DEAR FRIENDS,


AFTER LAST YEAR’S QUIET, THE UNIVERSITY OF MICHIGAN CAMPUS, DOWNTOWN ANN ARBOR, AND OUR LABORATORIES ARE ONCE AGAIN ACTIVE, ALBEIT WITH SOME DIFFERENCES AS WE WORK TO STAY SAFE IN THE SETTING OF THE CONTINUED COVID-19 PANDEMIC. MASKS, SOCIAL DISTANCING, AND OUTDOOR EVENTS ARE THE NEW NORMAL. HAPPY HOURS AT NEARBY ISLAND PARK, FALL HIKES, AND A DINNER AT THE SPACIOUS U-M GOLF COURSE CLUBHOUSE AFTER THE LANDS LECTURE HELPED TO KEEP SPIRITS UP, AND WE ARE CAUTIOUSLY OPTIMISTIC THAT THE COMING YEAR WILL SEE THE RETURN OF “NORMAL” EVENTS, INCLUDING IN-PERSON SCIENTIFIC CONFERENCES, OUR ANNUAL RETREAT, AND MORE. WE ARE THANKFUL FOR ALL THAT WE HAVE AND MINDFUL OF OUR RESPONSIBILITY TO SHARE AND MAKE A DIFFERENCE IN OUR COMMUNITY AND BEYOND.

AMONG OUR FACULTY, CONGRATULATIONS ARE IN ORDER TO PETER FREDDOLINO FOR HIS PROMOTION FROM ASSISTANT PROFESSOR TO ASSOCIATE PROFESSOR WITH TENURE AND TO JANET SMITH FOR A VARIETY OF AWARDS, INCLUDING BEING NAMED THE MARTHA L. LUDWIG DISTINGUISHED UNIVERSITY PROFESSOR OF BIOLOGICAL CHEMISTRY. READ MORE ABOUT THESE WELL-DESERVED HONORS AND MANY OTHER RECOGNIZATIONS OF OUR FACULTY AND TRAINEES IN THE FOLLOWING PAGES.

DURING 2021 WE WELcomed CHASE WEIDMANN AS AN ASSISTANT PROFESSOR WITH A PRIMARY APPOINTMENT IN BIOLOGICAL CHEMISTRY, SHYAMAL Mosalaganti AS A JOINTLY APPOINTED ASSISTANT PROFESSOR, AND REBECCA LEE AS CHIEF DEPARTMENT ADMINISTRATOR. WE CELEBRATED FOUR RETIREMENTS INCLUDING PROFESSORS ROBERTA FULLER, ALEX NINFA, MARK SAPER AND CHIEF DEPARTMENT ADMINISTRATOR SHERRY COGSWELL. CONGRATULATIONS TO ALL! WE ARE ALSO EXCITED TO ONCE AGAIN BE IN THE MIDST OF FACULTY RECRUITING AND LOOK FORWARD TO WELCOMING NEW COLLEAGUES NEXT YEAR.

OUR COMMUNITY OF PH.D. AND MASTER’S STUDENTS CONTINUES TO THRIVE, WITH ALMOST 40 PH.D. AND 15 MASTER’S STUDENTS CURRENTLY IN OUR PROGRAM AND LABORATORIES. WE ALSO CONTINUE TO STRENGTHEN OUR PIPELINE WITH 15 STUDENTS ENTERING THE INTERDEPARTMENTAL PROGRAM IN BIOMEDICAL SCIENCES (PIBS) THROUGH BIOLOGICAL CHEMISTRY THIS FALL—DESPITE LAST WINTER’S RECRUITING BEING DONE VIA ZOOM! THESE STUDENTS HAIR FROM AROUND THE WORLD AND ARE BUSY TAKING CLASSES, CONDUCTING LABORATORY ROTATIONS, AND CHOOSING THEIR FUTURE MENTORS AND RESEARCH PROJECTS. OUR FUTURE IS CLEARLY IN TERRIFIC HANDS AS THESE YOUNG COLLEAGUES ADVANCE THEIR SCIENCE WHILE WORKING TOGETHER TO STRENGTHEN AND DIVERSIFY OUR COMMUNITY.

PHYL LIS HANSON, M.D., Ph.D
A weekly highlight for the Department and broader University community is our seminar series, which continues to thrive, featuring a wide range of presentations. For example, Jason McLellan (UT Austin) presented “Structure-Function Studies of the SARS-CoV-2 Spike and Development of COVID-19 Interventions” and Pat Brown (CEO, Impossible Foods) described “How Science Can Save Our Planet.” We moved from last year’s 100% online format to a mixed model in which some speakers delivered their talks in person, with attendees present in a large lecture hall as well as online. The excitement of sharing cutting-edge science continues. Our lineup of terrific lecturers speaks is shown on p. 17 and this year’s special series of seminars on CRISPR and Genome Editing organized by Assistant Professor Yan Zhang and Professor Nils Walter on p. 14. These seminars and lectureships are made possible by your generosity and donations, and we very much appreciate continuing contributions to sustain them.

I am always interested in hearing from our Department’s members and friends, past and present. Please feel free to email me at pihanson@umich.edu with any updates, questions, or other information—including photos!

Happy New Year and Go Blue!

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On the Cover
Submitted by Janet Smith, Martha L. Ludwig Distinguished University Professor of Biological Chemistry

CREDIT: Rajani Arora, U-M Life Sciences Institute

Researchers have revealed how an antibody (in green) is able to neutralize a protein that is central to the dengue virus’s ability to cause disease by blocking the protein’s ability to interact with host cells.

Achievements and Recognition

Promotion of Peter Freddolino, Ph.D.

