the TEST TUBE

THE NEWSLETTER OF THE DEPARTMENT OF CHEMISTRY & BIOCHEMISTRY

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WHO WAS THAT?

On top of the many challenges that students, staff and faculty have faced this year, one of the more subtle changes within our department over the past year and half has been a significant turnover within the faculty ranks of the department. Between the start of 2020 and the end of this summer, a total of six faculty members will have left the department. Profs. Bruce Whittlesey, David Birney, and Horn Prof. David Nes have all retired. As for Prof. Michael Findlater and Dr. Mindy Findlater, they are both taking the next exciting steps in their respective careers at UC Merced. Finally, the untimely passing of Horn Prof. Bill Hase is something that many of us have not yet had the chance to fully process or acknowledge, although his loss has been keenly felt by all in the department.

As is always the case when well-known, well-liked, and well-respected faculty members depart, there has been a sense of trepidation about what the future will hold for the department. Given that this has all occurred during a time of lockdowns, Zoom calls and conferences, and few face-to-face interactions, you wouldn't be wrong to imagine that things have felt a little off in the department. Happily, thanks to a number of fortuitous events and the extraordinary work of several members of this department during 2020, we have had the unique opportunity to both strengthen and diversify our faculty ranks. In the fall of 2020, we welcomed four new faculty to the department, assistant professors Elka Georgieva and Ruibin Liang, and associate professors Anne and John Gorden. We are also excited to announce that Profs. Samantha Kristufek and Barrett Park will join the department family in fall 2021. These six faculty represent the next generation of educators and researchers of the Chemistry and Biochemistry department. We are excited to see how they will grow in their own careers, and we look forward to highlighting their accomplishments in future editions of the Test Tube.

To read more about each of these individuals, turn to the inside page.

It's Starting to Come Together

As we've highlighted multiple times over the past couple of years within these pages, the Chemistry building has undergone some dramatic changes. This past academic year, we welcomed over 1,600 students into the newly renovated organic labs in rooms 219 and 216. These renovations were made possible from funds generously provided by the university and exposed our future graduates to the type of lab experience that is expected from a Tier I research institute. While our general, organic, and inorganic labs have all received extensive upgrades over the past couple of years, for the time being this will be the end of renovations to our teaching labs in the Chemistry and Biochemistry building.

However, as the plans are coming together on a new Academic Science Building that will be located just a stone's throw to the west of the current Chemistry and Biochemistry building, we look forward to the completion of a cutting-edge undergraduate teaching lab space that will house all of our upper divisions (organic, inorganic, analytical, physical, and biochemistry). Under the current timeline, the building is proposed to be completed and open for the centennial celebration of the founding of Texas Tech University and will be first utilized by the classes of 2024 and 2025.

TEXAS TECH UNIVERSITY
Department *of* Chemistry & Biochemistry

INSIDE THIS ISSUE

CONTINUED FROM COVER

WHO WAS THAT? Meet the Professors

For Professors Annie and John Gorden, Texas has always been home. Annie was raised in Richardson and John was born in Fort Worth. They both completed their respective Ph.Ds. at the University of Texas at Austin working with Profs. Jonathan Sessler (organic chemistry) and Alan Cowley (inorganic chemistry), respectively. After completing their postdoctoral research at Berkeley, they began their independent careers at Auburn University.

For 15 years, Annie explored her research interests in supramolecular chemistry, selective coordination of actinides, and Green chemistry and catalysis, while John continued his research in X-ray crystallography and focused on undergraduate instruction as well as student engagement and retention in the general chemistry and chemistry majors programs. In addition to their research activities, both have been recognized as outstanding teachers and student mentors. The two have been very active in promoting outreach and chemical education in the American Chemical Society, organizing events like the chemistry tailgate for National Chemistry Week, chemistry demonstrations for Auburn Outreach, and the Auburn Summer Science Institute for high school students.

Looking to be closer to family and eager for new projects and challenges, the duo made the big move to return to Texas, and started positions with Texas Tech in the fall of 2020. They bring with them their son Ian, daughter Mara, and two Alabama lab mix rescue dogs nicknamed the "lab experiments."

