New Insights into How DNA Replicates at Chromosome Ends
The Biochemistry In Vivo newsletter keeps our current members, alumni, supporters, and friends worldwide up to date on happenings in the department. The 2022 edition is a presentation of our achievements and continued success. It is our sincere hope that you will find this newsletter engaging, enlightening, and inspiring.

This year’s offering celebrates our junior faculty, their tremendous research teams which include high school interns, undergraduates, graduate students, postdoctoral fellows and research staff, and their stunning accomplishments. The department is proud of our recent graduates and our dedicated staff and faculty, who all persevered through the pandemic and are moving forward with the impressive work reported here.

In the cover photograph, titled New Insights into How DNA Replicates at Chromosome Ends, assistant professor Ci Ji Lim and biophysics graduate student Qixiang He are collecting structural data on Pol α primase, with the 14-ft tall Titan Krios G3i cryo-electron microscope. With expert support from lab manager Xiuhua Lin, this research team discovered the intricacies of another protein’s involvement in DNA replication at telomeres — CST facilitates the ability of Pol α primase to recognize both RNA and DNA. In another advance for nucleic acid researchers in the department, Integrated Program in Biochemistry (IPiB) graduate student Saeed Roschdi and Steenbock Professor Sam Butcher showed the structure of pUG, a RNA quadruplex structure that winds around itself into a cube shape that can control gene splicing (p. 4).

The 42nd Steenbock Symposium (p. 8) celebrated the opening of the UW–Madison Cryo-Electron Microscopy Research Center (CEMRC) and the Midwest Center for Cryo-Electron Tomography (MCCTET), led by professor Elizabeth Wright. The centers are supported by the NIH, Morgridge Institute for Research, other campus partners, faculty grants, industry contracts, and an endorsement provided by Daniel (B.S. ’71) and Judy Klessig.

This year, assistant professors Ci Ji Lim and Amy Weeks received highly prestigious NIH DP2 awards (p. 11). The DP2 awards support the work of early-stage investigators, such as Lim’s work on telomerase described above. Weeks’ research is on mapping post-translation modifications of the human proteome. Her research team has created specially engineered proteases, clever chemical derivatization schemes, and uses high-resolution mass spectrometry to map the extent, timing, and consequences of post-translational modifications in the human proteome (p. 11). Since thousands of human proteins likely contain these modifications, this work has great promise to have cross-cutting impacts on our understanding of diverse cellular processes.

The department now has a strong cohort of researchers working on the microbiome and the challenging rise of antibiotic resistance. Our efforts include development of new methods, quantitative approaches, and leverages of rapidly expanding capabilities in genomics, metabolomics, and structural biology. Vatsan Raman was promoted to the rank of associate professor with tenure last summer, won the College of Agricultural and Life Sciences Pound Research Award (p. 9), and is continuing his work on exploiting the specificity of bacteriophages to selectively kill pathogenic bacteria — maybe even those hiding out in the microbiome (p. 7). Assistant professor Ophelia Venturelli and assistant scientist

A pedestrian bridge connects the DeLuca Biochemistry Building and the DeLuca Biochemical Sciences Building with the DeLuca Biochemistry Laboratories behind on an autumn day.
From the Chair continued

Jun Feng made groundbreaking discoveries about a cluster of genes called the polysaccharide utilization locus (PUL) found in human gut microbiome (p. 5). PULs have important roles in digestion of complex carbohydrates and modulation of the interactions among various species in microbiome community. Also in the Venturelli Lab, Dr. Freeman Lan won a prestigious Burroughs-Wellcome Trust Career award to work on microbiome communities (p. 14). In combination, these advances are providing new options to control the community of microbes in the human gut.

Assistant professor Samu Sandgren in the Lab of mentor researcher Xinyun (Sherry) Cao and Charles Yanofsky Professor Robert Landick are learning how a promising antibiotic can knock out the function of essential RNA polymerase from Clostridium difficile (C. difficile) (p. 6). In recognition of this exciting work, Dr. Cao was awarded a Pathway to Independence Award (K99/R00) from the NIH to support her future research and transition to a faculty position (p. 14).

Our department continues to receive grant funding from many sources to carry out research across the full spectrum of the life sciences. Assistant professor Judi Simcox (p. 10) received an American Federation for Aging grant. Assistant professor Jason Cantor (p. 12) a Hartwell Individual Biomedical Research Award, and professors Brian Fox, John Ralph, and University of British Columbia professor Shawn Mansfield a collaborative DOE grant (p. 9) to continue their work on gene discovery and bioenergy plant engineering. These represent only a few of the numerous research grants secured by our department.

I am pleased to recognize Dr. Ronnie Fredrick (p. 13), who won the 2022 CALS Academic Staff Excellence Award, professor Mike Sussman (p. 10), who was named the first recipient of the College of Agricultural and Life Sciences Salm-Bray Professorship in recognition of his contributions to genomics sciences and entrepreneurship, Dr. Jae Yang (p. 13), who won the 2022 Boyer Award for Postdoctoral Excellence in Biochemistry, Dr. Josie Mitchell (p. 15), a recent Ph.D. graduate, who received a 2022 Wisconsin Initiative for Science Literacy (WISL) Award for Communicating Ph.D. Research to the Public. Nithesh Chandrasekharan (p. 15), who was the first recipient of the CALS B.R. DasGupta award supporting the research of international graduate students, and Biochemistry undergraduates Sarah Fahlberg, Samuel Lewis, and Elias Kemna, who received Barry Goldwater fellowships (p. 16).

On the Cover

Enzymes, Proteins Work Together to Tidy Up Tail Ends of DNA in Dividing Cells

A ssistant professor Ci Ji Lim’s group has described how an enzyme and proteins interact to maintain the protective caps, called telomeres, at the end of chromosomes, a new insight into how human cells preserve the integrity of DNA through repeated cell division.

DNA replication is essential for life as we know it, but many complexities of the process — how myriad biomolecules get where they need to go and interact over a series of intricately orchestrated steps — remain mysterious.

“The mechanisms behind how this enzyme, called Polα-primase, works have been elusive for decades,” says Lim. “Our study [in Nature] provides a big breakthrough in understanding DNA synthesis at the ends of chromosomes, and it generates new hypotheses about how Polα-primase — a central cog in the DNA replication machine — operates.”

Every time a cell divides, the telomeres at the end of the long DNA molecule that makes up a single chromosome shorten slightly. Telomeres, like the aglet protects the end of a shoelace. Eventually, telomeres are so short that a chromosome’s viral genetic code is exposed and the cell, unable to function normally, enters a zombie state. Part of a cell’s routine maintenance includes replenishing this DNA using Polα-primase to prevent excessive shortening.

At the telomere construction site, Polα-primase first builds a short nucleic acid primer (called RNA) and then extends this primer with DNA (called RNA-DNA primer). Scientists thought Polα-primase would need to alter its shape in order for Polα-primase to perform these steps — remain mysterious.

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Our findings reveal an unprecedented role that CST plays in facilitating this Polα-primase activity,” explains first author Qixiang He, a graduate student in the biophysics graduate program. “It will be interesting to see if accessory factors involved in DNA replication elsewhere on chromosomes set up Polα-primase the same way as CST does for telomeres.

The researchers built the structural model of CST-Polα-primase using an advanced imaging technique called cryo-electron microscopy (cryo-EM) single particle analysis. In cryo-EM, rapidly frozen samples are suspended in a thin film of ice, then imaged with a transmission electron microscope, resulting in high-resolution, 3D models of biomolecules like the enzymes at work in DNA replication.

“Beyond that, the structures also provide ideas that we can now design experiments to test,” says Xinhua Lin, lab manager and co-author of the study.

Among these ideas are capturing how CST-Polα-primase works in more detail. The researchers also want to map the entire human telomere replication process, and they’re studying how CST-Polα-primase terminates its activity once the DNA at the telomeres is copied.

Original story by Catherine Steffel, Ph.D., Biochemistry
genes. They control the way living things look and even function, what eye color they may have and what diseases they may live with. Scientists have worked for decades to understand how some genes get switched on while others are switched off, or silenced, determining which traits are expressed.

In a study published in *Nature Structural & Molecular Biology*, UW–Madison and Harvard University biochemists have found a new piece of the puzzle by identifying an unusual cube-like RNA structure that can control gene silencing in roundworms. The basis for the structure is a sequence of nucleotides called a “pUG.”

People are familiar with the double helix of DNA,” says professor Samuel Butcher, a senior author of the study. “This is an RNA quadruple helix that winds around itself four times into a cube shape.

In cells, there are many strands of RNA with different sequences and shapes. RNA has many important jobs inside of cells, like carrying instructions from DNA to make proteins, and is made up of bases, or nucleotides. In particular, Butcher and his colleagues recognized that these bases were interested in whether pUGs take on a particular shape, or fold, since RNA sometimes must take on specific shapes to perform work.

The researchers found that, like the curious tails of the dogs their nickname alludes to, pUG sequences can fold tightly around themselves. This “pUG fold” is important for their ability to silence genes.

To arrive at this finding, Roschdi, who’s a member of the Butcher Lab and lead author of the study, made a bunch of pUGs of different lengths and then analyzed them with special imaging techniques to see if and how they folded. They discovered that 12 is the magic number: pUG RNA must have at least 12 pairs of UG nucleotides in a row to form its cube-like structure and silence genes. Any fewer than 12, and the strand is too short to fold around itself.

From there, they looked for the pattern of 12 UG repeats in other genomes besides the roundworm. They found the sequence in thousands of human genes, but the sequence was in the middle of the RNA instead of on the tail end. They suspect that these pUG sequences fold up into the same cube-like structure that controls gene silencing in the roundworm, but the structure hasn’t yet been observed in humans.