In May the Board of Regents approved the recommendation for promotion of Peter Freddolino to Associate Professor of Biological Chemistry with tenure, and Associate Professor of Computational Medicine and Bioinformatics. His promotion took effect in September. Peter has been a highly regarded member of the department since his arrival in 2015. During the time period leading to tenure Peter mentored 13 graduate students, four undergraduate students, five postdoctoral fellows, two visiting scholars, and 18 rotating graduate students. Research in the Freddolino laboratory involves developing experimental and theoretical tools to understand and manipulate cellular decision making, generating quantitative and predictive models of cellular regulatory and metabolic networks. Efforts to date have focused on defining the logic and evolution of bacterial regulatory networks, and the interplay between bacterial chromosomal structure and gene regulation. Congratulations to Peter for this well-deserved recognition of his leadership, scholarship, and scientific contributions.

Accolades for Janet Smith, Ph.D.

In March the Protein Society announced that Janet was the 2021 recipient of the Dorothy Crowfoot Hodgkin Award, in recognition of her exceptional contributions to our understanding of the biological function of proteins through knowledge of their 3D structures. The award was conferred in July at the 35th Anniversary Symposium of the Protein Society, where Janet gave a plenary talk, “Flavivirus NS1: New Fold and New Functions for an Enigmatic Virulence Factor.”

We applaud Janet Smith, Professor of Biological Chemistry since 2005, Associate Director and Research Professor in the U-M Life Sciences Institute, and Director of the U-M Center for Structural Biology, for a series of honors that she received this year.

In July the Board of Regents approved Janet’s appointment as the Martha L. Ludwig Distinguished University Professor of Biological Chemistry, effective in September. This prestigious honor recognizes Janet’s outstanding scholarly achievements in chemical and structural biology, her commitment to excellence in education for her students, and her extensive contributions to the University of Michigan and beyond.

In August the American Society for Biochemistry and Molecular Biology (ASBMB) announced that Janet is the 2022 winner of the Mildred Cohn Award in Biological Chemistry. The award, which is named after the first female president of the ASBMB, honors scientists who have made substantial advances in understanding biological chemistry using innovative physical approaches. Stay tuned for Janet’s award talk at the Society’s 2022 annual meeting, which will be held in Philadelphia next April.
Michael Baldwin, a research lab specialist in Patrick O’Brien’s lab, received a 2021 Research Staff Award from the Endowment for Basic Science, University of Michigan Medical School.

Nicholas Bockhaus, a graduate student in Janet Smith’s lab, was appointed to the Chemistry Biology Interface Training Program for 2021–2022.

Professor Renny Francheschi, Ph.D., was elected to be a fellow of the American Association for the Advancement of Science.

David Hanna, Ph.D., a postdoctoral fellow in Ruma Banerjee’s lab, received a Ruth L. Kirschstein National Research Service Award (NIH F32) for his project “Sulfide Metabolism at the Host Microbiome Interface.”

Natalia Harris, a graduate student mentored by David Sherman and Janet Smith, was appointed to the Pharmacological Sciences Training Program for 2021–2022.

Professor Ursula Jakob, Ph.D., was elected to be a fellow of the American Association for the Advancement of Science.

April Kaneshiro, a graduate student mentored by Neil Marsh, won an Outstanding Poster Award at the 41st Midwest Enzyme Chemistry Conference for her poster “Transient Kinetic Analysis of Ferulic Acid Decarboxylase (FDC) Indicates Half-of-Sites Reactivity.”

Roshan Kumar, Ph.D., a postdoctoral fellow in Ruma Banerjee’s lab, received an American Heart Association Postdoctoral Fellowship for his project “Redox Remodeling by Hydrogen Sulfide.”

Lecturer Allison Lamanna, Ph.D., received a 2021 Teaching Award from the Endowment for Basic Science, University of Michigan Medical School.

Chase Lindeboom, a graduate student mentored by Marilia Cascalho and Peter Freddolino, was appointed to the Genetics Training Program for 2021–2022.

Cara Loomis, a graduate student mentored by Emily Scott, won an Outstanding Poster Award at the 41st Midwest Enzyme Chemistry Conference for her poster “Redox Partner Adrenodoxin Alters Cytochrome P450 11B1 Ligand Binding and Inhibition.”

Romila Mascarenhas, Ph.D., a postdoctoral fellow in Ruma Banerjee’s lab, was selected to be a 2021 Leading Edge Fellow.

A research article published in the *Journal of the American Chemical Society* by research lab specialist Anjali Patwardhan, Ph.D., professor Stephen Ragsdale, Ph.D., and their collaborators was featured in *JACS Spotlights*.

Michael Rankin, a graduate student in Janet Smith’s lab, received a Ruth L. Kirschstein National Research Service Award (NIH F31) for his project “Expanding the Library of (Un)Natural Products through Megasynthase Docking Domain Engineering.”

Victor Rivera-Santana, a graduate student in Neil Marsh’s lab, was appointed to the Chemistry Biology Interface Training Program for 2021–2022.

Professor Audrey Seasholtz, Ph.D., received a 2021 Teaching Award from the Endowment for Basic Science, University of Michigan Medical School.

Zoe Yeoh, a graduate student mentored by Melanie Ohi and Janet Smith, was appointed to the Chemistry Biology Interface Training Program for 2021–2022.

Xufei Zhou, Ph.D., a postdoctoral fellow in Yan Zhang’s lab, received a Tech Transfer Talent Network (T3N) Postdoctoral Fellowship through the University of Michigan.

