BENCHMARKS

A newsletter from the Department of Biochemistry

Fall 2020

A YEAR DEFINED BY SARS-COV-2 Chair's Message from Wes Sundquist

By any measure it has been a challenging year, headlined by the COVID-19 pandemic, George Floyd's murder and the ensuing push for racial justice, a rancorous national political campaign and a series of natural disasters. The pandemic's tragic scope made it the defining event of 2020, but many different threads have woven together to create the current fabric of uncertainty. I sincerely hope that all of you, the valued members of our extended departmental family, are remaining healthy and are coping as well as possible with the many different challenges that we all currently face.

COVID-19 has altered nearly every aspect of our lives, and our department has not been immune. All of our graduate and medical school courses are now being delivered online, which has required a herculean effort by our faculty. Our overall research productivity has certainly suffered from the reduction in personnel density required for social distancing, but I am proud of the way our community has come together to create a safe and supportive work environment. I sincerely believe that our labs are as safe as we can possibly make them given the reality that case loads in Utah are currently high and rising. Thanks to a combination of responsible behavior and just plain good luck, we have not yet had a single case of COVID-19 transmission in our building (touch wood!).

I have also been impressed at the way so many department members have rallied to help fight the virus. This began late last winter with a departmental donation of PPE to help our heroic colleagues working in the University of Utah Hospital, and has now evolved to include dedicated COVID-19 educational and research efforts in several of our labs. Janet Iwasa and her colleagues are creating a molecular animation that depicts the SARS-CoV-2 life cycle and will complement their amazing animation of the HIV life cycle. Debbie Eckert, Michael Kay and colleagues have exploited their D-peptide mirror phage display platform to develop inhibitors of SARS-CoV-2 entry, and have already identified initial hits. A great attribute of their approach is that inhibitors are selected for broad activity against many different coronaviral strains, thereby helping us to respond strongly to the inevitable next pathogenic human coronavirus. You can hear interviews describing their research efforts here and here. Together, the Iwasa and Kay groups have raised nearly $750,000 in NIH and NSF grant funds to support their efforts.

Another striking aspect of the remarkably rapid research response to COVID-19 has been the degree to which it is built on previous antiviral research. Essentially all of the current therapeutic strategies being deployed against SARS-CoV-2 had their origins in research on HIV, influenza, and other well-studied viruses, and the rapid SARS-CoV-2 response simply would not have been possible without those efforts. I was again reminded of this truth while working on a timeline chronicling the history of HIV/AIDS treatment and research in Utah, which, amongst many other highlights, documents how basic research in our department ultimately contributed to the development of potent new inhibitors of HIV entry and capsid function. High quality fundamental research takes time, hard work and resources, but it inevitably pays great dividends, and often in entirely unpredictable ways.

Despite the challenges of the current year, our department continues to excel in research, training and service. We were fortunate to welcome two truly outstanding new faculty members into the department this year – Justin English from UNC and Keren Hilgendorf from Stanford - and our many other advances are nicely documented elsewhere in this newsletter and on our department webpage. Brighter days are ahead, and I very much look forward to writing an even happier Chair's message next year!

REMEMBERING EVELINE BRUENGER

Chris Hill

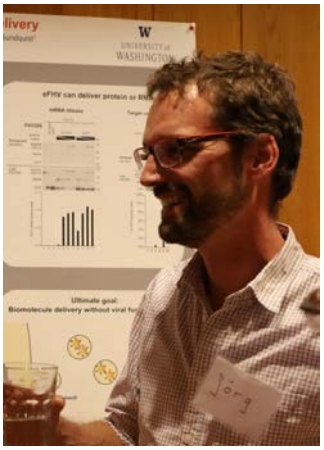
Eveline Bruenger, who passed away April 23, 2018, was a dear friend to all of us at the University of Utah Department of Biochemistry. She led a full life that included being a refugee from the Allied bombing of her home town, Frankfurt, during World War II, and working as a technician in our department during which time she was co-author of multiple papers. It was always a pleasure to meet her at events such as the Department picnic. She displayed great enthusiasm for life, including hiking the Grand Canyon rim-to-rim in her 70s, and rafting 280 miles of the Colorado (with some serious rapids) in 2017 at well over the age of 80. Her excitement at seeing the latest scientific discoveries was inspirational and contagious. Her obvious joy at seeing the successes of trainees and faculty was inspirational. We miss Eveline and are grateful for having known her. We honor her memory each year by making an award to the postdoctoral trainee who most exemplifies Eveline's values of scientific success and community engagement.