“The potential that it’s going to be context dependent,” Roschdi says, explaining that the pUG RNA may compete with other sequences that cause the RNA to fold into a different shape.

Now, they are trying to figure out what proteins interact with the human pUG sequences. From there, they may be able to test the interactions to see how it affects gene expression in humans.

“In the future, we might be able to use this information to instruct any kind of cell to silence a harmful gene,” Butcher says. “It could be viral, or a cancer-causing gene. The possibilities are numerous.”

Roschdi thinks pUG tails also provide a great opportunity to study certain human proteins that interact with pUG RNAs and are involved in neurodegenerative diseases like ALS. Further research is necessary to determine exactly how the power of these pUG tails can be harnessed, but Roschdi is excited for the challenge. “Obviously in an ideal world, you would just do an experiment and it would work perfectly,” Roschdi says. “But for me, as long as I’m figuring out new things, I’m motivated.”

*Original story by Elise Mahon, University Communications*
Most antibiotics are double-edged swords. Besides killing the pathogen they are prescribed for, they decimate beneficial bacteria and change the composition of the gut microbiome. As a result, patients become more prone to reinfection, and drug-resistant strains are more likely to emerge.

An answer to this problem might be narrow-spectrum antibiotics that kill only one or a few species of bacteria, minimizing the risk of collateral damage. Professor Robert Landick and his team took a close look at one such antibiotic, fidaxomicin, used to treat Clostridium difficile (C. diff), one of the most common healthcare associated infections. Landick’s team demonstrated at a molecular level how fidaxomicin targets C. diff while sparing innocent bacterial bystanders. Their findings, detailed in *Nature*, might help scientists discover new narrow-spectrum antibiotics against other pathogens.

Like several other antibiotics, fidaxomicin targets an enzyme called RNA polymerase (RNAP), which *C. diff* uses to transcribe its DNA code into RNA. To understand why fidaxomicin selectively inhibits RNAP in *C. diff* and not in most other bacteria, Landick teamed up with associate professor Elizabeth Campbell from The Rockefeller University to visualize RNAP using cryo-electron microscopy (cryo-EM). Cryo-EM is a powerful imaging technique that can reveal the 3D shape of molecules and capture the drug molecule and its target in action.

One big challenge, however, was producing large amounts of *C. diff*, an anaerobic germ that doesn’t grow in the presence of oxygen, to image. The study’s first author, Xinyun (Sherry) Cao, a postdoctoral researcher in the Landick Lab, spent two years developing a system to more easily produce *C. diff* RNAP using *E. coli*, a bacterium that grows easily and is frequently used in the lab. A key component of the system is an engineered plasmid that produces soluble proteins for *C. diff* RNAP while maintaining subunit stoichiometry. Cao’s approach opens the door to similar studies with other bacterial pathogens (read about her subsequent K99/R00 award from the NIH on p. 14).

“RNA polymerases from many bacterial pathogens like *C. diff* are proven drug targets, but study of these enzymes is difficult because they differ in properties from the RNA polymerases in model bacteria and the pathogens themselves are problematic to grow at scales that yield enough enzymes,” says Landick. “Xinyun’s recombinant system is a major breakthrough for *C. diff* research.”

Using this material, co-first author Hande Boyaci, a postdoc on Campbell’s team, generated images of *C. diff* RNAP locked with fidaxomicin at near-atomic resolution. Wedged into a hinge between two subunits of RNAP, fidaxomicin jams the enzyme’s pincer, preventing it from grabbing onto genetic material and transcription. The researchers identified one amino acid on the RNAP that binds to fidaxomicin but is absent in the main groups of gut microbes that are spared by fidaxomicin. A genetically altered version of *C. diff* that lacked this amino acid was unperturbed by fidaxomicin, just like other commensal bacteria in the gut. Conversely, bacteria that had it added to their RNAP became sensitive to fidaxomicin.

The findings suggest this one amino acid among the 4,000 amino acids of this robust and essential transcription machine is its Achilles heel, responsible for the killing of bacteria by fidaxomicin.

The approach used in this study proposes a roadmap to developing new and safer antibiotics, the researchers say. By further elucidating RNAP structure of diverse bacteria, scientists can design antibiotics that target each pathogen more selectively and effectively.

Antibiotic fidaxomicin (green) inhibits *C. diff* bacterium by jamming RNAP, an enzyme crucial to bacterial replication.

Original story by The Rockefeller University

**How a Narrow-Spectrum Antibiotic Takes Aim at *C. diff***

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In nature, bacteriophages are the natural predators of bacteria. Phages, as they’re commonly known, are classified as viruses. They infiltrate the walls of bacteria and hack biological machinery to make a slew of baby phages. Those baby phages fill the bacterium until it explodes; then they seek other bacterial cells to destroy. Bacteria mutate to survive these attacks in an evolutionary arms race that has been raging for billions of years.

For the last five years, associate professor Vatsan Raman and his team have been working on ways to make thousands of mutations to phages. With phage therapy, they want to see what mutations can best kill the deadliest bacteria in the world, hoping to fight back against the growing superbug crisis.

“I have thought of the phage as the ultimate smart drug,” Raman says. “It precisely targets a pathogen, unlike traditional antibiotics, which cause collateral damage. It is evolvable, which means that if bacteria become resistant to a phage, we can evolve the phage using synthetic biology to remain effective against the bacteria. With traditional antibiotics, once bacteria become resistant, it is a dead end. Finally, there is a limitless supply of phages in nature to work with. Some estimates suggest there are more than [one nonillion](https://en.wikipedia.org/wiki/Nonillion) phages on Earth.”

In 2021, Raman and his team published a study highlighting a method they created that would systematically map how altering a phage’s DNA sequence changes how it interacts with bacterial hosts. The method, dubbed ORACLE — optimized recombination, accumulation, and library expression — makes tens of thousands of changes to the phage’s DNA. While evolution makes one change at a time to see if a version of a phage can kill the current version of its host, ORACLE makes thousands of changes at once, searching for the phage mutations that will kill drug-resistant bacteria.

Raman credits Phil Huss, who recently graduated from the Microbiology Doctoral Training Program and now works as a researcher in Raman’s lab, as the creator of ORACLE. The promise of ORACLE, says Huss, is that it will help researchers know more about different parts of the phage that can be effective killers of bacteria. If a phage is good at killing *E. coli* or salmonella, for example, researchers can use that knowledge to design phages that will target these bacteria, thus fighting back against the problem of drug-resistant bacteria.

“ORACLE is a systematic process that can be used to map a phage against its bacterial hosts,” says Huss. “It can be used to develop new phage therapies, which are critical right now. ORACLE can be used to map a phage against its bacterial hosts, which is critical right now.”

Raman believes that, once approved clinically, phage therapy will offer medicine a new opportunity to treat stubborn infections, but he says it may be a tough sell for large pharmaceutical companies because it’s a treatment that quickly and inexpensively solves a problem. There will be few repeat customers for successful phage therapy treatments, which means it may be hard to profit from phages. At first cautiously optimistic about phage therapy, though, now Raman is certain it will save lives. His lab is researching ways that phages and ORACLE can be used to precisely edit the microbiome, for both humans and livestock.

“I’m more convinced now than ever,” Raman says, “that the phage revolution will have a large impact.”

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**A New Tactic in the Superbug Battle**

Original feature story for Grow magazine by freelance writer Hal Conick

Original story by The Rockefeller University
Research News

A Warm Reception for Ultra-Cold Tech at UW–Madison

This year, Biochemistry opened its doors in celebration of two new research centers that bring to campus an advanced biomolecular imaging technology called cryo-electron microscopy (cryo-EM). The technology allows scientists to capture detailed information about the smallest components of living cells to understand everything from more effective drug development to how viruses infect cells. It requires ultra-cold temperatures during biomolecular specimen preservation and imaging and requires the right combination of expertise and highly specialized equipment.

The UW–Madison Cryo-Electron Microscopy Research Center (CEMRC) and the NIH-sponsored Midwest Center for Cryo-Electron Tomography (MCCET) are both directed by biochemistry professor Elizabeth Wright and represent a continuation of our long history of contributions to structural biology. Both centers provide instrumentation, training, technical assistance and support to UW–Madison researchers, as well as access to cryo-EM. The centers are also open to other universities and to private industry.

The centers’ grand opening, held during Biochemistry’s 42nd Steenbock Symposium, and a subsequent Congressional staff tour highlighted the facilities’ technical capabilities and societal impact. The centers are supported by federal and UW–Madison funding sources and are currently hosting over 140 research projects from UW–Madison and across the country.

Thomas Anderson, a cellular and molecular biology graduate student working in the lab of biochemistry assistant professor Robert Kirchdoerfer, and Anil Kumar, a research specialist in the cryo-EM centers, explain the inner workings of the Titan Krios cryo-electron microscope to a tour group at the CEMRC and MCCET open house in June 2022, held in conjunction with the Department of Biochemistry’s 42nd Steenbock Symposium. Photo: Michael P. King/UW–Madison CALS

Joseph King, a graduate student in the chemistry department, leads scientists through an interactive workshop during the open house in June. Dedicated on-site training by center users and staff is available to scientists across campus and beyond. Remote training and operation of equipment are also features of the new centers. Photo: Michael P. King/UW–Madison CALS

The Department of Energy (DOE) announced $178 million for bioenergy research to advance sustainable technology breakthroughs that can improve public health, help address climate change, improve food and agricultural production, and create more resilient supply chains.