Christine Ziegler, a graduate student in Peter Freddolino’s lab, received a 2021–2022 Rackham Predoctoral Fellowship for her project “Characterization of the Mechanism of Leucine Sensing and the Role of Leucine in Gene Regulation by the *E. coli* Leucine-Responsive Regulatory Protein (Lrp)”
The bending of DNA during engagement of a damaged nucleobase by human AAG, a DNA glycosylase in the base excision repair pathway, can be monitored using an assay developed by Adam Thelen. It uses stopped-flow fluorescence spectroscopy to detect fluorescence resonance energy transfer (FRET) between donor and acceptor fluorophores attached to the DNA ends, which increases upon bending.

Yuqi Wang, Ph.D. (February 9, 2021)
Ph.D. Thesis: “Exploring the Function of Polyphosphate in the Contact Pathway of Blood Clotting and Developing Polyphosphate Probes for Enhanced Specificity”
Mentor: James Morrissey, Ph.D.
Current Position: Senior Scientist, AbbVie, Worcester, MA

The ability of polyphosphates of varying sizes, together with high molecular weight kininogen and Zn²⁺, to mediate four proteolytic reactions that contribute to initiation of the contact pathway of blood clotting was investigated by Yuqi Wang and colleagues using in vitro measurements of enzyme kinetics. 1, activation of FXII by FXIIa (FXII autoactivation); 2, activation of FXII by PKα; 3, activation of PK by PKα (PK autoactivation); and 4, activation of PK by FXIIa. Propagation of the clotting cascade happens when FXIIa activates FXI, leading ultimately to thrombin generation.
M.S. Degrees Awarded

**Alexandria Chabez, M.S.** (April 30, 2021)
M.S. Thesis: “Molecular Underpinnings of LIG1 Syndrome: Biochemical Characterization of DNA LIG1 Disease Variants”
Research Track Mentor: Patrick O’Brien, Ph.D.

**Qiwei Lei, M.S.** (August 20, 2021)
M.S. Thesis: “Inorganic Polyphosphate Regulation in Caenorhabditis elegans”
Research Track Mentor: Ursula Jakob, Ph.D.

**Macy Lozen, M.S.** (August 20, 2021)
M.S. Thesis: “Testing Potential Anti-CRISPR Candidates for Their Inhibition of Neisseria CRISPR-Cas Systems”
Research Track Mentor: Yan Zhang, Ph.D.

**Ivan Federico Mier, M.S.** (April 30, 2021)
M.S. Thesis: “Characterizing the Role of ESCRT-III N-Terminal Motifs in Membrane Association”
Research Track Mentor: Phyllis Hanson, M.D., Ph.D.

**Juan Nevarez, M.S.** (April 30, 2021)
M.S. Thesis: “Elucidating the Substrate Specificity of Legionella pneumophila Methyltransferase LegAS4”
Research Track Mentor: Raymond Trievel, Ph.D.

**Rachel Nicholas, M.S.** (April 30, 2021)
M.S. Thesis: “Why Does the E. coli Genome Encode the Thioesterase YigI?”
Research Track Mentor: Peter Freddolino, Ph.D.

**Deepa Raghavan, M.S.** (April 30, 2021)
M.S. Paper: “A Review of Müller Glia as Stem Cells for Neural Regeneration in the Zebrafish and Mammalian Retina”
Course Track Mentor: Daniel Goldman, Ph.D.

**Sebastien Rauch, M.S.** (April 30, 2021)
M.S. Thesis: “Overexpression of NEUROD2 and Neuronal Maturation of Human Stem Cells”
Research Track Mentor: Michael Uhler, Ph.D.

**Eleese Timiney, M.S.** (April 30, 2021)
M.S. Paper: “Potential Use of Mesenchymal Stem Cells in Bone Regeneration”
Course Track Mentor: Renny Franceschi, Ph.D.

**Ying-Ting Weng, M.S.** (April 30, 2021)
M.S. Thesis: “Investigating the Corticotropin-Releasing Hormone System in Drosophila melanogaster”
Research Track Mentor: Audrey Seasholtz, Ph.D.
Department Welcomes

Two Assistant Professors Join the Biological Chemistry Department

Welcome to Shyamal Mosalaganti, Ph.D., who was appointed as an Assistant Professor of Biological Chemistry in late 2020. Shyamal has held a primary appointment as an Assistant Professor in the Cell and Developmental Biology Department since November 2020 and is a Research Assistant Professor in the U-M Life Sciences Institute.

Shyamal was the recipient of an International Max Planck Research Fellowship and earned his Ph.D. at the Max Planck Institute of Molecular Physiology in Dortmund, Germany, in 2014. During his Ph.D. program he studied the structure and function of membrane proteins in the laboratory of Stefan Raunser and worked in collaboration with the group of Andrea Musacchio to elucidate the architecture of the components of human kinetochore.

Inspired by the revolution in cryo-electron microscopy, Shyamal focused his postdoctoral research on understanding the architecture of protein complexes in near-native environments (in-situ structural biology). His work in the laboratory of Martin Beck at the European Molecular Biology Laboratory in Heidelberg, Germany, contributed to mapping the symmetric core of the human nuclear pore complex.

In his laboratory at the U-M Life Sciences Institute, Shyamal and his group will continue to provide structural snapshots of macromolecular complexes in situ, with a special emphasis on understanding how lysosomes perform their functions, how they get repaired when damaged, and how they communicate with other organelles to maintain cellular fitness.

We are pleased to announce that Chase Weidmann, Ph.D., a 2015 graduate of the department, joined the Biological Chemistry faculty as an Assistant Professor in September 2021. Chase is also a Faculty Scholar in the Center for RNA Biomedicine and Member of the Rogel Cancer Center. We warmly welcome Brittany Bowman, Ph.D., a 2014 alumna and Chase’s wife and collaborator, who has returned to the department as a Research Lab Specialist.

