his science with experts in the caveolae field, during which he received both positive and constructive feedback on the progress of his project thus far. Over the course of the five-day conference, Jeff was also able to meet and converse with several scientists,

post-docs, and graduate students from across the globe who have all contributed to the caveolae field. Given that this was the first time he attended a conference as a graduate student, it was both helpful and intriguing to see the most recent progress in the field happening globally. Jeff considers his attendance as an invaluable experience that has assisted him in developing new ideas to strengthen his own research efforts. In addition to the conference, Dr. Glover and Jeff also took the time to explore different regions of France, including the cities of Marseille and Paris. Overall, both the conference and excursions were a pleasant experience that Jeff hopes future graduate students will be able to enjoy when the opportunity arises!

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In late August, graduate student **Scott Shreiber** of the Vicic Lab Group attended the 19th European Symposium on Fluorine Chemistry in Warsaw, Poland. Scott attended the conference along with his advisor, Professor David Vicic, who gave an invited talk. Scott presented at one of the evening poster sessions on his recently published work (Organometallics **2019**, *38*, 3169–3173) and received one of the *Best Poster* prizes. He discussed his research with experts in the field and even had the opportunity to field questions from Nobel Laureate Roald Hoffman. He attended talks given by some of the pioneers of fluorine chemistry including Karl O. Christe and István T. Horváth, as well as



<u>-Ursula Le</u>Guin

top researchers in the field such as Surya G. Prakash and Veronique Gouveneur. Scott received funding for the trip from the Lehigh Presidential Fellowship which he received as an incoming first year graduate student (2018) and appreciates the experience that provided. While in Poland, he had some time to explore the unique city including the Old Town and the Palace of Culture of Science, pictured above.



Alumni News

'73 Jack R. Reid of Whitsett, NC, has retired as Research Toxicologist at P. Lorillard Tobacco Co. and become a substitute chemistry teacher in the Randolph County (NC) School District. Jack and the regular chemistry teachers he assists recently moved to a new high school. Jack was warmly impressed that he was given a t-shirt with the new school logo and that the teachers had his name put on the chemistry classroom door. Jack, who is thoroughly enjoying retirement, says his 50th college reunion (from Lebanon Valley College) is coming up in 2019 and he's considering driving up north for it.

'79 Maurice U. Cahn is the senior partner in an intellectual property law firm (Cahn and Samuels) located in Washington, DC. Maurice has been a licensed patent attorney for more than 38 years, and he specializes in trademarks, copyrights, trade secrets, and patents. After his student years at Lehigh (BS '77, MS '79) he obtained his law degree from Catholic University and has since practiced in the greater DC area.

¹82 Hayden Ravert After 35 years at the Johns Hopkins School of Medicine, Hayden Ravert retired on December 31, 2017. Working in the PET Radiochemistry Center of Johns Hopkins Medical School, Dr. Ravert, with other chemists and radiochemists, developed numerous PET imaging agents for clinical research including the first radiotracers for imaging a human brain neuroreceptor (dopamine and opioid). Hayden and his colleagues also developed imaging agents for precise diagnostic imaging of prostate cancer.

'84 Peter Seoane has been named the President of One-Bucket Solutions LLC located in Greensboro/ Winston-Salem area of North Carolina. The company is dedicated to helping academic and small business clients bring focus to their efforts by defining a single valuable goal and designing a development program to reach it. Pete has spent a career on the business and management side of biopharma companies and until recently was Manager of Business Development for SoBran BioSciences.

'86 David Stephon was named Vice-President for Quality Assurance at Esperion Pharmaceuticals, headquartered in Ann Arbor, MI. Dave, a bio-analytical grad of Lehigh, has gained considerable industrial experience in regulatory affairs and in quality assurance with such companies as Elan, Adolor, and Onconova Therapeutics. He was formerly Senior Vice President for Quality Management at Onconova Therapeutics. Esperion's product focus is on drugs to reduce elevated LDLcholesterol levels in patients with hyper-cholesterolemia without employing statin therapy. The company's lead drug, the highly symmetrical bempedoic acid, has completed Phase 3 trials and is awaiting a NDA filing before the US FDA.



'86 Donna Fitzpatrick of Stuart, Florida, retired from public school teaching to open a quilt-making business and to provide tutorial aid to students struggling with chemistry courses. Donna is also a grader for the chemistry exams administered by the International Baccalaureate program. She recently stepped back into the classroom on a regular basis to replace a high school teacher taking paternity leave.