The first Bruenger award was presented in 2018 to Jörg Votteler, a postdoc in Wes Sundquist's lab. Jörg opened up a new direction of study by designing self-assembling protein nanocages that release from cells in a manner similar to some viruses. His first

Eveline rafted 280 miles of the Colorado in 2017.

author paper in Nature was a "technical and conceptual tour-de-force" that heralded the exciting potential to use self-assembling nanocages to deliver therapeutics into cells. Jörg contributed to multiple other publications, is a very hard worker, and highly tenacious. Jörg is charismatic, well-liked, and very generous with his time and very willing to help others.

The 2019 Bruenger awardee was Han Han, a postdoc in Chris Hill's lab. Han played the leading role in a series of papers that transformed understanding of the mechanism used by an important family of cellular protein machines called AAA ATPases. Han's foundational biochemical studies enabled the formation of active complexes, and his subsequent structure determination of Vps4 and, in collaboration with the Peter Shen lab, Cdc48, revealed the mechanism that AAA ATPases appear to use to translocate and thereby unfold their substrate proteins. In addition to his scientific excellence, Han is extraordinarily resilient and very generous mentor to junior members of our research community.



Jörg Votteler, 2018 Bruenger awardee (left) and Han Han, 2019 Bruenger awardee (right).

THE INAUGURAL JAMES AND KATHLEEN MCCLOSKEY BIOSCIENCE ENDOWED LECTURE

Chris Hill

James (Jim) A. McCloskey, Jr. was a beloved member of our faculty with joint appointments in our department and the College of Pharmacy. He was born Robert McCloskey at Robert B. Green Hospital in San Antonio, June 25, 1936 to James Augustus McCloskey, MD, and Marian Rebecca Koehler McCloskey. His name was changed to honor his father, who was killed in WWII in the Philippines, where the family was stationed prior to the war. While there, he contracted polio at age five which left him with a facial paralysis that gave him an endearing smile. Jim was reared in San Antonio by his mother and grandparents. Following studies at Trinity University in San Antonio and Massachusetts Institute of Technology, he took a faculty position at Baylor College of Medicine in Houston, Texas, before moving to the U in 1974.

Jim was a true leader in the field of mass spectrometry, modifications on tRNA, and evolutionary relationships. His many awards included serving as president of the American Society for Mass Spectrometry, the University of Utah Distinguished Research Award, fellow of the American Association for the Advancement of Science, and the Distinguished Contribution in Mass Spectrometry Award. The American Chemical Society, Chemical Heritage Foundation has published an oral history of Jim's career that may be viewed online at: https://oh.chemheritage.org/oral-histories/mccloskey-james-a.

Jim retired from the University of Utah in 2007. He died August 30, 2017 at age 81 at home in Grey Forest, TX. In addition to his scientific excellence, we miss his quick wit, laugh, understanding, and compassion. He had a love of wine, good food, travel, camping, and picnicking in the Utah canyons. His favorite evening ritual was to enjoy a glass of wine on the balcony watching for the "green flash" as the sun went down over the Great Salt Lake and listening to the music of Philip Glass. Many blue jays in the area missed their daily peanuts after he moved away. Jim is survived by his loving and devoted wife of 57 years Kathleen (Kay) McCary McCloskey; children: Lydia McCloskey, James Augustus McCloskey III, Madeline McCloskey, and Alexander O'Brien McCloskey;

Kay, who had her own distinguished career at the U with the Eccles Health Sciences Library, has provided a generous gift to found the James and Kathleen McCloskey Bioscience Endowed Lecture, which is hosted annually by the Departments of Biochemistry and Medicinal Chemistry. The inaugural lecture, held on Friday September 20th 2019, was given by Sir Venkatraman (Venki) Ramakrishnan, who is currently President of the Royal Society and received the Nobel Prize in Chemistry in 2009 for work that he performed, in part, in our Department. Venki's research transformed understanding of how proteins are synthesized by determining the structure of ribosomes in different states, which, among other things, explained how fidelity is maintained when mRNA is translated into proteins. Venki's spectacular talk, entitled Termination of translation in bacteria and eukaryotes, described structural work that shed light on the basis of release factor function, and showed that despite dissimilarity between bacteria and eukaryotes, certain common features and mechanisms are conserved. It was followed by Venki signing copies of his best-selling book, *Gene Machine: The race to decipher the secrets of the ribosome*. The celebrations continued at the annual Department picnic in Sunnyside Park. Due to COVID restrictions, the 2020 McCloskey lecture has been postponed, although we look forward to catching up with this new annual tradition this coming Spring.