The biochemistry award provides the labs of professors Brian Fox and John Ralph, and University of British Columbia (UBC) collaborator Shawn Mansfield, approximately $2.6 million over three years. Their research aims to uncover important information about how BAHD acyltransferases and acyl-CoA ligases — enzymes that control the composition of plant cell walls — behave in vitro and in plants.

“The work will help us understand how plants produce a large variety of products that have potential for use in a sustainable bioeconomy,” Fox says. “Their results will help inform targeted modification of plant metabolic properties, particularly for bioenergy crops such as poplar, sorghum and switchgrass. Their work will also allow production of easily extractable, energy-rich aromatics in bioenergy plants as well as the discovery and validation of additional enzymes and products that may contribute to increased drought tolerance, reduced insect feeding, and resistance to fungi and microbes.”

The research team includes participants from all career stages, including high school interns Daniel Lee, Hailey Sieran, Ella Lodewyk and Kaya Meyer from the Dane County Youth Apprenticeship program, undergraduate and Mary Shiong Petersen awardee Ella Rose Torkelson, graduate student Dehany Chaudhury, and Ph.D. staff scientists Justin Acheson, Craig Bingman, Steve Karlen, and Rebecca Smith. The team also includes graduate UBC graduate students Yucen Pu and David Sun.

“Producing cheaper energy from organic materials — like plants, food and waste — keeps money in the pockets of energy consumers and prevents carbon pollution from reaching the atmosphere,” said U.S. Secretary of Energy Jennifer M. Granholm in a DOE press release. “These projects will continue to advance the boundaries of biotechnology and support the emergence of a thriving U.S. bioeconomy that creates good-paying jobs and helps us meet our climate goals.”

Associate professor Vatsan Raman received the College of Agricultural and Life Science’s Pound Research Excellence Award. The award, which is supported by an educational development fund created to honor former CALS Dean Glenn S. Pound upon his retirement in 1979, is given to honor an outstanding, early-career CALS research scientist and to promote continued excellence in research.

“I want to thank CALS for this recognition,” Raman says. “It is such an honor to receive the Pound Research Award. Most importantly, I want to thank the people in my laboratory for the amazing work they do — it is a privilege to be their mentor.”

Raman, who has worked in the biochemistry department since 2015, is an extremely productive researcher in systems and synthetic biology. He and his team leverage computational protein design, next-generation DNA synthesis and sequencing technologies, and highly multiplexed selection and screening assays to understand and design allosteric proteins, synthetic bacteriophages, and high-throughput functional assays. His research has major implications for understanding the underlying relationships between sequence, structure and function. Read more about some of his research projects on p. 7.

Brian Fox and John Ralph Awarded DOE Grant to Characterize Gene Function in Bioenergy Crop Plants

Professor Vatsan Raman

Professor John Ralph

Professor Brian Fox

Vatsan Raman Receives Pound Research Award
Research News

The American Federation of Aging Research (AFAR) and the Glenn Foundation for Medical Research announced recipients of the 2022 Glenn Foundation for Medical Research and AFAR Research Grants for Junior Faculty. **Awards** include assistant professor Judith Simcox, whose research addresses questions about the metabolic signals that regulate brown fat, which produces heat and regulates body temperature, and how those signals change as humans age.

With the Research Grant for Junior Faculty, Simcox will focus on how levels of ceramides, a type of lipid, changes as humans age. Her team will also study how ceramides regulate energy expenditure and activate brown fat. Results not only will reveal how ceramides are regulated in the body but also may also highlight new biological mechanisms that can be targeted for therapeutic options for healthy aging.

"As humans age, most gain body weight as they lose energy consuming tissue causing a lower basal metabolic rate. Our research will allow us to understand the signals that cause the lower energy expenditure and allow us to combat weight gain that causes age-related diseases," Simcox says. "AFAR creates a research community focused on aging by bringing all early career faculty together for a conference, and I'm grateful to be amongst peers that are leading creative research projects to tackle age-related disease."

Since its founding over forty years ago, AFAR has granted close to $189 million to more than 6,300 talented researchers, physicians, and medical students to conduct research and to help them begin and further careers in aging research and geriatric medicine. The AFAR and Glenn Foundation grant provides Simcox approximately $125,000 over one year.

**Mike Sussman Honored with CALS Named Professorship**

Professor Mike Sussman was named the first recipient of the Salm-Bray Distinguished Chair in the College of Agricultural and Life Sciences (CALS). This chair recognizes a faculty member who demonstrates exceptional cross-disciplinary scholarship and collaboration in human or animal health, and who advances agricultural and life sciences through identification and development of novel biotherapeutic compounds.

The Salm-Bray Distinguished Chair was established by Christopher and Susan Salm, both alumni of CALS. The name of the chair also honors the legacy of the late Robert Bray, a faculty member in the meat and animal science department from 1941 to 1984. With this distinguished chair, the Salm’s aim is to support a collaborative thinker with an aptitude for bringing together the deep expertise found in UW-Madison’s research community to develop innovations that can be applied for the betterment of humanity.

Sussman’s selection as a Distinguished Chair recognizes his pioneering work in the development and application of innovative technologies to plant biology research and research in other organisms to understand more about our world. During his 40 years in CALS, Sussman has formed cross-disciplinary collaborations with faculty across campus to explore new areas of research, and he has made critical discoveries that have opened avenues of research beyond the plant kingdom.

"I want to thank CALS for this significant recognition and Chris and Susie Salm for their generosity and positive statement about the importance of innovative basic and translational research at UW as an engine for bettering mankind. This may be the first Distinguished Chair awarded by CALS, but I hope it is just the start with many more to come so that the very talented new young faculty recruited into the department and college have similar opportunities for recognition," Sussman says. "Of equal importance, I want to thank folks in my laboratory for the incredible science they perform day in and day out, and for their diligence, patience and care in making life at this university so rewarding."

**Two Biochemistry Professors Look to Unravel Secrets with NIH New Innovator Awards**

With support from the National Institutes of Health 2022 High Risk, High Reward New Innovator Awards, assistant professors Ci Ji Lim and Amy Weeks are pursuing some of their most unconventional ideas about repeating DNA sequences and the way cells reorganize proteins as they receive signals from outside their walls.

More than half of the human genome is made up of repetitive sequences of DNA. Lim studies telomeres, repeating sequences of DNA that appear at the ends of chromosomes, including how telomeres are maintained and organized and how they replicate.

Research to date has primarily focused on the length of these repeat sequences — shorter telomeres have been associated with aging, while both shorter and longer telomeres have been connected to certain cancers. But Lim hopes to change that.

"According to Lim, research suggests that telomere length is only one variable that scientists might consider in their quest to understand health, disease, and basic telomere-related biological functions. How certain proteins bind along this repetitive DNA sequence could have important implications that scientists don’t yet understand.

"It’s time we have an impression of what the distribution of proteins along repetitive DNA sequences are, and how this changes over different telomere states. Currently, it’s a black box,” Lim says. “The tools we will be developing, together with others, could breach this barrier and allow us to understand this system, synergizing an entire field of chromosome biology research at repetitive genomic sequences.”

Weeks’ research group draws from diverse disciplines, including protein engineering, chemical biology, cell biology and proteomics — the study of large sets of interrelated proteins — using a host of different tools and technologies, to map the dynamics of proteins in humans and how these proteins respond in time and space to signals from outside cells.

A subset of her research involves deciphering the biological functions of post-translational modifications, which are the chemical changes that reprogram how cells are organized after a protein has been produced. These changes happen on a continuum of time scales, on the order of seconds to days depending on the biological signals involved.

There are hundreds of thousands of post-translational modifications, but scientists only know the functions of a few thousand. Weeks plans to develop automated tools that can be applied across the full set of proteins in humans and will allow scientists to develop targeted hypotheses about what different post-translational modifications do.

"I think you’ll hear some people in the cellular signaling field say that many post-translational modifications are just bystanders, that they don’t have an important function. I don’t think that’s true,” Weeks says. “I think it’s analogous to back when the human genome was first sequenced. People used to say that 90% of the human genome was junk DNA, and now we know that’s not true. I think something similar is true of these protein modifications.”

Once developed, Weeks’ tools could help scientists understand how proteins move between compartments in cells in response to the signals they receive and how that relates to function.

Grants to Lim and Weeks are among 71 researchers receiving New Innovator Awards this year. The awards, created to support unconventional approaches to major challenges in biomedical and behavioral research, provide as much as $1.5 million over three years for unusually innovative research done by early-career investigators.

**Judi Simcox Receives American Federation for Aging Research Grant for Junior Faculty**

Professor Judith Simcox
Assistant professor Jason Cantor has received a Hartwell Individual Biomedical Research Award. His was among ten award-winning proposals that represent early-stage, innovative and cutting-edge technology in medicine and biomedical engineering. Cantor’s three-year grant awards $100,000 per year in support of his research that could identify promising new therapeutic targets with greater relevance to human disease. He and his team will examine T-cell acute lymphoblastic leukemia (T-ALL), an aggressive blood cancer that accounts for 15% of all newly diagnosed ALL cases in the U.S. each year. Although survival rates for pediatric T-ALL cases have steadily improved, the intensive regimes typical for treatment cause chronic adverse effects in survivors and are ineffective for the nearly 20% of children that relapse.

“One of the basic questions that we ask in my lab is, ’how do human cells facilitate their growth,’ and by extension, ’how do environmental factors influence this process.’ Cantor says. ’To address this intriguing question, over the past few years, my group develops and uses new tools designed to more faithfully model environmental contributions to cell biology, and in turn, combine these with technologies that cut across areas of biology and engineering—CRISPR is a great example.’