In fall 2020, Dr. Ruibin Liang joined the faculty of the Department of Chemistry and Biochemistry as a tenure-track Assistant Professor. He will teach biochemistry-related courses. His research projects are in the areas of physical, theoretical, and computational chemistry, with a focus on multi-scale simulation of chemical reactivities in biomolecules.

In fall 2020, Dr. Elka Georgieva joined the faculty as a tenure-track Assistant Professor. She will teach biochemistry-related courses and her research projects are in the areas of molecular mechanisms of membrane proteins from human pathogens and cancer-related human proteins.

In fall 2021, Dr. Samantha Kristufek will join the faculty as a tenure-track Assistant Professor. She will teach organic chemistry-related courses and her research projects focus on designing sustainable materials for next-generation applications in plastics, agriculture, engineering, and biomedicine (https://kristufeklab.com/).

In fall 2021, Dr. Barrett Park will join the faculty as a tenure-track Assistant Professor. He will be teaching physical chemistry courses and will conduct research in the areas of spectroscopy and chemical reactions at surfaces. He currently leads a German-Chinese collaboration group for surface science experiments at VUV-free electron lasers.

GOOD THINGS COME IN THREES

For assistant professor Kristin Hutchins, the last six months have been a whirlwind of life-altering events and achievements. In the previous edition of the Test Tube, we announced that Prof. Hutchins was awarded an ACS-PRF grant entitled "Incorporation of Motion-Capable Functional Groups into Solid-State Materials and Impacts on Thermal Expansion." However, this was just the beginning of a very exciting start to 2021.

In January, it was announced that she had received the National Science Foundation CAREER Award for her project "Solid-state molecular motion, reversible covalent-bond formation, and self-assembly for controlling thermal expansion behavior." This project focuses on controlling how organic solids respond to changes in temperature. The topic is of particular interest to Prof. Hutchins because nearly all materials used in the real world are exposed to temperature changes. For electronics this is due to heat, and for materials used in outdoor settings, it is due to weather and seasonal changes. The way a material responds to a change in temperature affects its ability to function. This award is NFS's most prestigious award in support of early-career faculty who have the potential to serve as academic role models in research and education, and to lead advances in the mission of their department or organization.

Then, in April, it was announced that Prof. Hutchins was also awarded a Welch Foundation grant for her project entitled "Mechanochemistry as a green synthetic and crystallization tool for drug development." The Welch Foundation is one of the nation's largest private funding sources for fundamental chemical research at universities, colleges, and other educational institutions in Texas. Along with supporting our faculty since its inception in 1954, the Welch Foundation also sponsors the Welch Summer Scholars Program, in which TTU faculty have participated over the past 30 years. Prof. Hutchins has served as a faculty mentor for the program since she began her career here at TTU.

Despite the pandemic, this past academic year saw many of our undergraduate and graduate students honored for their hard work and ingenuity in their respective research labs. For the undergrads, two of our graduating seniors were honored for their accomplishments and we wanted to let them discuss how important their research experiences were here at TTU. The respective awards and honors of our graduate students, both highlighted below and at our department banquet, speak to the excellent work that everyone has accomplished in spite of the many hurdles they have faced this year.

GRADUATE STUDENT HIGHLIGHTS

Juan Dominguez, a graduate student studying under Dr. Morales, is one of four recipients at TTU of the National Science Foundation's Graduate Research Fellowship. Juan received the fellowship for his proposed research on the direct, time-dependent simulation of chemical reactions. In their computational approach, a reaction is simulated in the way the process evolves in "real life." Juan's research advocates for a generalized quantum/classical (Q/C) approach to ab initio molecular mechanics, where molecular degrees of freedom and/or molecular regions are distributed into Q/C treatments. The award is for four years and includes an annual $34,000 stipend for its student recipients and a $12,000 course fee waiver.