¹**87 Robert Outten**, Senior Manager for Regulatory Affairs at Pfizer Pharmaceuticals, took a 2-week canoe trip in Algonquin Provincial Park (Ontario, Canada) in which he covered 15 lakes, paddled 90 miles and portaged another 25 miles. He reported that he had a great time even though he never saw a moose. Bob is an adult scout leader in Boy Scout Troop 73, Westfield, New Jersey.

'88 Bruce Sachais is a coauthor of a recent paper in the journal *Transfusion* [Vol. 59 (2): 659-670, 2019] entitled "A dual strategy to optimize hematopoietic progenitor cell collections: validation of a simple prediction algorithm and use of collect flow rates guided by mononuclear cell count." Bruce, who holds his M.D. and Ph.D. from Washington University, is Vice-President and Head of Platelet Research at the New York Blood Center.

89 Therese Wignot was just named Associate Provost for Enrollment at Wilkes University in Wilkes Barre, PA. She has been an Associate Professor of Chemistry at Wilkes since 1989. Dr Wignot has served as both the Coordinator and the Chair of the Chemistry Department. From 2000 to 2013, Dr. Wignot was the Director of Science in Motion, a grantfunded program which enables Wilkes to partner with and provide outreach to secondary schools in the region

In addition to her proven leadership in science education, Dr. Wignot has also served as Interim Provost, Acting Dean of the School of Education, and Interim Dean of the College of Science and Engineering.



'95 Michael F. Frey has been named Vice-President for Information Strategy and Architecture at Xerox Corp, Rochester, NY. Michael joined Xerox in the IT field in 1998 after serving the University of Rochester School of Nursing as Manager of Information Systems. At Xerox Michael's office is accountable for enterprise-wide IT strategy, enterprise architecture and solution design, IT innovation, and IT organizational business operations.

'99 Angela Mendel Hunter Angela has just been named Developmental Editor for American Chemical Society journals. Previously (2012–2018) Angie was a Data Analyst with the ACS journal *Organic Letters* and before that she spent 11 years in drug discovery with Astra Zeneca Pharmaceuticals.

'04 Lee Schaller After 23 years with Glaxo-Smith-Kline (GSK), Lee has been promoted from Discover R&D to IT and Platform Business Manager. He is a member of a critical GSK in-house team called "Discover the Best Molecule" which combines business, profitability, and technical strategies to help the company select new candidate therapeutic classes for drug discovery. Lee is located at Glaxo's Research Triangle site (Raleigh-Durham, NC) and obtained his B.S. from NC State before he enrolled as a Lehigh Pharmaceutical Chemistry grad student.

'04 Jeremy Webber has been promoted to Director, CMC Project Management at Moderna Therapeutics in Cambridge, MA. Moderna is a clinical-stage company whose mission is to deliver on the promise of messenger RNA medicines. Jeremy feels fortunate to have spent the past 20 years in pharmaceutical development and looks forward to this new challenge.

12 Matthew Yosua was in ROTC while at Lehigh, and and has completed his first tour of duty. Matthew, who is serving as an Assistant Operations Officer, has just been accepted to the Uniformed Services University of the Health Sciences--F. Edward Hebert School of Medicine as his next assignment. Following his medical school training, he will continue his service as a medical doctor.

13 James Devery (B.S. '06, Ph.D. '13) For 50 years, the American Chemical Society has operated Project SEED ("Summer Experience for the Economically Disadvantaged") as a pathway to encourage high school students from low-income families towards careers in science by providing them a "hands-on" experience in a chemistry lab. Funds are raised by ACS from >1000 donors and endowments and dispersed to 400+ students spending 8 weeks or more in an academic or industrial lab in summer. Over the previous two summers, James Devery, Assistant Professor in the Department of Chemistry & Biochemistry of Loyola University Chicago, has hosted SEED students in his research lab.

Alumni News

Dear Editor:

I just ran across the "75 Years (1940-2015) of Lehigh University's Chemistry Department" history now available on-line*. I was a chemical engineering student at Lehigh for most of the 50s. My office was directly below Ray Myers' lab. It got soaked a few times when his gang let the water run. I was disappointed that more space was not devoted to the physical chemists of the 1950s (e.g. Warren Walter Ewing and Frank Healy) in that Departmental history. Ewing was a fine experimental physical chemist, while Healy was strong in theory. Healy taught the graduate course in physical chemistry which I wanted to take, but could not owing to a conflict. Professor Sturm was the successor to Healy in the sense that he taught the graduate level physical chemistry sequence after Healy departed for a position at Lever Brothers Research. I recall this since my roommate, Joshua Wilson Stout, took the course the first time Sturm offered it. Joshua (LU class of 1954) was a brilliant undergraduate. He died about two years ago. The story goes that he studied only one night for Professor Edward Amstutz' organic final and still got an A. I studied for six weeks and got a D.