Chase did his Ph.D. research in the laboratory of Aaron Goldstrohm, where he studied mechanisms of post-transcriptional gene regulation by the RNA-binding proteins Pumilio and Nanos, characterizing mechanistic details of their roles in embryonic development, stem cell maintenance, and learning and memory formation.

After completing his graduate degree Chase moved to the laboratory of Kevin Weeks at the University of North Carolina at Chapel Hill, where he was an American Cancer Society postdoctoral fellow. There he developed and applied new RNA chemical probing strategies that take advantage of massively parallel sequencing to characterize the structure and protein interaction networks of long non-coding RNAs (lncRNAs). Before relocating to Ann Arbor, Chase worked for a year in the laboratory of Ben Major at Washington University School of Medicine in St. Louis, integrating his background with cutting-edge approaches in next-generation screening and proteomic technologies.

Chase’s research program at the University of Michigan centers on how cellular signals are propagated through interaction networks at the RNA-protein interface, and how these networks malfunction during cancer and disease. His laboratory will leverage RNA and protein sequencing technologies to characterize these altered interaction network profiles in cancer cells and generate novel therapeutic strategies that target the RNA-protein interface.

An RNA laboratory

native RNP

Risk-binding proteins (RBP)

disease-causing RNP

add RNA chemistry, localization, and modification
Introducing Our Research Investigators

Becoming a Research Investigator is the first step on the Research Track faculty career path at the University of Michigan Medical School. Research Investigators typically hold doctoral degrees and have completed two or more years of postdoctoral work. The time-in-rank limit for the appointment is four years, and Research Investigators may subsequently be promoted to Research Assistant Professor or Assistant Research Scientist. The department is currently home to five accomplished Research Investigators.

Kevin Bohannon, Ph.D.
Affiliation: Phyllis Hanson Lab
Study of membrane repair using advanced microscopy techniques

Zhonggang Hou, Ph.D.
Affiliation: Yan Zhang Lab
CRISPR biology and mechanism; applying CRISPR-based tools to biological questions

Jiwon Hwang, Ph.D.
Affiliation: Ryan Baldridge Lab
Identifying Hrd1 substrates; investigating the influence of the membrane on ERAD function

Markus Ruetz, Ph.D.
Affiliation: Ruma Banerjee Lab
Structure/function of B12 trafficking proteins

Jeremy Schroeder, Ph.D.
Affiliation: Peter Freddolino Lab
Mechanisms by which heterogeneity is generated within bacterial populations

Introducing Our Affiliate Faculty

To strengthen U-M’s biochemistry community and to expand the range of research opportunities available to our students, the department has welcomed a diverse group of faculty members who engage in biochemical research to participate as mentors in the Biological Chemistry graduate program. Our 12 Affiliate Faculty hold primary appointments in departments across the university.

Matthew Chapman, Ph.D.
Molecular, Cellular, and Developmental Biology
Biogenesis of bacterial amyloid fibers called curli

Kristin Koutmou, Ph.D.
Chemistry
How cells control protein synthesis by the ribosome

Morgan DeSantis, Ph.D.
Molecular, Cellular, and Developmental Biology
Function of microtubule associated motor proteins

Stephanie Moon, Ph.D.
Human Genetics
Messenger RNA regulation in human disease and stress

Tobias Giessen, Ph.D.
Biomedical Engineering
Understanding and engineering large protein assemblies

Teresa O’Meara, Ph.D.
Microbiology and Immunology
How fungal pathogens adapt to the stresses of a human host

Ajit Joglekar, Ph.D.
Cell and Developmental Biology
Mechanism of chromosome segregation by the kinetochore

Melanie Ohi, Ph.D.
Cell and Developmental Biology, U-M LSI
Structure/function of dynamic macromolecular machines

Sarah Keane, Ph.D.
Biophysics, Chemistry
RNA structure/function using NMR spectroscopy

Emily Scott, Ph.D.
Medicinal Chemistry, Pharmacology, Biophysics
Structure/function of cytochrome P450 enzymes

Nicole Koropatkin, Ph.D.
Microbiology and Immunology
Carbohydrate degradation/uptake by human gut bacteria

Anthony Vecchiarelli, Ph.D.
Molecular, Cellular, and Developmental Biology
Subcellular organization in bacteria
Rebecca Lee, Our New Chief Department Administrator

Welcome to Rebecca Lee, who will celebrate her first anniversary as Chief Department Administrator in January.

Rebecca received a B.S. in Communication from Northwestern University, a M.A. in Teaching Foreign Language from the Monterey Institute of International Studies, and held a Fulbright Teaching Assistantship in Alzey, Germany.

She started her career in university and academic management here at U-M, advancing through the ranks as Procurement Coordinator, Administrative Assistant and then Associate in Internal Medicine, and ultimately Facilities and Office Manager for the Chair of Internal Medicine. In 2007 she moved to the University of Miami Miller School of Medicine where she served as Facilities Manager in the Department of Medicine, as Senior Division Administrator for the Department of Medicine’s Cardiovascular Division, and most recently as the Vice Chair for Administration in the Department of Neurology (2012–2020).

Rebecca has excelled in all of these roles and brings a deep understanding of medical school and academic administration to her new position. She values a collaborative and cooperative approach to leadership and looks forward to working with all of us to further our scientific and educational goals.

Ph.D. Students Choose Research Homes in Biological Chemistry

David Beier is a graduate of the University of Wisconsin, Madison. Mentor: Sarah Keane, Ph.D.

Kailyn Jessel is a graduate of Butler University in Indianapolis, IN. Mentor: Matthew Chapman, Ph.D.

Chase Lindeboom is a graduate of Michigan State University, East Lansing. Mentors: Marilia Cascalho, M.D., Ph.D., and Peter Freddolino, Ph.D.