Cristian Gutierrez-Reyes is a Ph.D. student studying under Dr. Mechref and has received the American-Mexican Friendship – Waterman Scholarship for his research project related to the field of "Molecular Medicine" dedicated to Glycomics, Glycoproteomics, and Proteomics analysis using LC-MS techniques. The purpose of this research is to investigate the glycosylation changes in the human proteome when a disease develops or increases in severity. This information can then be used in clinics for diagnostic purposes. The analysis focused on many cancer types, neurodegenerative and viral diseases (breast cancer, HHC, COVID-19, MCI, Alzheimer's disease, and many others). The amount of the award is $4,000 for up to four academic years ($2,000 for the fall and $2,000 for the spring semesters), beginning in the fall of 2021.

Kevin Finch, a Ph.D. candidate studying under Dr. Gamez, received two awards this spring. The first was the 2021 Edward Steers Bursary Award from the Association of British Spectroscopists. This international award was established to recognize the contributions of eminent atomic spectroscopist Prof. Edward B.M. Steers and assists a promising early scientist (non-tenured academic post or in industry, within 7 years of award of Ph.D.) engaged in or utilizing analytical spectroscopic techniques to attend a recognized scientific meeting or visit a place of learning. Kevin was also selected as a recipient of the 2021 Society for Applied Spectroscopy Atomic Section Student Award. He will receive the award at the upcoming SciX 2021 conference in September, where he will give an invited talk about his current research. This international award also recognizes excellence in the area of Atomic Spectroscopy of SAS student members.

UNDERGRADUATE STUDENT HIGHLIGHT

Lindsay Bishop

Having the opportunity to conduct novel inorganic chemistry research has been one of the most enriching experiences of my collegiate career here at TTU. Over the past two years, I have learned to apply knowledge from the classroom to generate new ideas and tackle challenges in a research setting. In addition to increased confidence in my skills and my ability to present research findings to my peers, working in Dr. Casadonte's lab has provided me with wonderful and unique friendships.

During the fall of my sophomore year, I worked alongside Amy Reed, a junior chemical engineering major, on a project synthesizing magnetic ferrite nanoparticles to catalyze the degradation of the pollutant acid orange. Amy and I became great friends over that year while working on the same research project. We presented our research at the 2019 TTU Undergraduate Research Conference (URC) and the 2019 AIChE Southwest Regional Conference, where we received 3rd place. In October 2020, I presented my work on magnetic ferrite nanomaterials at Rice University's 2020 Gulf-Coast Undergraduate Research Symposium. This year, I worked with PhD candidate Ashley Moreno-Gongora on sonochemically synthesizing shape memory alloys. The purpose of this research was to determine the size domain in which these materials gain their super-elastic properties. I presented this research at the 2021 TTU URC and received 3rd place in the Technology Impact category.

In July, I will begin my career as a medical student at McGovern Medical School in Houston and I can't wait to see what the future holds! I am extremely grateful to have had Dr. Casadonte as a research mentor and for the all the skills I have gained over the past three years. From repairing 'Frankenstein's Monster' (our variable-frequency sonicator) to attempting (unsuccessfully) to solve an escape room with my lab group, the memories of my time as an undergraduate researcher will always be very special to me.

Aldo Hernandez

If I had to condense my research experience into a single word, I would say "rewarding" is an accurate descriptor. Prior to joining a research group, it was a daunting task just to choose the kind of work that I wanted to engage in and the kind of mentor that I wanted to receive guidance from, as there is a large variety of quality and interesting research in the Chemistry and Biochemistry department. I met many professors that displayed a true passion for their work and the general progress of empirical information that fostered a desire in me to actively participate in the same pursuit. In the end, I opted to join Dr. Gerardo Gamez's laboratory in the fall semester of 2019. I vividly remember one of the first times I talked to Dr. Gamez, I could feel the enthusiasm he had for all the various projects in his laboratory as he spoke about them. Doing research under his supervision has been a great endeavor and I truly feel like I am a part of the scientific community.

It's quite common for students to meet a large learning curve when starting new research; I was certainly no exception to the rule. However, I have been fortunate to have a great mentor and wonderful coworkers to guide me through the process, especially during the early stages. With the passage of time and experience, I now lead a research project on the development of a nanomaterial characterization technique using existing plasma-based chemical imaging techniques. Understanding the nuances of a complex topic while making contributions to a field—however minor—is a fulfilling experience, one that I have relished due to the many engagement opportunities to which this research has led.