My story is more interesting. I had a 22 average (out of 100) going into the Amstutz final, and was sure I would fail. A fellow student (W K Schubert) bet me that I would get at least a C for the course. I took him up on that to the extent of betting one dollar – with the provision that I had to spend the entire three hours working on the final exam. Well, within 20 minutes I put down everything I knew in the exam book. I spent the remainder of the three hours making up organic reactions I had never seen before. I filled up the exam booklet with complete garbage. I did not think Amstutz could be flim-flammed . . . and he wasn't! I got a D. I was a good student of physical chemistry, but organic was a mystery.

Are you aware of my "memoir" on the Chemistry department's softball team (The Alchemists) which previously appeared in Mudd-In-Your-Eye (February 2006-Edition 30?)**

Your departmental history was well done - nice job.

John Mahoney, Professor Emeritus, University of Florida LU BS-Chem Eng 1955, PhD-Chem Eng 1960

*https://preserve.lehigh.edu/lehigh-history/2/ **https://chemistry.cas2.lehigh.edu/newsletter-archive



Alumni News

In Memorium



Conney Will Berger, Jr., DABT ('91) passed from this life on October 27, 2017. He was born on July 2, 1969, and was the beloved husband of Aimee Gail Berger. After graduating from Dover High School, Conney

earned his BA in Biology from Lehigh University. In 1996, he graduated from the University of Medicine and Dentistry of New Jersey, now affiliated with Rutgers University, focusing on Pharmacology and Toxicology. His research centered on organo-phosphate insecticides. He continued in that path with his postdoc fellowship in Toxicology at Rutgers in 1996. In 1999, he was certified in General Toxicology by the American Board of Toxicology. He had 20 years of experience as a regulatory toxicologist well-known pharmaceutical and consultant for companies like Bristol-Myers Squibb, GlaxoSmithKline, and Hoffmann-La Roche. He became the U.S. Head of Toxicology in the Department of Non-Clinical Safety for Roche in Nutley, N.J., where he served as a PI for pharmaco-kinetic and toxicology studies and as a primary member of the Roche ACUC. Conney most recently served as Senior Toxicologist at Toxicology Regulatory Services in Charlottesville. He was a member of the Society of Toxicology (SOT) along with its Mid-Atlantic Chapter (MASOT) serving on the MASOT Program Committee (2005-2009) and as MASOT Secretary/Treasurer (2007-2009).

Aimee was lucky to have 30 wonderful years with Conney. He was a devoted husband and father who cared deeply for his family. His dedication and perseverance towards life made him an incredible man, and his love for knowledge kept him busy. Raising two sons also kept him occupied, and they were his pride and joy.

Wilbur T. Brader ('51) passed away in June 2018 at the age of 89. He was a retired Supervising Chemist with D.E.L.C.O.R.A./Delaware County Regional Water Quality Conservation Authority.



Joseph A. Lavelle ('68) of Coopersburg PA, passed away peacefully on Friday, March 15, 2019 at his home surrounded by his loving family. He was the devoted husband of Jean (Sosoka) Lavelle, with whom he was happily

married for over 52 years. Born in Scranton, Joseph earned his B.S. in Chemistry from the University of Scranton, his Masters degree at Rutgers University, and his Ph.D. at Lehigh University. He also earned his MBA from Wharton.

Joseph worked for Rohm & Haas (Dow Chemical) for over 30 years. In his retirement he taught chemistry at Lehigh University, DeSales University, and at Northampton County Community College. In addition to his adoring wife Jean, he will be lovingly remembered by his daughter Lisa Buckingham Medeiros (Paul) of Barrington, RI and their children Jenna and Grey Medeiros, and his daughter Elizabeth McGinley '90 (Jim) of Essex Fells, NJ and their daughters Grace and Caroline McGinley.



Richard Murray Ramer ('61)

passed painlessly on Sept 28, 2018, after a brief bout with pneumonia. He is survived by his children, Nick, Michelle, Marc, and

Jim; his identical twin brother Dr. Robert Ramer; and his sister Elaine Pepper. "Dicky", as he was known for decades by his family, was born and raised in Passaic, NJ. He attended Lehigh University then got his PhD in Chemical Engineering from the Stephens Institute of Technology in Hoboken, NJ.