Claudia Mak is a graduate of Skidmore College in Saratoga Springs, NY. Mentor: Anthony Vecchiarelli, Ph.D.

Victor Rivera-Santana is a graduate of the University of Puerto Rico at Mayagüez. Mentor: Neil Marsh, Ph.D.

Jacquelyn Roberts is a graduate of Eastern Michigan University, Ypsilanti. Mentor: Melanie Ohi, Ph.D.

Anibal Tornes Blanco is a graduate of the University of Puerto Rico at Rio Piedras. Mentor: Kaushik Ragunathan, Ph.D.

Natalia Ubilla is a graduate of the University of California, Santa Cruz. Mentor: Tobias Giessen, Ph.D.

Zoe Yeoh is a graduate of Gettysburg College in Gettysburg, PA. Mentors: Melanie Ohi, Ph.D., and Janet Smith, Ph.D.

Ph.D. student/faculty hike at Pinckney State Recreation Area, October 2021. From left: Professor Phyllis Hanson, Zoe Yeoh, Claudia Mak, Jeremy Dortch, Dana Beseiso, Kira Holton, Minli Ruan, Jason Li, Cassie Dutcher, Kailyn Jessel, Nate Boysen
A New Cohort of M.S. Students for 2021–2022

Kayla Chattinger is a graduate of the University of Michigan, Ann Arbor. Course Track Mentor: Ryan Baldridge, Ph.D.

Jue (Amy) Chen is a graduate of Clark University in Worcester, MA. Research Track Mentor: Yan Zhang, Ph.D.

Jeanette Cruz is a graduate of Michigan State University, East Lansing. Research Track Mentor: Stefanie Galban, Ph.D.

Kayla Daniels is a graduate of Grand Valley State University in Allendale, MI. Research Track Mentor: Stephen Ragsdale, Ph.D.

Rosemary Gedert is a graduate of the University of Michigan, Ann Arbor. Course Track Mentor: Chase Weidmann, Ph.D.

Nolan Gersabeck is a graduate of Michigan State University, East Lansing. Research Track Mentor: Michael Uhler, Ph.D.

Alexander (Alex) Scott is a graduate of Drury University in Springfield, MO. Research Track Mentor: James Morrissey, Ph.D.

Danielle (Dani) Silverman is a graduate of the University of Michigan, Ann Arbor. Course Track Mentor: Audrey Seasholtz, Ph.D.

Michelle Wang is a graduate of Johns Hopkins University in Baltimore, MD. Research Track Mentor: David Turner, Ph.D.

Manassa Yadavalli is a graduate of the University of Washington, Bothell. Research Track Mentor: Peter Freddolino, Ph.D.

Zhiying Yang is a graduate of Beijing Jiaotong University in Beijing, China, and the University of Waterloo in Waterloo, Canada. Research Track Mentor: Phyllis Hanson, M.D., Ph.D.

Alexandra (Alex) Hicks is a graduate of the College of William and Mary in Williamsburg, VA. Research Track Mentor: Raymond Trievel, Ph.D.

Hyunsu (Sarah) Lee is a graduate of the University of California, Berkeley. Research Track Mentor: Neil Marsh, Ph.D.

Tatiana Maine-Brown is a graduate of Michigan State University, East Lansing. Course Track Mentor: Kaushik Ragunathan, Ph.D.

Claire Maiocco is a graduate of the University of Michigan, Ann Arbor. Research Track Mentor: Stephen Ragsdale, Ph.D.

M.S. student/faculty hike at Waterloo State Recreation Area, September 2021. Back row: Professor Mike Uhler, Alex Scott with his dog Aldo, Noah Gersabeck, Claire Maiocco, Alex Hicks, Jeanette Cruz, Professor Phyllis Hanson, Professor Debra Thompson, Thomas Uhler. Front row: Michelle Wang, Kayla Daniels, Amy Chen, Zhiying Yang.
Department Retirements

Heartfelt thanks go to Sherry Cogswell, Roberta Fuller, Alex Ninfa, and Mark Saper for their lasting contributions to the department over the years. Alex and Mark were honored with a reception at the Burns Park home of Phyllis Hanson on July 1, and the department celebrated Sherry and Roberta during a dinner gathering at the Postma Family Clubhouse at the U-M Golf Course on November 18 (see page 18). Congratulations and enjoy retirement to the fullest!

Sherry Cogswell, Chief Department Administrator of Biological Chemistry, retired on December 31, 2020. Sherry graduated from Eastern Michigan University in 1988 with a B.B.A. degree (Accounting major), and in future years she advanced to become both a Certified Public Accountant (CPA) and a Certified Internal Auditor (CIA). Between 1987 and 2006 Sherry worked in corporate and health care settings in Southeast Michigan and Eastern Iowa, becoming a highly skilled and valued business professional with an extensive background in health care, higher education, and corporate financial management. In 2007 Sherry took a position as a Senior Audit Manager with University Audits at the University of Michigan, where she was employed until joining Biological Chemistry as Chief Department Administrator in 2015. In this role Sherry first worked alongside interim chair Dan Goldman for three years. When Phyllis Hanson arrived as department chair in 2018, Sherry was instrumental to her successful launch. Sherry generously delayed her retirement, originally planned for the summer of 2020, to help the department navigate through the early part of the pandemic. She then continued to work on a temporary basis into 2021, to ensure a smooth transition of administrative leadership to Rebecca Lee, her successor in the department.

During retirement Sherry has transferred some of her productivity to her legendary garden and to her volunteer work as a finance committee member for the Haitian Nursing Foundation and as an accountant for the Washtenaw Area Council for Children. Sherry and her husband Stephen live in Ann Arbor.