Conducting novel research has allowed me to be active in many facets that go along with being a scientist. Overall, my work can be seen in two co-authored publications in the Journal of Analytical Atomic Spectroscopy and Spectrochimica Acta Part B: Atomic Spectroscopy. I have also presented numerous posters at national conferences including Pittcon and SciX and just recently received 1st place in the Technology Impact category of the 2021 TTU URC. There is still much work to do, and there always will be, but I am excited by the prospect of seeing more portions of my research come to fruition before graduation, and by those who will take up the project after me.

MAKING A DIFFERENCE IN THE CLASSROOM

PROF. PAPPAS RECEIVES THE CHANCELLOR'S COUNCIL DISTINGUISHED TEACHING AND THE PROFESSING EXCELLENCE AWARDS

For decades, the success or failure of students in college courses has hinged on two major events: the midterm and the final exam. And if either went poorly, the student was almost assured of failing the entire class. Dimitri Pappas is not a fan of that model. As he says, "In real life, we are continuously tested. Why shouldn't college be the same?" That's why Prof. Pappas has opted for more frequent examinations over smaller chunks of material. With more tests, each represents a smaller percentage of the student's overall grade. Innovation is nothing new to Pappas, who was honored with the 2011 Chancellor's Council Distinguished Research Award for his work detecting sepsis, cancer and heart disease. His numerous research grants include one from the Cancer Prevention & Research Institute of Texas (CPRIT) for his ongoing work toward developing a new, quick and inexpensive cancer-detection chip.

However, it's his classroom innovations that have earned him the 2021 Chancellor's Council Distinguished Teaching Award. Follow this link for an in-depth Q&A with Pappas, followed by testimonials from some of his students.

THE COINAGE METALS **DONOR PAGE**

As we continue to strive for student excellence and research recognition, your support is always appreciated and will be used to the fullest. We hope you will consider donating to one of the endowments or scholarships below.

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HONORS AND AWARDS

Prof. Dominick Casadonte received the national Council on Undergraduate Research (CUR)-Goldwater Scholars Faculty Mentor Award. In commemoration of this award, Texas Tech University will receive a check for $5,000 to be used to support his undergraduate research program.

Prof. Gerardo Gamez received the 2020 Young Plasma Scientist Award, sponsored by Thermo Fisher Scientific, at the Winter Conference on Plasma Spectrochemistry held in Tucson, January 2020. The award "recognizes achievements in conceptualization and development of novel instrumentation as well as the elucidation of fundamental events or processes involved in plasma spectrochemistry" and also "authorship of significant research papers or books that have had an influential role in new advancements as well as outstanding applications that open new fields of use for plasma spectrochemistry." He was also the recipient of the 2021 Outstanding Faculty Mentor Award, Texas Tech University Center for Transformative Undergraduate Experience (TrUE) and the 2021 Susan Talkmitt STEM Motivator Award, Texas Tech University Center for the Integration of STEM Education and Research (CISER).

Prof. Haibo Ge was awarded the 2021 Outstanding Researcher Award by the Office of Research Innovation. This award recognizes achievement in research and scholarship.

Prof. Greg Gellene was the recipient of the Diamond Award (presented by the Teach Academy and Teaching, Learning and Professional Development Center) for providing an innovative and transformative learning experience for students during a pandemic.

Prof. Michael Latham was the recipient of the 2021 Arts & Sciences Excellence in Research Award. This marks the third straight year that a member of the department of Chemistry and Biochemistry has received this award.

Prof. Bill Poirier was awarded the Diamond Award, along with the 2021 President's Excellence in Teaching Award.

GRANT AWARDS

Prof. Gerardo Gamez was awarded an NSF grant award entitled "Glow Discharge Optical Emission Coded Aperture Spectral Imaging Elemental Mapping (GOCAEM) for Ultrahigh Throughput 3D Surface Analysis of Nanoscale Materials." The total grant amount is $411,000 over a 3 year period.