CRISPR, a transformative DNA-editing technology that works like a pair of genetic ’scissors’ that can be used to precisely turn off (’knockout’) any of the nearly 20,000 known human genes, makes it possible for scientists to ask how specific knockouts influence cell traits like survival and vulnerability to drug treatment. CRISPR-based knockout screens further make it possible to test, in a single mixed population, how thousands of individual knockouts affect cell growth and thus offer a powerful approach to identify targetable vulnerabilities in human cancers. However, most CRISPR screens are performed in model systems with little relevance to growth conditions in the human body and offer only limited control of the cellular environment over time.

Among the ongoing efforts to address the modeling capacity of systems used to study human cells, Cantor previously developed Human Plasma-Like Medium (HPLM), a cell culture reagent that supports cell growth in nutrient conditions that more closely reflect the metabolic composition of human blood (HPLM became commercially available from Thermo Fisher Scientific in 2021). In addition, he and his team optimized the use of mammalian cell bioreactors that allow them to culture blood cells under several tightly monitored and fixed ’steady state’ conditions: cell density, temperature, nutrient availability, pH, and oxygen tension.

“I have a multidisciplinary background and so it’s exciting to pursue a high-risk project that borrows and integrates pieces from both my chemical engineering and basic biology training,” Cantor says.

With his Hartwell Individual Biomedical Research Award, Cantor will test the hypothesis that CRISPR-based knockout screens of T-ALL cells growing in steady state conditions that better mimic those faced in circulation will reveal genetic dependencies that cannot be identified through similar screens done in existing model systems. If successful, this work has the potential to uncover new T-ALL therapeutic targets that would otherwise be masked by traditional approaches but that could have greater likelihood for successful translation into the clinic.

Cantor will partner with Dr. Christian Capitini, an associate professor of pediatrics in the School of Medicine and Public Health, to determine how lead genetic dependencies identified through CRISPR-based screens in this new platform affect the growth of human T-ALL xenografts (cells or tissues that are transplanted from one species to another) in mice. Through collaborations with Dr. Capitini and others, Cantor ultimately hopes to establish a pipeline for follow-up preclinical studies, the development of drugs that target proteins encoded by the genetic dependencies identified through CRISPR-based screens in this new model system. If successful, this work has the potential to uncover new T-ALL dependencies that cannot be identified through similar screens done in existing model systems.

Jae Yang has developed and used innovative workflows and tools for cryo-electron tomography (cryo-ET).

Yang’s research at UW–Madison has focused on cryo-ET method development and structural virology. In collaboration with associate scientists, Yang led the development of CorRelator, a user-friendly cross-platform software tool that can significantly accelerate the high-precision structure determination of high-resolution particles. Now, she is incorporating 3D correlation for in-situ cryo-focused ion-beam scanning milling workflows into CorRelator. She has also recently developed solutions for high-throughput, larger field of view cryogenic-tilt series collection, or ’montage cryo-ET,’ for high-magnification, high-resolution structural studies. This data collection scheme will be essential for resolving the vast, macromolecule-rich interiors of cells in cryo-EM.

These accomplishments and more, coupled with Yang’s receiving the 2022 Boyer Award for Postdoctoral Excellence in Biochemistry, Yang was

Professor Jason Cantor

Cantor is an absolute honor for me to join the outstanding community of scientists who are supported by the Hartwell Foundation,” Cantor says. “This award will have continued recruitment of highly passionate and creative trainees who have easily exceeded my expectations, taking initiative, being often performing above and beyond their accomplishments and service to the betterment of others.”

A commitment to the career development of others is an outstanding example of how UW–Madison helps to improve the lives of its students, but it is people like Ronnie who do the enduring work that has the impact,” says department chair Brian Fry. “I was honored to nominate him for the 2022 CALS Academic Staff Excellence Award based on this remarkable and selfless contribution to the betterment of others.”

Yang says she’s most proud of the tools and methods she’s developed and contributed to the Wright Lab and cryo-EM community. “I think all of the images we collect during an experiment are beautiful. We learn a lot about the biological system from these images. The simplicity and complexity of a network is so clearly seen, this is one reason I fell in love with microscopy as a student. With time, I hope to continue to expand the field more with new technologies to help new investigators ‘see’ the systems they are studying,” Yang says.

Yang earned her Ph.D. in biophysics at the Boston University School of Medicine. She was the first to join professor Elizabeth Wright’s team at UW–Madison shortly thereafter.

“Jae is an extremely talented structural biologist and structural virologist! Her work ethic, ability to teach others, and drive are astounding and unmatched amongst her peers,” Wright says. “She’s one of the lab’s pioneers, in spirit and especially with respect to the science and technology we are developing.”

NMRFAM Scientist Receives Academic Staff Excellence Award
Xinyun (Sherry) Cao, a postdoctoral researcher in the Landick Lab, was awarded a Pathway to Independence Award (K99/R00) from the NIH.

The initial award (K99) provides up to two years of mentored, postdoctoral support. The second phase (R00) provides up to three years of independent research support and is activated when the awardee accepts a full-time tenure track (or equivalent) faculty position. Cao’s award is focused on understanding how *Clostridium difficile* (C. diff) transcribes its DNA code into RNA using a multi-subunit protein and proven drug target called RNA polymerase (RNAP) and other factors, use genomic-scale mapping techniques and biochemical assays to understand RNAP transcription regulation, and build an *in vitro* platform to enable high-throughput screening of C. diff RNAP inhibitors.

"The groundwork of my K99/R00 is based on research we published earlier this year showing the structure of a narrow-spectrum antibiotic that targets C. diff," Cao says.

That study, which is described on p. 6, revealed the structure of the narrow-spectrum antibiotic fidaxomicin. Cao’s contributions allowed the research team to more easily produce C. diff RNAP and opened the door to similar studies involving other bacterial pathogens.

"Sherry’s K99/R00 is a testament to her strong work ethic, perseverance and creativity," professor Robert Landick says. "When she joined our group, Sherry undertook an entirely new project to establish the study *Clostridium difficile* RNA polymerase biochemically. Her success not only produced a landmark paper, but also opened a path to find new ways to attack this pernicious pathogen. NIH has rightly recognized her tremendous scientific potential with this award.

Cao received her Ph.D. at the University of Illinois Urbana–Champaign.

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Freeman Lan received a 2022 Career Award at the Scientific Interfaces distributed by the Burroughs Welcome Fund. The highly-competitive Career Award provides $500,000 over five years to support researchers in the quantitative sciences to pursue biological questions as they relate to research, training and transition to a faculty position. Eleven awards were distributed this year.

“This award gives me confidence that people see value in my current and future research and gives me encouragement to continue pursuing my unique approach to research,” Lan, who works in assistant professor Ophelia Venturelli’s lab, says. “The financial backing also allows me to pursue projects that are too risky to be funded by other traditional agencies.”

Lan studies microbes from a population lens, which requires characterizing massive numbers of microbes. His work will put powerful new tools in the hands of microbiologists to collectively speed up scientists’ understanding of microbes.

“The world of microbes is vast, and we’ve characterized only a tiny fraction of what is out there,” Lan says. “Our fast pace of discovery is characterized only a tiny fraction of what is out there,” Lan says. “Our fast pace of discovery is fundamental to understanding how fast we can perform these tasks, and improvements in how fast and how many experiments we can do will directly lead to faster rates of discovery.”

Venturelli, Lan’s research mentor, says that she is excited for Lan and what he will accomplish.

"Freeman is a highly creative and motivated scientist who has a unique vision for developing ultrahigh-throughput methods to study microbes and microbiomes," Venturelli says. "I am very supportive of Freeman exploring these ideas and leveraging our lab’s expertise and resources to advance these exciting research projects. This award will help Freeman launch his independent academic research career and lead to development of methods that can be widely deployed by the scientific community to study microbiomes in new ways.

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Josie Mitchell, a recent Ph.D. graduate in biochemistry, has received a 2022 Wisconsin Initiative for Science Literacy (WISL) Award for Communicating Ph.D. Research to the Public for including a chapter in her dissertation to describe her research to non-science audiences, such as family members, friends, civic groups, newspaper reporters, state legislators, or members of the U.S. Congress.

Mitchell’s chapter, called “Studying proteins in fruit fly neurons,” appeared in her Ph.D. thesis titled, “Coordination of ion channel delivery and dendrite growth in Drosophila sensory neurons.” As a member of the Widodoer Lab, Mitchell studied how a protein called Pickpocket gets to where it needs to be in the sensory neurons of *Drosophila*.

“While I was volunteering as a clinical lab assistant at Al Farooq Hospital in Mombasa, I got hands-on experience with biomedical techniques and discovered how important science is for human survival through medicine and nutritional health. That drove me to stay in science,” Chandrasekharan says. “I want to continue my work, which I love, and I want to pursue an undergraduate degree in biophysical chemistry at James Madison University, where he conducted research in structural and computational biochemistry. When those experiences fueled his curiosity about functions and applications of biomolecules, he decided to attend graduate school. Chandrasekharan is now a fourth year Ph.D. candidate in the Coley Lab, where he studies cell proliferation mechanisms involving in eukaryotic cell division and proteasome motility. His results will help scientists understand how eukaryotes organize their cytoskeleton for cellular motion in response to varying calcium signaling dynamics.

Long-term, he hopes to continue conducting innovative research that improves food nutrition or drug discovery while advocating for underrepresented and marginalized groups in STEM and mentoring the next generation of scientists.