Wes celebrates the inaugural McCloskey lecture with Pam Craine, Kay and her daughters, and Venki Ramakrishnan. Photo credit: Kay McCloskey.

Jim and Kathleen's son, Gus McCloskey, presenting Venki with a handmade pottery gift at the lecture.

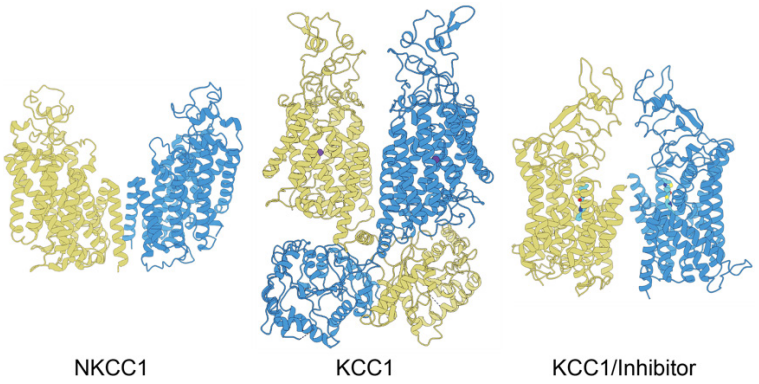
THE CRYO-EM REVOLUTION

Chris Hill

Recent years have seen remarkable advances in cryo-electron microscopy (cryo-EM) that are transforming structural and cell biology. Thanks to a grant from the Beckman Foundation (Wes Sundquist, PI) and matching funds from the U, we have world-class state-of-the-art facilities, including a Titan Krios microscope and K3 direct detector. Dave Timm and David Belnap – Biochemistry faculty and Directors of the Cryo-EM and the EM Core Facility – have now developed this into a highly functional facility that is generating excellent data and enabling highly impactful discoveries.

In recent years the department has recruited three exciting new Assistant Professors with expertise in Cryo-EM. Erhu Cao and Peter Shen have already built effective and productive research groups. This year, we were lucky to recruit Julia Brasch, who joins us from Columbia University and is now establishing her lab in our Department. Julia studies cell adhesion and has made landmark discoveries on the classical and desmosomal cadherins and the adhesive junctions they form. She also determined how protocadherin assemblies that mediate neuronal self-recognition in mammals assemble into neuronal self-recognition complexes on membranes (Brasch et al. Nature (2019) 569:280). In her new laboratory at the U, Julia is extending these studies to understand macromolecular assemblies at synapses in health and disease.

Our labs have created multiple important new structures/insights in recent years, including on the Dicer-2 dsRNAase (Sinha et al. Science 359:329), AAA ATPases (Cooney et al. Science 365:502), and ESCRT-III architecture (Nguyen et al. NSMB 27:392). In an important complement to the research-focused efforts, Janet Iwasa and Peter Shen received an NIH R25 grant to develop a course entitled "CryoEM 101; Interactive, Self-Paced Training Modules for the Cryo-EM Novice" (https://CryoEM101.org). This CryoEM 101 course has more than 5,000 users worldwide, and is employed by many labs and national cryo-EM centers to teach principles and best practices of cryo-EM to newcomers to the field.



Structure and pharmacology of human NKCC1 and KCC1 transporters. K+ ions and an inhibitor of KCCs are shown as purple spheres and sticks, respectively. The inhibitor wedges into and blocks the ion transport channel of KCC1.

This year saw advances from the Cao lab on understanding of cation-chloride cotransporters. Secondary active cation-chloride cotransporters (CCCs), utilize the Na^+ and/or K^+ gradients created by Na^+ - K^+-ATPases to move Cl^- into or out of cells. These transporters are fundamental for cell volume homeostasis, transepithelial ion movement, maintenance of intracellular Cl^- concentration, and inhibitory synaptic transmission, and their malfunction is associated with abnormal blood pressures and brain disorders. Recently, the Cao lab published the structure of the NKCC1 transporter in its inward-open state (Yang et al. Nature Commun. 21:1016). Remarkably, the structure suggests that each of the three relevant ions (Na^+, K^+, and Cl^-) may traverse a different path through the channel. Even more excitingly, the Cao lab has determined the structure of the related KCC1 cotransporter in both the inward-open state and outward-open states, the latter in complex with the first structurally characterized pharmacological inhibitor (https://www.biorxiv.org/content/10.1101/2020.07.26.221770v1).