Prof. Kristin Hutchins has received a grant from The Welch Foundation entitled "Mechanochemistry as a green synthetic and crystallization tool for drug development" for a total grant amount of $240,000. She was also awarded the NSF-CAREER award entitled "CAREER: Solid-state molecular motion, reversible covalent-bond formation, and self-assembly for controlling thermal expansion behavior." The total grant amount is $651,350.

Prof. Guigen Li was awarded the seventh renewal of his Welch Grant Award entitled "Multi-Layer 3D Chirality and its Asymmetric Catalytic Assembly." The total grant amount is $240,000 and is awarded over 3 years. The Welch Foundation has continuously funded Prof. Li since 1997.

Prof. Hans Lischka was awarded an NSF grant award entitled "Collaborative Research: Aggregation Mechanisms in Carbon Nanomaterials Based on Pi-conjugated Polycyclic Aromatic Hydrocarbons." The total grant amount is $249,999 over a 3 year period.

Prof. Huazhong Shi received a BASF-TTU Project Revolution grant to create breeding materials in cotton using gene-editing technology. The total grant amount is $228,032 for one year.

AWARDS & RECOGNITION BANQUET, MAY 4, 2021

Congratulations to all our award recipients! A special thank you to all our donors for making these possible!

Chemistry & Biochemistry Undergraduate Scholarship	Zackary Daniel, Jeremy Lawrence, Lindsee Miller,
Craig Memorial Chemistry Dept Endowed Scholarship	Jennifer Agu, Thomas Fields, Hoang Ho, Melanie Johnson, Rhea Karkera, Bailee Newham, Kendall Toelle
Gordon & Martha Bellah Endowed Scholarship	Mia Beck, Julieann Cherukara, Victoria Cruz, Isaac Griffin, Litzy Guevara, Kayla Henry, Alyssa Pleasant, Halaina Smith, Irving Sosa, Hannah Wood
Chemistry Alumni Scholarship	Ashton Goebel
H.E. Archer Endowed Scholarship	Ben Agarwal, Case Coker, Jonathan Locke, Hannah Powell
Hulda W. Marshall Chemistry Endowed Scholarship	Lauren Escobedo, Thomas Fields, Angelica Nibo
Jeanette & Joe Dennis Scholarship	Dorian Bolanos, Ashton Goebel, Hoang Ho, Kristen Nguyen
Holwerda Memorial Scholarship	Lauren Escobedo, Logan Foster, Alyssa Pleasant
Jerry L. Mills ACS Student Affiliate Scholarship	Braxton Jones
Richard A. Bartsch Endowed Scholarship	Christianah Adejokun, Torrey Stubblefield, Cormak Weeks, Noah Williams
Robert C. Goodwin Memorial Endowed Scholarship	Mariah Budomo, Chandeni Kassen, Stephanie Piel, Brandon Richardson
Samuel Lee Hunt General Chemistry Scholarship	Rushil Choutapalli
Chemistry Graduate Student Organization Scholarship	Mahtab Beikzadeh, Aneelman Brar, Jacob Culvyhouse, Kevin Finch, Sophia Sagala
Ginny Shen Lin Endowed Scholarship	Reza Amani, Andrew Cho, Xiaodan Ding, Ashley Moreno-Gongora, Evan Van Aalst, Dong Zhang
Ming Sun Family Graduate Research Scholarship	Reza Amani, Deepika Bedi, Andrew Cho, Chamila Manankandayalage, Ashley Moreno-Gongora, Samiur Rahman, Dong Zhang, Qixuan Zheng
Pearson TA Scholarship	Vanessa Charles, Kevin Finch, Henry Garcia, Nicholas LaRoe, Saman Majeed, Yue She
Richard Goodin Graduate Research Fellowship	Liulei Ma
Song Prize	Dr. Shiva Moaven, Dr. Xue Dong
Doctoral Dissertation Completion Fellowship	Bhumika Jayee
Graduate School 2020 Summer Dissertation Research Award	Elahe Masoumzadeh
Staff Appreciation Administrative Award & Unsung Hero Top Award - Raiders Who Rock	Quentin Vaughn
Staff Appreciation Technical Award	Dr. Piotr Dobrowolski
Outstanding TA Awards in General Chemistry	Henry Garcia, Yue She
Outstanding TA Awards in Organic Chemistry	Mazen Elsaid, Aneelman Brar
Outstanding TA Awards in Upper-Division Chemistry	Chitranjan Srivastav, Evan Van Aalst