“I am very humbled and honored to receive the B.R. DasGupta Graduate Award, and I’m thankful to Dr. DasGupta and the CALS Scholarship committee, as well as the biochemistry department for nominating me for this award,” Chandrasekharan says. “Being an international student has come with many challenges during my study, and opportunities to acquire funding to supplement my stipend and increase financial security are especially limited. With the current global economic uncertainty and civil unrest back home in Sri Lanka, this award is a much-needed resource for me to support my family and focus on my research to complete my degree.”
Three UW–Madison biochemistry undergraduates were named winners of the 2023 Barry Goldwater Scholarships, one of the most prestigious awards in the U.S. for undergraduates studying the sciences. Four UW–Madison undergraduates overall were named Goldwater recipients.

Goldwater Scholarships support undergraduates in the last two years of their bachelor’s degree programs. Sophomores receive up to $7,500 in each of the next two academic years, while juniors receive up to $7,500 for their senior year of study. The UW–Madison undergraduates are among 417 Goldwater Scholars named this year out of 1,242 college sophomores and juniors nominated by 433 academic institutions. More on this year’s UW–Madison winners appears below, with university standing at the time of the award listed (e.g., individuals listed as juniors are seniors in the 2022-23 academic year).

Sarah Fahlberg is a junior from Madison, double-majoring in biochemistry and computer science. Since 2019, she’s worked in the lab of assistant professor Phil Romero, developing new protein engineering strategies using computational models. Last summer, she interned at Northwestern University working on computational protein design. She plans to pursue a Ph.D. in computational biology after graduating.

Elias Kemna is a junior from McFarland, Wisconsin, majoring in microbiology with a certificate in global health. He began his research at UW–Madison during his last three semesters of high school in the lab of professor Brian Fox. Currently, he conducts research in the soil science lab of associate professor Thea Whitman. He plans to pursue a Ph.D. in genetics or microbiology.

Samuel Neuman is a junior from DeForest, Wisconsin, double-majoring in biochemistry and biomedical engineering. He works in the lab of medical physics professor Marina Emborg. Last summer, he conducted research at the National Institute of Child Health and Human Development. He plans to pursue an M.D./Ph.D. in biomedical engineering.

Three Biochemistry Undergraduate Researchers, Majors Receive Prestigious Goldwater Scholarships

### IPIB Degrees 2022

<table>
<thead>
<tr>
<th>Degree</th>
<th>Name (Major Professor)</th>
<th>Thesis Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph.D.</td>
<td>Adam Lewis (Henzler-Wildman)</td>
<td>NMR spectroscopic studies of structure, dynamics, and ligand binding in large proteins</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>Wamiah Chowdhury (Kiley)</td>
<td>Elucidating the mechanism of transcription regulation by the global regulator IscR in Escherichia coli</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>Hridinda Roychowdhury (Romero)</td>
<td>High-throughput enzymatics: Comparing caspases and engineering glycoside hydrolases with microfluidics</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>Elizabeth Larson (Harrison)</td>
<td>Coordination of transcriptional and post-transcriptional control of cell-fate transitions in Drosophila melanogaster</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>Kyle Nishikawa (Raman)</td>
<td>Evolution and the design of allosteric transcription factors toward novel ligand specificities</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>Dylan Plaskon (Record)</td>
<td>The kinetics and mechanism of E. coli transcription initiation</td>
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<tr>
<td>Ph.D.</td>
<td>Christopher Brandon (Ansell/Kimble)</td>
<td>Restoring balance: Overriding the epigenetic repression in Friedreich’s ataxia</td>
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<tr>
<td>Ph.D.</td>
<td>Josephine Mitchell (Wildonger/Rayment)</td>
<td>Coordination of ion channel delivery and dendrite growth in Drosophila sensory neurons</td>
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<tr>
<td>Ph.D.</td>
<td>Jennifer Peotter (Audhya)</td>
<td>Membrane trafficking defects contribute to neurodegenerative disease</td>
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<tr>
<td>Ph.D.</td>
<td>Nathan Murray (Pagliarini/Cox)</td>
<td>Small molecule modulation and characterization of the archetypal UbiB protein COQ8</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>Aryl Clarke (Audhya)</td>
<td>LGD-1 regulation of ESCRT-III during multivesicular endosome biogenesis</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>Dana Dalhan (Bednarz)</td>
<td>Characterization of evolutionarily conserved and divergent features of plant membrane trafficking</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>Alexis Lawton (Denzl)</td>
<td>Investigating the regulatory mechanisms driving dynamic protein acetylation in the cell</td>
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<tr>
<td>Ph.D.</td>
<td>Aidan McKenzie (Keck)</td>
<td>Cellular contexts and biochemical mechanisms of DNA replication restart in Escherichia coli</td>
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<tr>
<td>Ph.D.</td>
<td>Nathaniel Kuch (B. Fox)</td>
<td>Use of CdR as a model to understand glycoside hydrolase activity</td>
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<tr>
<td>Ph.D.</td>
<td>Miguel Angel Ostorio Garcia (Con)</td>
<td>Structure and function studies of the E. coli repair protein RalD</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>Peyton Spracker (Henzler-Wildman)</td>
<td>Exploring the biological implications of the Free Exchange Model of EmrE-mediated transport</td>
</tr>
</tbody>
</table>

M.S. Aspasia Amiridis (Weeks)

“Degrees Dec. 1, 2021 - Nov. 30, 2022”

IPiB Ph.D. graduate photos on p. 16.
Biochemistry Advisor Degrees 2022

<table>
<thead>
<tr>
<th>Degree</th>
<th>Name (Major Professor)</th>
<th>Program</th>
<th>Thesis Title</th>
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<tbody>
<tr>
<td>Ph.D.</td>
<td>Jonathan C. Greenhalgh</td>
<td>Chemical Engineering</td>
<td>Machine learning-based protein engineering for microbial chemical production</td>
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<tr>
<td>April 2022</td>
<td>(Romero)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ph.D.</td>
<td>Xingyuan Fu</td>
<td>Chemistry</td>
<td>Uncovering unknown pathways and roles of splicing factors in spliceosome activation</td>
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<tr>
<td>May 2022</td>
<td>(Hoskins)</td>
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<tr>
<td>Ph.D.</td>
<td>Jared R Erickson</td>
<td>MDTP</td>
<td>Baculovirus AcMNPV modulates the host insect DNA damage response but does not require the apical signaling kinase Ataxia-telangiectasia mutated</td>
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<tr>
<td>Aug 2022</td>
<td>(Friesen)</td>
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<tr>
<td>Ph.D.</td>
<td>Phil Huo</td>
<td>MDTP</td>
<td>Using deep mutational scanning to understand and engineer host specificity in bacteriophages</td>
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<tr>
<td>Aug 2022</td>
<td>(Raman)</td>
<td></td>
<td></td>
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<tr>
<td>Ph.D.</td>
<td>Susan Hromada</td>
<td>MDTP</td>
<td>Impact of human gut microbes on Clostridioides difficile growth and antibiotic susceptibility in vitro</td>
</tr>
<tr>
<td>Aug 2022</td>
<td>(Venturelli)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDTP: Microbiology Doctoral Training Program</td>
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</table>

**Degrees Dec. 1, 2021 - Nov. 30, 2022**

Diversity, Equity and Inclusion Committee Update

The Biochemistry Diversity, Equity, and Inclusion (DEI) Committee has had a busy 2021-2022 year. Our goal is to ensure that our department reflects the society we serve, and to ensure that the resources of our community and wonder of science are open to everyone. To achieve these goals, we focused on recruitment and retention of scientists from historically excluded and underrepresented backgrounds in the department, and investing in relationships with underserved communities.

Some of our major achievements in recruiting and retention:

- Judith Simcox was invited to give at 2022 Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) National Conference Keynote talk on her journey in STEM. Support for departmental graduate students Nithesh Chandrasekharan and Expery Omollo, and Integrated Program in Biochemistry (IPiB) staff Bre Sinotte Wang, was provided for attendance at the 2022 SACNAS National Conference. Support was also provided for IPiB students Nithesh Chandrasekharan and Rachel Cuency, and IPiB staff member Bre Sinotte Wang, to attend the Annual Biomedical Conference for Minoritized Scientists (ABRCMS). Trainees apply for attendance at these conferences through a competitive scholarship program funded by the Department of Biochemistry.
- In collaboration with the Biochemistry Seminar Committee, we hosted a talk from Dr. Maggie Werner-Washburne, former SACNAS National President and recipient of the AAAS Mentor Award. Dr. Werner-Washburne spoke on the thermodynamics of diversity and encouraging students, staff, and faculty to use creative thinking to tackle major problems associated with equity.
- The department funded two fellowships for an undergraduate and postbaccaulaureate from historically excluded and underrepresented backgrounds to work in Biochemistry research labs.

Our major achievements in outreach and support of historically excluded and underrepresented communities in science:

- Departmental support for the American Indian Science and Engineering Society (AISES) Chapter, which is co mentored by Judith Simcox. Administrative support from the department to two funded grants for the AISES Chapter outreach and receipt of three fellowships for AISES Chapter members to pursue research, IPiB graduate students Jess Davidson and Ryan Klevens spoke to the AISES Chapter on how to write a personal statement and apply to graduate school.
- The department came together to welcome students from Menominee High School, Madison Metropolitan High School, and OSMO Nation High School for tours in various labs and to discuss careers in science. Professors Katie Hetzel-Wildman, Liz Wright, Chad Riemstra, Tim Grant, and Judith Simcox led tours through laboratories. Trainees including Gina Wade, Autumn Chevalier, and Mac Huttadu-Theile spoke to students on their journey through STEM and guided the visiting scholars through experiments on measuring macromolecules in food.