Roberta S. Fuller, Professor of Biological Chemistry, retired from active faculty status on August 31, 2021. Fuller received her B.S. degree from Yale University in 1978 and her Ph.D. degree from Stanford University in 1984. She was an assistant professor at Stanford University from 1987–94. Fuller joined the University of Michigan faculty as an associate professor in 1994 and was promoted to professor in 1999. Fuller’s research focused on proteolytic processing and protein localization in the secretory pathway. This research resulted in numerous multiyear NIH funded grants, over 60 peer-reviewed publications, chapters in books and presentations at international meetings. A gifted teacher, Fuller gave lectures for multiple courses including BiolChem 415/515 (Introduction to Biochemistry), BiolChem 578 (Biochemical Techniques), BiolChem 596 (Critical Analysis), BiolChem 452 (Biochemistry II), and most recently co-directed BiolChem 675 (Biochemistry and Cell Biology of Membranes and Organelles) with Phyllis Hanson. She served as both director and co-director of the Cellular and Molecular Biology Ph.D. Program over the course of 17 years. Fuller was also Associate Chair of the Department of Biological Chemistry from 2000–07. An exceptional mentor, she served on numerous thesis committees and mentored many undergraduate, graduate, and postdoctoral students. Administratively, she participated in multiple committees in the Department of Biological Chemistry and in the Cellular and Molecular Biology Program. Fuller received the Faculty Recognition Award from the University of Michigan in 2000 and the Distinguished Scientist Award from the Society for the Advancement of Chicano/Hispanic and Native Americans in Science (SACNAS) in 2017.

Roberta is working on remaining manuscripts with Mithu De, a former postdoctoral fellow and research associate, as well as on an article for Methods in Molecular Biology. This winter she’ll co-teach BiolChem 675 with Phyllis Hanson, and she continues to serve on several dissertation committees. Roberta and her wife Carol spend some of their time in The Sea Ranch, CA. This remote part of the northern
Sonoma coast is a great place for them to hike/cycle/relax/entertain friends, and is their home base for visits to San Francisco, where they recently saw Fidelio at the San Francisco Opera, and other spots in the Northwest.

Alexander J. Ninfa, Professor of Biological Chemistry, retired on May 31, 2021. Ninfa received his B.S. from Villanova University in 1977 and his Ph.D. from Rutgers University in 1983. He was an assistant professor at Wayne State University before joining U-M as an associate professor in 1993. He was promoted to professor in 1999. Ninfa’s research focused on bacterial nitrogen regulation, and on elucidating the design principles of natural and synthetic signal transduction systems. This research resulted in numerous multiyear NIH and NSF grants, over 80 peer-reviewed publications, chapters in books, and presentations at international meetings. Ninfa served as course director for Introductory Biochemistry and Biochemistry II, and, with Professor Emeritus David Ballou, developed an undergraduate course in biotechnology and published a widely used textbook. He was both director and co-director of the Biological Chemistry Master’s program. He also participated in multiple departmental committees in Biological Chemistry, as well as in the Medical School’s Advisory Committee on Appointments, Promotion, and Tenure and the Biomedical Research Council. Ninfa received U-M’s Henry Russel Award in 1999, was elected a fellow of the American Academy of Microbiology in 2011 and was awarded the Endowment for Basic Science Teaching Award in 2015.

Since retiring Alex has been spending time with his wife Kathleen, reading, playing some chess, working around the house, boating, writing music, and playing tons of guitar. Alex also continues to teach in BiolChem 711, the graduate seminar course.

Mark A. Saper, Associate Professor of Biological Chemistry and Associate Research Scientist of Biophysics, retired on May 31, 2021. Saper received his B.S. from the University of Connecticut in 1976 and his Ph.D. from Rice University in 1983. He joined U-M as an assistant professor and assistant research scientist in 1990 and was promoted to associate professor and associate research scientist in 1997. Saper was honored as an HHMI, PEW and Fulbright Scholar. A sabbatical visit to Hebrew University of Jerusalem in 2003 resulted in binational funding and new research directions studying proteins necessary for the export of bacterial polysaccharide capsule from enteropathogenic E. coli, including crystal structure determination of one of these proteins. Thereafter he studied the LpoA protein, essential for bacterial cell wall biosynthesis, and an endopeptidase from Vibrio cholerae, also important for cell wall growth. He was known as a highly skilled, hands-on crystallographer and taught a graduate course on X-ray crystallography. He developed a hands-on molecular graphics component for the core Program in Biomedical Sciences course, Biological Chemistry 550 and Chemical Biology 501, and directed student seminar courses. Saper served on departmental and Medical School committees.

Mark took online courses on web software development during his first summer of retirement. He also revised and submitted a paper which was just accepted! Mark and his wife Cynthia are now spending three months in Jerusalem, where Mark is working in a structural virology lab at the Hebrew University Faculty of Medicine and both can see their son, daughter-in-law, and grandchildren on weekends.

Mark and Cynthia Saper with their grandchildren
Trainees in the Biological Chemistry department have been active participants in the U-M consulting community. The miLEAD Consulting Group is a nonprofit organization that seeks to help U-M graduate students and postdoctoral fellows transition to non-academic career paths by applying their research skills to complex business problems. Since its start in 2013 miLEAD has grown to over 80 active consultants and 160 alumni. https://www.milead.org

A consulting team from miLEAD that included graduate student Fabienne Birkle (Morrissey lab) and postdoctoral fellow Anindita Sarkar (Ragsdale lab) was awarded first prize out of an international field of over 60 teams in the Yale Healthcare Case Competition, held virtually on February 13, 2021.

On October 2, 2021, graduate student Tyler McCullough (Smith lab) and his teammates placed third overall in the Henrietta Lacks Health Equity Case Competition. After devoting hours to intense preparation, each of the 50+ participating teams presented innovative solutions to address health disparities in a variety of settings.