Dr. Ramer's post-doctoral work in ophthalmology brought him to the University of Florida, the state that, other than for a few fondly remembered years in New Orleans, was his home for the rest of his life. His career took him to Oxy, AMAX, Witco, the Florida DOT, and a startup, doing either chemical processing scale-up work or polymer engineering for various applications. But his passion always lay in the simpler things. He was active in the YMCA Indian Guides with his sons as they grew up and he was also a voracious fan of the Florida Gators.

He was active for decades with barbershop quartet singing. Patriotic songs routinely brought him to tears. He laughed heartily at a good joke, ate ravenously at a good meal, and conquered easily even the most challenging crossword puzzle. Dicky lived a good and simple life, quietly teaching the virtue of taking joy in small things, never predisposed to pursue material wealth, but rather to the wealth of his family's love and his own gentle spirit.

In Memorium

Alumni News



Van R. Reiner ('72) age 70, of Bel Air, MD passed away on June 5, 2019, at his home. Born in Lakewood, Ohio, he was the beloved husband of Shirley (Crane) Reiner. Raised in Cleveland, Ohio, Van graduated from Rocky

River High School in 1966. He then attended Wittenberg University ('70) and Lehigh University ('72), earning an AB and MS in Chemistry. A lifelong learner, Van went on to participate in many advanced management courses at The Wharton School, Duke University, and Harvard University. Van spent 30 years of his career with the Bethlehem Steel Corporation, holding increasingly senior positions in the Lackawanna and Burns Harbor plants. In 1998 he was named President of the Bethlehem Lukens Plate Division, located in Coatesville, PA before relocating to Baltimore in 2000 as the President of the Sparrow's Point Division, the second largest producing facility within Bethlehem's operating locations..

After leaving Bethlehem Steel, Van was named President and CEO of the Maryland Science Center in Baltimore's Inner Harbor. He spent 13 years at the Museum, raising funds and support for science education and innovation. He enjoyed the reactions of kids and adults alike to the many hands-on exhibits at the Center, even after his 2017 retirement

Van cared deeply about the environment and social justice. A tireless community volunteer, he held Board positions on many local organizations. They included The Academy of Natural Sciences of Drexel University, Maryland World Class Consortium, Baltimore Waterfront Partnership, and the Board Chairmanship of Pierce's Park in Baltimore. He was also involved in education, participating on STEM and Gifted/Talented Advisory Boards for the Maryland State Department of Education and other counties.

Quick to smile and laugh, Van always had a good joke or word of encouragement. An avid train buff, one of his great joys was sharing his model trains around the Christmas tree, first with his children, and then his grandchildren. He will be remembered both for his many professional accomplishments, and also for the kindness, integrity, and laughter that he brought to every interaction. Devoted to his wife, Shirley, they enjoyed over 48 years of marriage and adventures together. Van loved his family and was seldom happier than when surrounded by his grandchildren.



George Edward Schmauch Sr. ('59), died on June 11, 2016, in Macungie, PA.

Born on December 14, 1929 in Tamaqua, he was married to Emillie (Luke) Schmauch, to whom he was married on July 14, 1951. A 1947 graduate of Tamaqua High School, he graduated from Muhlenberg College and earned his M.S. ('54) and his Ph.D. ('59) in Chemistry from Lehigh University. While at Muhlenburg, he was a member of the wrestling team, which sparked an interest to follow and enjoy the sport throughout his lifetime. He spent his entire career working for Air Products as the Director of Engineering Safety.

An avid dog breeder, he was a member of the Lehigh Valley Wheaton Terrier Club. He showed dogs for many years and showed four championship dogs during that time. Dr. Schmauch served in the Army and was a member of St. Paul Evangelical Lutheran Church, Allentown. In addition to his wife, he is survived by his daughter and son as well as five grandchildren

Peter Hamilton Scott ('65) passed away on April 10, 2017, at his home in Palm Coast, FL. Dr. Scott was born in Warren, RI in 1936 and lived in Barrington, RI before retiring to Palm Coast. He was a graduate of Brown University and earned a Ph.D. in Organic Chemistry from Lehigh University under the supervision of Professor Thomas E. Young. He worked in research and development in the plastics industry. He was an avid runner and biker and loved to golf and sail. Peter embraced life and was happiest in the company of family and friends. He is survived by his wife, Carolyn Payne, a daughter, three sons, a step-son and seven grandchildren and two great-grandchildren.



n response to a recent careers survey by our Undergraduate Committee which asked about first employment after undergraduate degree as well as current employment, Dr. John Holz ('64) shared a reminder that the path you expect to take in life--and the road you actually tread are often two different things.