In the coming year, the Biochemistry DEI Committee will strengthen support of recruitment, retention, and outreach to continue building our community.

If you are interested in being involved, please email the DEI Committee co-chairs Jason Cantor (jrcantor2@wisc.edu) and Rick Amasino (amasino@biochem.wisc.edu).

Honors & Awards

<table>
<thead>
<tr>
<th>Faculty</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Jason Cantor</td>
<td>2021 Hartwell Individual Biomedical Research Award</td>
</tr>
<tr>
<td></td>
<td>2022 American Cancer Society Research Scholar Grant</td>
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<tr>
<td>Cj Ji Lim</td>
<td>National Institutes of Health 2022 High Risk, High Reward New Innovator Award</td>
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<tr>
<td>Mike Sussman</td>
<td>Salm-Bray Distinguished Chair in the College of Agricultural and Life Sciences (CALS)</td>
</tr>
<tr>
<td>John Ralph</td>
<td>2022 Clarivate Analytics Highly Cited Researcher</td>
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<tr>
<td>Vatsan Raman</td>
<td>2022 Pound Research Excellence Award</td>
</tr>
<tr>
<td>Judith Simcox</td>
<td>2022 AFAR Glenn Foundation for Medical Research Award</td>
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<tr>
<td></td>
<td>JORD Diversifying Academic Research Talent Grant</td>
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<tr>
<td></td>
<td>ASBMB/JLR Rising Star in Lipid Research Award</td>
</tr>
<tr>
<td>Amy Weeks</td>
<td>National Institutes of Health 2022 High Risk, High Reward New Innovator Award</td>
</tr>
</tbody>
</table>

Staff

- Ronnie Frederick | NMRFAM | Academic Staff Excellence Award |
- Jae Yang | MCCET/Wright | 2022 Buyer Award |
-  |  | 2022 Microscopy Society of America Professional Technical Staff Award |

Postdoctoral Staff

- Xinyun (Sherry) Cao | Landick | NIH Pathway to Independence Award (K99/R00) |
- Freeman Lan | Venturelli | Burroughs Wellcome Fund Fellowship |

Graduate Student Awards

- Matthew Blackburn | Sussman | Denton Award for Graduate Student Excellence in Teaching & Mentoring |
- Aryel Clarke | Audhya | Denton Award for Graduate Student Excellence in Teaching & Mentoring |
- Elizabeth Larson | Harrison | Sigrid Leizmo Memorial Award in Biochemistry |
- Nithesh Chandrasekharan | Coyle | B.R. D’Souza Graduate Award |
- Raghav Jain | Simcox | DEUEL Lipid Conference Travel Award for a Selected Talk |
- Eddie Rashan | Simcox | Rising Stars Symposium Travel Award from the University of Utah |
- Vicky Pappas | Wright | 1st place poster prize 42nd Steenbock Symposium |
-  |  | Poster prize at the 2022 Microscopy and Microanalysis Meeting |
- Helaina Von Bank | Simcox | CMB Travel Award for a selected talk for the FASER Molecular Metabolism Conference |
- Gina Wade | Simcox | GSA National Conference Selected Talk |
Honors & Awards

Graduate Student Fellowships

Haley Bridge
  Weeks
  William R. & Dorothy E. Sullivan WJ Distinguished Graduate Fellowship in Biochemistry

James Corban
  Raman
  William H. Peterson Fellowship in Biochemistry

Wayne Golden	
  Record
  Paul H. Phillips Fellowship in Biochemistry

Saced Roschidi
  Butcher
  Dennis R. A. & Martha Washburn Wharton Fellowship in Biochemistry

Sarah Schmidt-Dannert
  Raman
  Steenbock Predoctoral Fellowship in Biochemistry

Gina Ward
  Simcox
  Stephen Babcock AG Chem Fellowship

Junqiao Zhu
  Hookins/Landick
  Steenbock Predoctoral Fellowship in Biochemistry

Juan Sanchez
  Wright
  Science and Medicine Graduate Research Scholars (SciMed GR5)

Johnson Saba
  Landick
  NIH Predoctoral Fellowship

Andrea Wegezyrowsicz
  Henzler-Wildman
  NIH Predoctoral Fellowship

Nina Bondy
  Con/Keck
  NSF Graduate Fellowship Program

Christine Hustmyer
  Landick
  NSF Graduate Fellowship Program

Katherine Senn
  Hookins
  NSF Graduate Fellowship Program

Rou Senn
  Concox
  NSF Graduate Fellowship Program

Helaina Von Baak
  Simcox
  NSF Graduate Fellowship Program

Lauren Mazurkiez
  Weeks
  NSF Graduate Research Fellowship Program Honorable Mention

Rohith Rajasekaran
  Concox
  NSF Graduate Research Fellowship Program Honorable Mention

Gina Wade
  Simcox
  NSF Graduate Research Fellowship Program Honorable Mention

Graduate Student Training Grants

Julie Duchos
  Venturelli
  Biotechnology Training Program (BTP)

Andrea Hunger
  Concox
  Biotechnology Training Program (BTP)

Lauren Mazurkiez
  Weeks
  Biotechnology Training Program (BTP)

Robert Mejia
  Fox/Majumder
  Biotechnology Training Program (BTP)

Nauman Novy
  Raman
  Biotechnology Training Program (BTP)

David Rivera-Kohe
  Fox
  Biotechnology Training Program (BTP)

Ethan Ausbichon
  Hookins
  Chemistry-Biology Interface Training Program (CBI)

Merete Freiberg
  Henzler-Wildman
  Chemistry-Biology Interface Training Program (CBI)

Rohith Rajasekaran
  Conyle
  Chemistry-Biology Interface Training Program (CBI)

Max Frexel
  Raman
  Genomic Sciences Training Program (GSTP)

Clara Oechel
  Romero
  Genomic Sciences Training Program (GSTP)

Roma Broodberry
  Grant
  Molecular Biophysics Training Program (MBTP)

Owen Warmuth
  Rienstra
  Molecular Biophysics Training Program (MBTP)

Jessica Davidson
  Simcox
  Molecular and Cellular Pharmacology (MCP) Training Program

Postbaccalaureate Awards

Autumn Chevalier
  Simcox
  UW–Madison Post-baccalaureate Research Education Program (PREP) Scholar

Undergraduate Awards

Will Kim
  Hookins/Landick
  Alpha Helix Scholarship Award

Sarah Fahlberg
  Romero
  Astronaut Scholarship

Ian Rocha
  Babcock House Mark Sherry Memorial Scholarship

James Alvin
  Biochemistry Mary Shine Peterson Award

Sarah Fahlberg
  Romero
  Biochemistry Mary Shine Peterson Award

Farah Feng
  Biochemistry Mary Shine Peterson Award

Mary Grace Linsey
  Kimberlly
  Biochemistry Mary Shine Peterson Award

Ben Lask
  Biochemistry Mary Shine Peterson Award

Lisa Nakayama
  Simcox
  Biochemistry Mary Shine Peterson Award

Siwei Qian
  Record
  Biochemistry Mary Shine Peterson Award

Xindi Tang
  Biochemistry Mary Shine Peterson Award

Peter Hoferle
  Kirchoffer
  Biochemistry Undergraduate Summer Research Award

Deep Roy
  Kimberlly
  Biochemistry Undergraduate Summer Research Award

Elijah Kirchstein
  Biochemistry Undergraduate Summer Research Award

Brad Li
  Biochemistry Undergraduate Summer Research Award

Rami Barakat
  Biochemistry Undergraduate Summer Research Award

Kelli Marschall
  Biochemistry Undergraduate Summer Research Award

Undergraduate Awards continued

Isabel Montes de Oca
  Gellman
  Biochemistry Undergraduate Summer Research Award

Lars Schimmelpfennig
  Biochemistry Undergraduate Summer Research Award

Isabelle Stockic
  Biochemistry Undergraduate Summer Research Award

Ella Torkelson
  B. Fox
  Biochemistry Undergraduate Summer Research Award

Hezoue Waalada
  Kimberlly
  Biochemistry Undergraduate Summer Research Award

Natalie Zepf
  Hookins
  Biochemistry Undergraduate Summer Research Award

Jasmine Rose Miller
  Ntambi
  Biochemistry Undergraduate Summer Research Award

Noah Knezic
  B. Fox
  Biochemistry Undergraduate Summer Research Award

Hunter Coplen
  CALS Coryell Scholarship

Alejandro Otae
  College of Letters & Science Dean’s Prize

Zachary Janiesme
  Richard H. & Peggy A. Dalgote AGR Scholarship

Elisabeth Kirchenste
  Esla Thomeen Dometer Academic Merit Award

Sarah Shah
  Barry Goldwater Scholarship

Sarah Fahlberg
  Barry Goldwater Scholarship

Samuel Neuman
  Barry Goldwater Scholarship

Mac Hurtado-Thiele
  Simcox
  Genetics Undergraduate Research Award

Jennifer Monu
  Great Minds in STEM (GMS) travel scholarship

Ian Rocha
  Great People Scholarship

Siwei Qian
  Martha Gunn Reid Scholarship from Chemistry

Alejandro Otae
  Meric J. Lee Scholar

Ian Botsch
  Martin (Kann) H. Low Scholarship

Mara Combe Gitter
  Ruth & Carl Miller Academic Merit Award

Faith Fransceno
  Frank Barron Morrison Memorial Marsfield High School Scholarship