Kudos to all Biological Chemistry consultants, past and present, for their hard work and resourcefulness.

Screenshot of the miLEAD consulting team that competed successfully in the Henrietta Lacks Health Equity Case Competition on October 2, 2021. Graduate student Tyler McCullough is pictured at top right.

Screenshot of the miLEAD consulting team that won the Yale Healthcare Case Competition on February 13, 2021. Postdoctoral fellow Anindita Sarkar is pictured at bottom left, and graduate student Fabienne Birkle is pictured at bottom right.
Biological Chemistry faculty members Yan Zhang and Nils Walter co-directed a Fall 2021 graduate course that delved into CRISPR (Clustered Regularly Interspersed Short Palindromic Repeats) and its many applications. Recent advances in CRISPR technology have transformed areas ranging from discovery research to applied science, such as gene therapy and crop breeding. The course directors and other prominent researchers in the field helped students explore how a basic research finding changed science and led to the 2020 Nobel Prize in Chemistry. Talks by six invited scientists were included in the departmental seminar series, which was provided via a mix of in-person presentations and Zoom webinars this fall. Students enrolled in BiolChem 713 attended course-related seminars, engaged in discussions with each speaker, and prepared a final written reflection. Course director Yan Zhang’s research program focuses on CRISPR-CAS biology, mechanism, and genome engineering applications, and Nils Walter’s team integrates experimental and computational approaches to study the structure, dynamics, and function of RNAs and DNA nanodevices outside and inside human cells.

The 2020 Nobel Prize in Chemistry was awarded to Emmanuelle Charpentier and Jennifer Doudna for discovering the CRISPR/Cas9 genetic scissors. Researchers can use this molecular tool to change the DNA of animals, plants, and microorganisms with extremely high precision.

**CREDIT: Johan Jarnestad, The Royal Swedish Academy of Sciences**

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**Achieving and Balancing Selectivity in CRISPR-Cas Systems**
Dipali Sashital, Ph.D.
Iowa State University
September 7, 2021

**Base Editing: Performing Chemistry on the Genome**
Alexis Komor, Ph.D.
University of California, San Diego
September 21, 2021

**Targeted DNA Integration Without Double-Strand Breaks Using CRISPR RNA-Guided Transposases**
Samuel Sternberg, Ph.D.
Columbia University
October 12, 2021

**Know Thy Enemy: Making CRISPR Memories**
Michael Terns, Ph.D.
University of Georgia
October 26, 2021

**Structural Basis of Bacterial CRISPR Immunity**
Ailong Ke, Ph.D.
Cornell University
November 9, 2021

**Harnessing CRISPR for Multiplexed RNA Detection**
Chase Beisel, Ph.D.
University of Würzburg
December 7, 2021
In Memory

Irwin J. Goldstein, Ph.D.
1929-2020

On forest walks in the 1970s, Irwin J. Goldstein would enlist his young sons in collecting seeds or flowers that struck him as possible sources of lectins—carbohydrate-binding proteins that were the focus of his pioneering research as a biochemistry professor at the University of Michigan.

He once told his boys he was so excited about his work that he could barely wait to get out of bed in the morning—an unflagging energy and enthusiasm that fueled a scientific career spanning 60 years. Goldstein, a professor emeritus of biological chemistry and longtime Ann Arbor resident, died December 26, 2020, in Chelsea, Michigan. He was 91.

A Guggenheim Scholar at the Lister Institute in London, he also did research at the Pasteur Institute in Paris and Stockholm University, and lectured around the world. His half-century at U-M included 12 years as associate dean of research and graduate studies at the Medical School. He received the Claude S. Hudson Award in Carbohydrate Chemistry from the American Chemical Society in 1993, and the university’s biochemistry department holds an annual glycobiology lectureship in his name.

Irwin’s passion and drive were evident in everything from art to athletics. He and his wife, Martha Mayo, amassed a lithograph collection focusing on 20th-century American masters, and also focused on local artists. A lifelong distance runner, he later passed his joy of running on to his two sons. He was also a zealous Michigan football fan.

In the 1960s, he protested against the House Un-American Activities Committee at SUNY-Buffalo, and later helped lead teach-ins at U-M against the Vietnam War.

A gourmet who relished everything from caviar to corned-beef sandwiches, Irwin and Martha ate and hiked their way around the world. Closer to home, he was a fiercely loyal customer of Zingerman’s Deli, even getting a sandwich named after him—“Irwin’s Inspiration.”

Born in Newark on September 8, 1929, he graduated from Weequahic High School in 1947 and Syracuse University in 1951. He completed his Ph.D. in biochemistry at the University of Minnesota in 1956, and served several years there as a postdoctoral fellow. He published 300 scientific papers and three books analyzing the structure, functioning, and biomedical applications of lectins. He married his first wife, Jone Rymer, now of Ann Arbor, in 1959. He was an assistant professor at SUNY-Buffalo before joining the U-M faculty in 1965. Irwin married Martha Mayo in 1986.

In addition to Martha, Irwin is survived by his sons, Garth Goldstein of Somerville, Massachusetts, and Brandt Goldstein of New York City; daughters-in-law, Ona Ferguson and Angella So; grandsons, Bjorn, Soren and Lars Goldstein; stepdaughter, Mira Hinman, and her husband, Todd McDermott, of Libertyville, Illinois; and their daughters, Annika and Celia McDermott-Hinman. His younger sister, Judith, died in 1989.

An online celebration of Irwin’s life took place on September 26, 2021.