John came to Lehigh in September 1960 to major in Civil Engineering, an endeavor that lasted until he encountered CE 61 – Engineering Drawing. Dr. Holtz reports that he "STILL can't draw." That experience convinced him to major in Chemistry in the School of Engineering. Notable among the professors at the time were Jerome Daen (P-Chem), Edward Amstutz (Organic), and James Diefenderfer (Analytical Chemistry).

Students were highly encouraged to go to graduate school—especially since this was a period of increased NSF/NIH funding, as well as the NASA "space race". When John and three other students announced plans to attend Cornell, Dr. Daen insisted that four Lehigh students were NOT going to go to the same program--and Dr. Diefenderfer made sure they were NOT going to stay at Lehigh for their advanced degrees. As a result, John went to Yale for both its MS and PhD programs, getting a deferment from active duty as a commissioned officer in the US Army.

When he completed his research on "The Effects of Electron Transfer Reactions on Electron Spin Resonance Spectra" (which included simulations on early IBM computers) he went on active duty (1969) and was assigned to the U. S. Army Soldier Systems Center in Natick, MA. John's initial assignment was performing ESR research on radiation damage, but this rapidly changed to developing lab automation systems for the Mass Spectrometry Lab for studies related to food irradiation. The reason for the reassignment was "he knew something about computers," which was a rarity in 1969. He led the effort to acquire funding for automation of the Lab, where he developed computerized data collection systems.

John's goal in graduate school was to become an academician, but the tight job market after he completed his military service had limited academic options. Industrial options were limited as well; in fact, DuPont (one of the largest chemical industry employers) hired no chemists for approximately three years in the early 1970s. Nevertheless, his experience with a computer from Digital Equipment Corporation (DEC) while in the Army opened an opportunity in Marketing Technical Support for DEC. John took the position "for a year, while he looked for a teaching job." The year lasted a bit longer (28 years in total) and he left DEC in 2000.

John's career at DEC was primarily in engineering management, overseeing the development of systems that solved realworld problems, including:

- · Data acquisition programs for high resolution mass spectrometry
- On-line diagnostics and error logging
- Educational "personal computer" systems (circa 1975)
- Fault-tolerant multiprocessor systems
- Industrial control systems (including networked data acquisition (circa 1978)
- Extending the life of VAX 11/780
- Network Security for DEC's engineering group
- A cooperative development project with DuPont for a networked workstation environment
- · Document Management and Plant Design for a DEC subsidiary
- Developing a Systems Test business for internal and external use

After leaving DEC, John went on to restructure a content-delivery project for Mirror Image Internet (startup) and then worked for NCR, Avaya, and Flextronics, developing startup projects in high-security labeling, Android phone applications, and the control system for automobiles. Along the way, John also worked as a technical consultant with several legal teams that were involved with monetizing patents.

With the hindsight of a distinguished and enjoyable career, John reflected, "At the end of my career, I looked back on what I'd done and realized that what happened was actually a PERFECT fit for me." His message to current students is, "Take a chance. You have no idea where you'll end up."

The Road Not Taken

Two roads diverged in a yellow wood, And sorry I could not travel both And be one traveler, long I stood And looked down one as far as I could To where it bent in the undergrowth; Then took the other, as just as fair, And having perhaps the better claim, Because it was grassy and wanted wear; Though as for that the passing there Had worn them really about the same, And both that morning equally lay In leaves no step had trodden black. Oh, I kept the first for another day! Yet knowing how way leads on to way, I doubted if I should ever come back

.. by Robert Frost

I shall be telling this with a sigh Somewhere ages and ages hence: Two roads diverged in a wood, and I— I took the one less traveled by, And that has made all the difference.

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his·to·ry/'hist(ə)rē/ 1.the study of past events, particularly in human affairs.