UNDERGRADUATE OUTSTANDING PERFORMANCE AWARDS

Analytical Chemistry	Alex Alvarez, Elisabeth Bengston, Mariah Budomo, Michael Jarrar, Phuong Pham, Jacob Pittman, Carly Stroud, Brett Thigpen, Savannah Zachariah
Biochemistry	Lindsey Bishop, Sagar Patel
Inorganic Chemistry	Kindall Brijalba, Colton McNabb
Organic Chemistry	Senjuti Karmaker, Akash Maheshwari, Timothy Matei, Thomas Nolan, Julie Sang, Carly Stroud, Lamia Zuberi
Physical Chemistry	Alexiss Dennett, Hayden Mathews
Outstanding Senior Award	Aldo Hernandez

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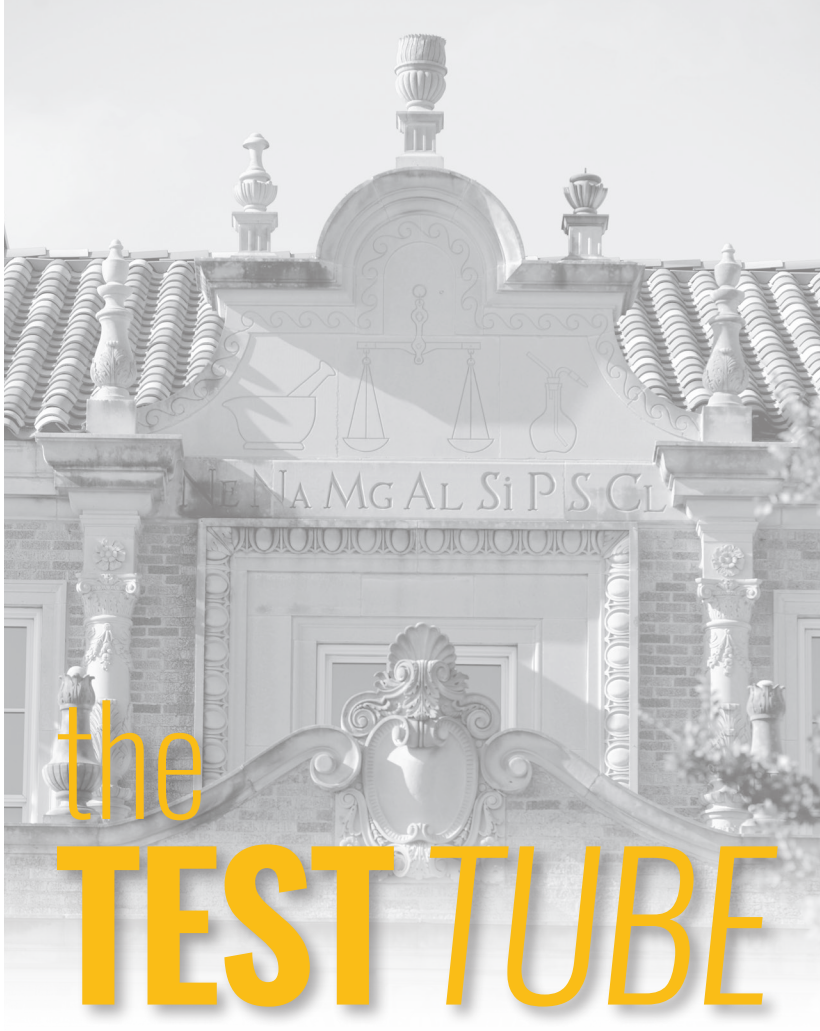

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OUR VISION

The Department of Chemistry and Biochemistry will strive to be recognized locally, nationally, and internationally for the quality of the education of the undergraduate and graduate students; vibrant, synergistic, and inventive interdisciplinary and multidisciplinary research programs; and impactful community engagements.

the **TEST** *TUBE*

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