Joshua Jast
  Albert J. & Adelaide E. Riker Academic Merit Award

Ryan Hazzard
  Albert J. & Adelaide E. Riker Scholarship

Mac Hurtado-Thiele
  Simcox
  SGNAS 2022 Student Presentation Award

Victoria Zarzovkarski
  Rylee Smith
  Second place in the 2021-2022 UW-Madison Student Employees of the Year

Jasmine Machhi
  Henry Steenbock Academic Merit Award

Alan Hug
  Henry Steenbock Scholarship

Zash Lin
  Dorothy Strong Scholarship

Renni Li
  Wisconsin ACS Local Section Undergraduate Award for Excellence in Chemistry

Alexis Lundade
  Wisconsin Ag Connection 2022 student Outstanding Senior

Sarah Shah
  Lawrence M. Weyer Scholarship

Undergraduate Fellowships

James Alvin
  Hilldale Undergraduate Research Fellowship

Allison Czora
  Hilldale Undergraduate Research Fellowship

Ryan Hazzard
  Hilldale Undergraduate Research Fellowship

Ziling Hu
  Rienstra
  Hilldale Undergraduate Research Fellowship

Mac Hurtado-Thiele
  Simcox
  Hilldale Undergraduate Research Fellowship

Jenna Kirchstein
  Kimberlly
  Hilldale Undergraduate Research Fellowship

Ruoji Li
  Biochemistry Undergraduate Research Scholarship

Mary Grace Linsey
  Kimberlly
  Hilldale Undergraduate Research Fellowship

Jasmine Rose Miller
  Hilldale Undergraduate Research Fellowship

Marshall McGaulley
  Biochemistry Undergraduate Research Scholarship

Raveena Mishra
  Hilldale Undergraduate Research Fellowship

Joana Pehal
  Lim
  Hilldale Undergraduate Research Fellowship

Hunter Coplen
  Sophomore Research Fellowship

Adam Eckardt
  Sophomore Research Fellowship

Christian Glitchev
  Sophomore Research Fellowship

Peter Hoferle
  Kirchoffer
  Sophomore Research Fellowship

Ivy Lucier
  Sophomore Research Fellowship

Niharika Patankar
  Sophomore Research Fellowship

Natalie Zepf
  Hookins
  Sophomore Research Fellowship

Awardees for whom a lab is not listed perform research in other departments on campus.
Below are some updates we received from the faculty and other sources. Have something you’d like to share with us? (You don’t need to wait for someone else to tell us.)

**Contact:** alumninews@biochem.wisc.edu.

**Antic Lab**
Alan Antic gave the 2021 Stefan Fajans Lecture in Diabetes at the University of Michigan.

**Butcher Lab**
Allison Didychuk (Ph.D. 2017) won a 2022 Damon Runyon-Dale F. Frey Award for Breakthrough Scientists and is now an assistant professor at Yale. Johannita Vira (postbaccalaurate research intern 2020) is a Ph.D. student at UCSF and received a 2022 NSF Graduate Research Fellowship Program Award honorable mention.

**Cantor Lab**
Dimitri Ritacca (B.S. 2022) earned his B.S. in Biochemistry as a Candidate for Distinctive Scholastic Achievement and then, starting in the fall, joined the Columbia University Microbiology and Immunology Ph.D. program.

**Kiessling Lab**
Marshid Alam (M.S. 2017) is now a senior scientist at Joussie Therapeutics in Cambridge. Deena Al Mahboob (M.S. 2017) defended her thesis this past year. Jack Berekov (M.S. 2007) is a Director of Protein Engineering at Horizon.

**Adam Courtney (Ph.D. 2012) is an assistant professor in the Department of Pharmacology at the University of Arizona. Roger Duld (M.S. 2017) is a postdoctorate in the group of Alison Narayan at Michigan.

**Tatyana Gruber (Ph.D. 2009) was recently promoted to tenure at Christopher Newport University. Christine Isabella (M.S. 2017) finished up a one-year teaching position at Bowdoin College and is now a Scientist at Aaptiform Bio. Alex Justin (M.S. 2017) is now a scientist at Sana Biotechnology.

**Ginie Kincaid (Ph.D. 2017) is now a senior research scientist at Promega.**

**Attie Lab**
Lucas O’Neill is currently in his 12th year of teaching and 2nd year at the L.M. Terrell Academy of STEM and VPA in Fort Worth, Texas. L.M. Terrell is the high school that Opal Lee, ‘the grandmother of Juneteenth’, graduated from and is rich with history. This year, Lucas serves as a representative on the district employee relationship council and teaches organic chemistry, honors chemistry, and UT-Austin dual enrollment chemistry. Lucas loves going to work each day and is very proud of his students, school, and community.

**Raines Lab**
Steve del Gardyri (Ph.D. 1994) now makes cooking oil by fermentation as co-Founder and CTO of Zero Acre Farms in San Mateo, CA. Steve Fuchs (Ph.D. 2006) is now working at Ginkgo Bioworks in Boston, MA. Ian Windsor (Ph.D. 2019) is now developing drugs at Pfizer in Groton, CT. Ron Raines won the 2022 Khorana Prize from the Royal Society of Chemistry.

**Reznikoff Lab**
Lynne Maquat (Ph.D. 1979) won the 2021 Warren Alpert Foundation Prize.

**Riemstra Lab**
Chad Riemstra was the 2022 Vaughan Lecturer at the 61st Annual Rocky Mountain Conference on Magnetic Resonance.

**Wickens Lab**
Chris Lapointe (Ph.D. 2016), now a postdoc at Yale, received a 2022 Damon Runyon award.

**Wildonger Lab**
Jesse Mitchell (Ph.D. 2022) is an assistant professor of Chemistry at Kalamazoo College (Michigan). Harriet Saunders (Ph.D. 2021) is an EMBO postdoctoral fellow at Utrecht University in the Netherlands. Mike Kellierre (Ph.D. 2019) completed his fellowship in Clinical Chemistry at Dartmouth-Hitchcock and is now Director of Chemistry at Sutter Health Shared Laboratory in Livermore, CA.

I’m so proud of all my IPb “kids” — JW

**Klim Lab**
Josie Mitchell (Ph.D. 2022) is an assistant professor of Chemistry at Kalamazoo College (Michigan). Florence Lapointe (Ph.D. 2016), now a postdoc at Yale, received a 2022 Damon Runyon award.

**Hoskins Lab**
Maggie Rodgers (Ph.D. 2016), now at Johns Hopkins as a postdoc, received a 2022 Scaringe Award. David Beattie (former undergrad), now at University of Michigan-Ann Arbor, won a 2022 NSF Graduate Research Fellowship Program Award.

**Landick Lab**
Allison Schiffman (former undergrad), now at UCLA, won a 2022 NSF Graduate Research Fellowship Program Award.

**Lim Lab**
Joshua Kraus, biophysics graduate student, has graduated with a master’s degree and is transitioning to a career in nursing. Erin Leisten (former biochemistry undergraduate) is now working as a research technician in Northwestern University and is currently applying for graduate schools.

**Markley Lab**
Ian Lewis (Ph.D. 2010), associate professor and Alberta Innovates Translational Health Chair in Metabolomics at the University of Calgary, has been named the Director of the newly launched Alberta Centre for Advanced Diagnostics (ACAD) — a new hub in the global push to advance diagnostic technology for health care. John Markley was recognized on 8/2/2022 at the Boston meeting of the International Conference on Magnetic Resonance in Biological Systems “for his outstanding contribution to ICMRBS as Chair of the 1988 meeting in Madison, as a Council Member, and as long-standing service as Treasurer.”

**Mntabi Lab**
Lucas O’Neill is currently in his 12th year of teaching and 2nd year at the L.M. Terrell Academy of STEM and VPA in Fort Worth, Texas. L.M. Terrell is the high school that Opal Lee, ‘the grandmother of Juneteenth’, graduated from and is rich with history. This year, Lucas serves as a representative on the district employee relationship council and teaches organic chemistry, honors chemistry, and UT-Austin dual enrollment chemistry. Lucas loves going to work each day and is very proud of his students, school, and community.

**Ntambi Lab**
Jonathan Ntambi has uncovered remarkable properties of small, largely unstructured proteins on PUF function. Sarah focuses on differential functions of FBF binding elements, and Ahlan and she are both working on their Ph.D.s at the University of Wisconsin-Madison. Sarah’s work on PUF proteins as key players is groundbreaking. Brian Carrick, a joint PhD student with Judith Kimble, is working on the network of RNA-protein connections that modulate a PUF regulatory network in the worm C. elegans.

**Riemstra Lab**
Chad Riemstra was the 2022 Vaughan Lecturer at the 61st Annual Rocky Mountain Conference on Magnetic Resonance.

**Wickens Lab**
Hello all – Marv speaking here. It has been nearly four decades since I arrived in Madison, in that winter’s worst blizzard, at 2 am, carrying 13 boxes of reagents from Cambridge, full of dry ice, and getting stuck in snow drifts four times on the way to our rented home. Things have improved substantially.

When I arrived, of course I expected to enjoy research, and I have in spades. But I could not have predicted the joy I’ve drawn from the folks in the lab, my faculty colleagues, and the scientific community in Madison. Nor the great support of the staff, front office, and departmental chairs. I am deeply grateful.

Since my last letter in the 2013-2016 newsletter, we’ve continued to work on how are RNAs are controlled and biological roles of that regulation. RNA binding proteins called “PUF” proteins are key players. Brian Carrick, a joint PhD student with Judith Kimble, is working on the network of RNA-protein connections that modulate a PUF regulatory network in the worm C. elegans. Sarah Crittenden and Ahlan Ferdous, a student and a scientist in the Kimble Lab, respectively, are close allies in this RNA-protein development-oriented world. Sarah focuses on differential functions of FBII binding elements, and Ahlan has uncovered remarkable properties of small, largely unstructured proteins on PUF function.