IrwinJGoldsteinMemorial.com
Harvey J. Whitfield, M.D.
1940-2021

Harvey James Whitfield, M.D., biochemist, researcher, educator and psychiatrist, died on July 3, 2021, at his home in Evanston, IL, at the age of 81. The cause was Alzheimer’s disease.

Harvey, known to family and friends as “Skipper”, was born in Chicago, IL, on April 10, 1940, to Harvey James Whitfield, Sr., a urologist who was the first Black attending physician at Michael Reese Hospital, and Kate Matthews Whitfield, the first female Black pharmacist to be licensed in Illinois.

Harvey graduated from Hyde Park High School in Chicago where he played drums and often jammed with Herbie Hancock. Harvey attended the University of Illinois at Urbana-Champaign for both undergraduate and medical school, graduating with an MD in 1964. Following his internship year in Chicago, he had a postdoctoral fellowship at the National Institutes of Health (NIH) in Bethesda, Maryland. He simultaneously held the position of Senior Assistant Surgeon with the US Public Health Service from 1965–1969. Harvey then spent a further fellowship year at the National Cancer Institute Microbial Genetics Research Unit in Edinburgh, Scotland. He later described his year in Scotland as one of the happiest of his life.

From 1970 to 1984, he was a professor in the Department of Biological Chemistry at the University of Michigan Medical School. At Michigan, he was one of the few African American faculty members, and won the Distinguished Service Award from Black Undergraduates and the Distinguished Faculty Teaching and Service Award. Known for his kind and helpful demeanor, he influenced hundreds of students who became deeply attached to him.

In 1983, Harvey returned to the NIH. During this period, he decided to pursue his growing interest in psychiatry, and 20 years after graduating with his MD degree, returned to training, doing a 3 year residency in psychiatry at the University of Maryland followed by a fellowship in Clinical Neuroendocrinology at the National Institute of Mental Health. He continued his research at NIMH for the next 4 years, before joining the faculty at the University of Illinois at Chicago, and becoming an attending psychiatrist at the VA Medical Center in Chicago, positions he held until his retirement. At the VA, Harvey kindled a passion and reputation for being a fierce advocate for his patients and their struggles to receive the mental health care and benefits they deserved.

Harvey’s nearly 40 published articles and papers over the course of his career included groundbreaking research that contributed to the development of the Ames Carcinogenicity Test, a widely used method for determining the carcinogenic potential of a compound.

Harvey married Dr. Carolyn Dickson in 1965, and worked with her both at the University of Michigan, and in Bethesda, Maryland. They had one son, Harvey Amani Whitfield in 1974 who himself has gone on to a distinguished career as a professor of African American and Afro Canadian History. Harvey and Carolyn were divorced in 1989.

Skipper considered himself extremely fortunate to have met Barbara Sittler in Chicago, whom he married in 2000. Barbara and Skipper found in each other that rare combination of mutual respect, love, contentment and joy and enjoyed 21 years of happy married life, filled with humor, companionship and caring. Barbara and Skipper were devoted to their extended family and had many travel adventures, especially to Scotland, a country both he and Barbara had a special love for. They made regular trips to Vermont to visit his son’s family including their much loved granddaughter Hope. He was able in later years to indulge his interests and love of Lionel model trains, photography, sailing, jazz, good food and friendships.

Harvey is survived by his beloved wife Barbara, his son Amani, daughter-in-law Natalie, granddaughter Hope, sister Andrietta, niece Alexis, and cousin Homer Fleetwood along with the entire Matthews family: Aunt Shirley and cousins Jada, Paula and Jeanie Matthews. He was a much-loved uncle on the Sittler side to Amy, Stephen, Edward, Will, Paul, Noah, Abby and Lilia, and brother-in-law to Claudia, Cynthia, Bay, and Ted.
The Endowed Lectureships 2021–2022

Rowena Matthews Lectureship in Biological Chemistry

Jason McLellan, Ph.D.
Professor of Molecular Biosciences,
Robert A. Welch Chair of Chemistry
University of Texas, Austin

September 14, 2021

Irwin J. Goldstein Lectureship in Glycobiology

Lara Mahal, Ph.D.
Professor of Chemistry, Canada Excellence Research Chair in Glycomics
University of Alberta

November 2, 2021
(rescheduled from 2019–2020)

George William Jourdain Lectureship in Biological Chemistry

Vamsi Mootha, M.D.
Professor of Systems Biology and Medicine
Harvard Medical School
Investigator, HHMI

November 16, 2021
(rescheduled from 2019–2020)

William E.M. Lands Lectureship on the Biochemical Basis for the Physiology of Essential Nutrients

Pat Brown, M.D., Ph.D.
CEO and Founder
Impossible Foods

November 18, 2021

G. Robert Greenberg Lectureship in Biological Chemistry

Brenda Schulman, Ph.D.
Director of Molecular Machines and Signaling
Max Planck Institute of Biochemistry

March 22, 2022

Martha L. Ludwig Lectureship in Structural Biology

Bil Clemons, Ph.D.
Arthur and Marian Hanisch Memorial Professor of Biochemistry
California Institute of Technology

April 12, 2022

The Distinguished Graduate Lectureship

Jon Huibregtse, Ph.D.
Professor of Molecular Biosciences,
Benjamin Clayton Centennial Professor of Biochemistry
University of Texas, Austin

April 19, 2022
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A department dinner gathering was held at the Postma Family Clubhouse at the U-M Golf Course on November 18 to celebrate the Lands Lecture that had taken place earlier that day and to honor recent retirees Sherry Cogswell and Roberta Fuller. After the meal Chair Phyllis Hanson highlighted the contributions of William Lands and both retirees in her remarks, and Roberta Fuller presented “Reflections on My Life in Science.”

Sherry Cogswell

Roberta Fuller