Dr. Alpha A. Difenderfer c. 1938 An alumnus of 1955 recently supplied Mudd In Your Eye with a fondly remembered story about a beloved former Professor of Analytical Chemistry who, as student, faculty, and retiree, spent 68 years in the Department. Professor Alpha A. Diefenderfer earned an AC degree from Lehigh in 1902 and an M.S. in 1908. He joined the faculty in 1908 as an instructor and was later given two years leave of absence to complete a PhD since that degree was a requirement for promotion to full professor rank. He enrolled as a graduate student in Kaiser Wilhelm University in Berlin from 1927 to 1928 and his family relocated to Germany with him. Unfortunately, during this year, Alpha witnessed the collapse of the Weimar Republic and the rise of Hitler as Führer. Social unrest, strikes, protests, and closure of

universities made it impossible for him to pursue the PhD. He returned to America sans degree.

Fortunately, his Lehigh faculty colleagues recognized his heroic efforts towards attaining the doctorate and long years of service and promoted him to full professor in 1930. Alpha was one of the last graduates of the AC (Analytical Chemist) degree track which Lehigh gave from 1866 to 1905. As a student he was a member of the student chemical society and as a faculty member he became its advisor. When the Lehigh trustees voted to allow all holders of the old AC degree to receive a BS diploma, Alpha did so. He retired from the Chemistry faculty in 1946 but continued personal research and maintained an office in the Chandler Building until 1966. He died in 1967. The Department of Chemistry has an endowed award for undergraduate students that is named in his honor.

For many years Diefenderfer taught Lehigh's quantitative analysis lab, a mainstay of the laboratory undergraduate curriculum. For the first lab class of the semester, the analytical students would line up on the stairs in Chandler Laboratory clutching their wash bottles, and start the march to the underground laboratory chanting a song that went "Limestone, Iron, and Spiegeleisen … Dief'll make ya analyze 'em." Apparently it was a tradition that many people came from outside to witness.

Anecdotally, long after Diefenderfer's retirement and passing, he was being fondly remembered by a speaker at a Lehigh event who claimed that "Dief knew all there was to know of analytical chemistry." Two Chem alumni in the audience were overheard in a side-bar chat about that attribution of analytical omniscience. Ralph Muraca (BS '44, PhD '50) turned to George Schmauch (PhD '59) and noted, "That wasn't such a big deal; back when ol' Diefenderfer was active there were ONLY nine elements."



From 1866 to 1910 all chemistry majors at Lehigh were encouraged to take the more employable AC (Analytical Chemist) degree, not the BS. Each student in the AC program needed to purchase a portable assay kit to conduct mineral analyses in remote areas, often within a mine itself. Over the years, three of these assay kits were returned to the Department as gifts by the descendants of the alumni. One kit, originally used by Charles R. Rauch (AC 1877), was loaned by the department to the Smithsonian Institution where it was on display from 1993 to 2013. The Rauch kit has returned from its two-decade visit to Washington and been placed in the University archives.

The kit shown here, purchased in 1905 by Joseph C. Heilman (AC 1909), was used to assay the quality of ores from mines in Kansas. Given to the department by a grandson, Joseph C. Lukens, it too has been transferred to University archives for preservation. The handsome box (8.5 x 14 x 4") bears Heilman's name on a small brass plate. In two layers, the box contains more than 50 items used in qualitative and quantitative analyses. A Lehigh research scientist tested the 114-year old blow-piping components used in elemental chemical analyses of minerals and found that they still worked perfectly!

Your donations can and travel, expanding the Lehigh University reputation across the nation and around the globe.

important part of our continuing environment for teaching and research at Lehigh.

If you are at the point in life where you can "Pay It Forward" please consider a donation to support those students following in your footsteps.

Donations can be made fast and easy in either of the following ways:

- By contactng Dept. Chair Greg Ferguson (gf03@lehigh.edu) to discuss specific projects
- By contacting Lehigh's Advancement Office at (800) 533-9565

FALL 2019 CHEMISTRY SEMINAR SERIES

Department of Chemistry

All seminars begin at 10:45 a.m. in Neville Hall - Room 3

October 29 Kristin Wustholz November 5 November 14 College of Ji-Xin Cheng Julien Bachmann William & Mary **Boston University** University of Erlangen

November 19 Xiaofeng Feng University of Central Florida

November 26 Wesley Chalifaux University of Nevada-Reno

December 3 Elena Jakubikova North Carolina State

September 3 Mark Ellison Ursinus College

September 17 **Kyle Lancaster** Cornell Unversity

September 24 Xiaoji Xu Lehigh University

October 22 Christian Hamann Albright College

October 23 Troels Skrydstrup Aarhus University

Detailed information on titles and abstracts can be found at https://chemistry.cas2.lehigh.edu/seminars