On other fronts, an amazing scientific story emerged from the work of Melanie Preston, then a post-doc in the lab, and collaborations with old friends and colleagues. Melanie developed a clever screen to detect enzymes that added previously unknown tails to RNAs. She discovered a C. elegans enzyme that added alternating U and G, as in 5’UG/UG/5’UG. She called this enzyme ‘CUG’ and ‘CUG tails’. She suggested they might form a structure that could be RNA silencing.

Based on that idea, we began collaborating with Scott Kennedy’s lab (now at Harvard, but who many of you will remember from his years in Madison). We discovered that CUG tails not only exist in C. elegans, but are

Continued on next page
required for silencing genes across generations. In parallel, we began collaborating with Sam Butcher’s lab in this department, just two floors away, in pursuit of a pUG structure. In a revelation, Sam’s lab discovered that pUG tails form a beautiful and distinctive structure. All in all, our combined efforts have revealed a castle’s worth of doors to open. You can read more about that work on p. 4. The enormous pleasure of these collaborations is matched only by the startling findings we’ve shared, their implications for RNA biology, and very likely for diseases in that endlessly fascinating model organism, *H. sapiens*.

On the personal side... I was inspired and moved by a remarkable gathering of senior colleagues in and out of the RNA world, and of Wicks’s lab alumni, for a Steenbock Symposium called “Epiphanies in and around the RNA World” aka “Marvel Fest” in 2018 (see photo below). Former lab members and illustrious older friends of mine in science gave talks focused on their epiphanies and how sudden “epiphanic moments” changed their way of thinking and their research. The talks were inspiring, as they emphasized the thrill of doing science, which we all sometimes forget in the day-to-day of gel without markers, contaminated plates, and failed sequencing runs. For those of you who attended, my heartfelt thanks. And I beg you to contact me for a Zoom when your next epiphany comes — that would be wonderful!

Some recent changes among former lab members... I’ll mention only relatively recent changes, and apologize in advance for those I miss. Carol Pfieffer, who for decades kept me sane and on track, has now retired. My sanity has decayed in parallel. We all miss her kindness, care, and laughter. Amy Cooke is now a professor at Haverford College, with a thriving team of talented undergrads. Jeff Coller has moved to Johns Hopkins as a named professor of RNA Biology and Therapeutics, while Zak Campbell returned to Madison as a professor at UW, studying RNA biology related to pain. Labib Roubana has moved to U Mass-Boston, where he studies RNA regulation in planaria and regeneration. Daniel Wilinski (U Michigan) and Chris Lapointe (Stanford) are thriving postdocs now, armed with NIH awards as they seek faculty positions. Hugo Medina-Munoz is a post-doc in Gene Yeo’s group at UCSD, and Douglas Porter is a post-doc at Stanford. Dave Zarkower and Vivian Bardwell, among my very first students and long since married, have retired from their faculty positions at U Minnesota. Rock Pulak is Scientific Director at Union Memotecta.

And perhaps most amazingly... Our son, Zachary Wickens, who some of you may remember as a red-headed toddler full of energy, is now a professor in the Chemistry Department here at UW–Madison! A great, utterly unexpected blessing. Zach and his wife, Natalie, live on the burgeoning near east side and are doing well. And while we discuss changes, there’s me. But then, I am the same as when I started. Well, maybe not exactly: my hair is shorter and white, and I soon will retire!

To all of you who worked with me or who I have known in other ways... If you now are somewhere else, I hope you remember more of Madison than the cold winters; that each of you also recalls moments of discovery, joy and friendship. And to everyone, from former members of my lab, Judith’s, Phil’s, Jim and Elsebeth’s, participants in RBsGroup, RNA MaxiGroup, Anarchy Group, or Meet the Press: please don’t hesitate to contact me any time. I would love to hear from you, even if you don’t have an epiphany in your pocket, or forgot to add the markers and standards.

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**Letters from the Labs**

**Simcox Lab**

The Simcox Lab has been open for four years, and it’s been a wild ride. The lab focuses on identifying plasma lipids that correlate with human disease to determine the function and regulation of these lipids. In the past year, the lab has made several strides toward these goals. Raghav Jain and Jess Davidson published a pre-print identifying plasma oxylipins as drivers of inflammation in cardiovascular disease in women. This study was pursued in collaboration with the Midlife in the US (MIDUS) and Survey of the Health of Wisconsin (SHOW) human population cohorts. Lab members Paula Gonzalez, Lainy Von Bank, and Gina Wade identified lysophospholipids as markers of chronic pain in adolescent women in collaboration with Medical College of Wisconsin published in *Lipids in Health and Disease*.

Raghav Jain and Gina Wade published their work to computationally infer the tissue of production for plasma lipids in *Journal of Lipid Research*. This work used the stress of cold exposure to dynamically regulate the plasma lipids levels to generate hypotheses on the tissues of uptake and production for acylcarnitines and ceramides. Raghav also followed this with a perspective on thermogenesis by hyperthermia published in *Cell*.

Projects focused on understanding these plasma lipids are regulated were led by postdoc Gisela Geoghegan and graduate student Lainy Von Bank. In their recently released preprint, they worked to understand the regulation of liver lipid production by the nuclear receptor HNF4-a. Gina Wade and Ayren McGahee assessed the ability of monounsaturated fatty acids to regulate insulin sensitivity in collaboration with Dr. James Ntambi. The year brought a large amount of change and growth. The Simcox Lab welcomed two new graduates students from IPB, Jess Davidson and Isabella James. Jess received the Molecular and Cellular Pharmacology T32 training grant. The lab also welcomed two Fullbright Scholars Dr. Sylvia Michorowska from the Medical University of Warsaw and Dr. Nirmali Wickramaratne from Sabaragamuwa University of Sri Lanka. Several Simcox lab members were selected to give oral presentations at National Conferences including Edrees Rashan (Rising Stars Symposium at the Back to TOC

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Hi, Everyone! A lot has been going on in the Hoskins Lab in recent years. We’ve published really terrific science, including several stories that have been hanging around for a while, such as Sarah Hansen’s work on U1 binding kinetics, Karli Lipinski’s and Xin Chen’s work with Dave Brow on U6 synthesis by RNAP II, Maggie’s work on Lsm binding dynamics.

I’ve been thinking more about high throughput approaches to studying splicing and RNA processing in general. David White is working with the Herschlag and Greenleaf groups at Stanford on using RNA arrays to study U1:5’SS interactions at the transcriptome scale, while I recently spent a few weeks in Polly Fordyce’s lab at Stanford learning about how microfluidics can be used in high throughput enzyme assays. I think together these represent a really unique toolset for us to study RNA processing. Currently, Sierra Love is making terrific progress in our high throughput screen to identify novel splicing inhibitors, and we’ve begun thinking more about how these could be applied as new antifungals. In fact, we were recently awarded a new grant in this area together with the Hull Lab in BMC! Another big story on the horizon involves Ye Liu’s work on using single molecule methods to study U6 snRNP biogenesis—part of a long-standing collaboration with the Butcher Lab.

In lab member news, Ethan Aubuchon joined the lab as a graduate student in IPiB to launch a new research direction — working on cleavage and polyadenylation factor with Lori Passmore’s lab. Ethan, Junqiao Zhu, and David White have all been awarded fellowships or traineeships in recent years! In addition, superstar undergrad Natalie Zeps was awarded a Sophomore Research Fellowship. Xingyang Fu graduated in 2022, and his first paper on single molecule studies of spliceosome activation was accepted in PNAS and should be out by the time this newsletter comes out. Paper #2 should be rolling out shortly thereafter. Xing is now a postdoc in the Yemini lab at UMass Chan Med School. Louise and Agatha are also holding up well and continue their long-term association with the lab.

In alumni news, Sarah Hansen, currently with Brenda Bass, was awarded a trainee fellowship at U. Utah as part of the Microbial Pathogenesis Training grant. Clarisse van der Feltz published her first paper in JAVE (PMID: 35848833). Charlie Schneider began working at Merck Research Labs in Cambridge, MA (and became the first Hoskins lab alumni to host Aaron for a seminar!). Matt Ashton is now a resident in emergency medicine at Mount Sinai in NYC. Maggie Rodgers won the Scaringe Award from the RNA society and recently began her own laboratory at NIDDK and hired her first scientist — Tucker Carrocci! Sarah and Maggie also both got married this year! Finally, we recently had an impromptu Hoskins Lab reunion of the OG tri-snRNPs along with Sandy Trebar, who now has two children and visited from Germany!
Our thoughts are with the families of any others in the Biochemistry community who recently passed.
Celebrating our past.
In October 2022, the American Chemical Society (ACS) honored with National Historic Chemical Landmark designation the isolation of a chemical compound that prevents blood from clotting. With support from the university, the state, and the Wisconsin Alumni Research Foundation (WARF), further research on the compound and its analogs led to the development of warfarin, a revolutionary blood thinner still widely used today. Warfarin and its analogs were discovered by UW–Madison biochemistry alumnus and professor Karl P. Link and members of his lab, including graduate students Mark Stahmann and Miyoshi Ikawa. Both Stahmann and Ikawa would go on to become professors, Stahmann at UW–Madison and Ikawa at the University of New Hampshire. A reaction appearing in one of the patents filed by the trio is shown above, overlaid on a photo of Link (right) and Stahmann working in the lab. Photo: UW–Madison Archives Photo Collection.