THE 2019 MARJORIE RICHES GUNN AWARD FOR GRADUATE STUDENT EXCELLENCE

Adam Hughes

The fourth annual Marjorie Riches Gunn Award for Graduate Student Excellence was shared this past year by two very deserving candidates—Alyssa English and Max Schuler. The Gunn Award is given annually in honor of long-time Department friend Marge Gunn, to the Biochemistry PhD candidate(s) judged by the faculty to most exemplify our values of scientific excellence. Alyssa and Max are both senior graduate students in the Hughes and Shaw labs. Working closely together over the past four years, Alyssa and Max have made critical insights into the function and regulation of a new nutrient sensitive organelle conserved from yeast to humans, called the Mitochondrial Derived Compartment (MDC). In three papers that will be published this year, Max and Alyssa have discovered that MDCs are dynamic organelles that are generated in cells experiencing excess nutrient stress, and that these structures play a critical role in protecting cells from toxic accumulation of amino acids. Their studies open the door for years of study elucidating how cells generate MDCs, and identifying how this system can be harnessed to combat a range of metabolic disorders. In recognition of their excellent work, Max and Alyssa have both been selected to orally present their findings at international scientific meetings and have each received Ph.D. fellowships during their graduate tenure. Both Alyssa and Max are regarded as tireless workers and exemplary department citizens by their peers. Their ability to work selflessly together on this project is a testament to their collegial nature, and should serve as a model for successful student collaboration. Congratulations again to Alyssa and Max on this tremendous, well-deserved honor.

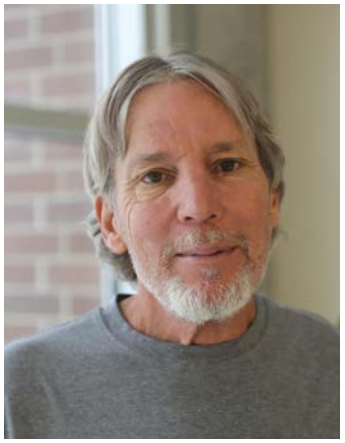
Gunn and Bruenger award winners at the 2019 Biochemistry Picnic. From left to right: Wes Sundquist, Max Schuler, Eveline Bruenger, Alyssa English, Adam Hughes, Han Han, and Chris Hill.

STAFF HIGHLIGHT: MEET BOBBIE WILCOX AND PAUL KIRBY

Bobbie Wilcox and Paul Kirby are department Lab Aides who are in charge of all the glass washing and sterilizing for the entire department. They also prepare standard solutions and cultures that are regularly needed by labs. Bobbie and Paul have been integral parts of the department for 20 and 12 years respectively.

Bobbie takes great pride in making sure that everything she does, she does well and correctly. She ensures that every solution, culture, and piece of glass that leaves her station has been prepared correctly so that the lab personnel can properly do their experiments. She encourages her grandchildren to take an interest in science and to have fun with it. When Bobbie isn't working hard supporting the biochemists, she enjoys camping and attending popup painting tutorials around the city with her friends.

Paul takes pride in the partnership and comradery that has developed with Bobbie, along with how they have worked together over the years to streamline their work and created an efficiency that the department both appreciates and depends on. Paul works hard to provide high-quality service to all the lab personnel. Outside of work, Paul enjoys playing the guitar while sitting on his back porch with his dog and watching the nearby stream.

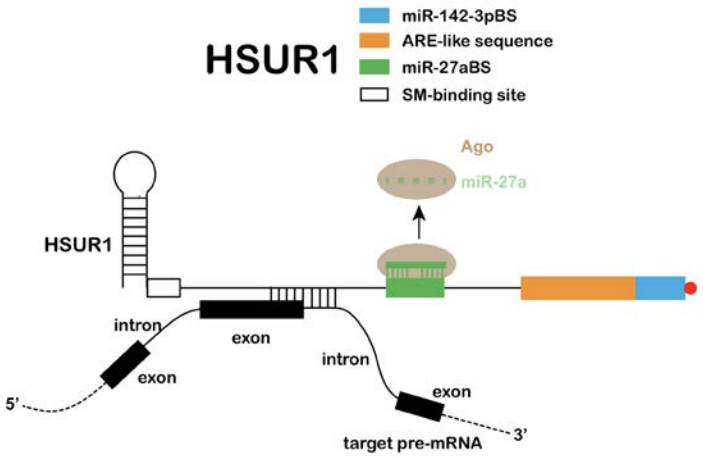


Bobbie Wilcox (left) and Paul Kirby (right).

Both Bobbie and Paul have become indispensable members of the Biochemistry Department through their many years of excellent service. They both greet everyone with a smile and make anyone they talk to feel welcome.

FACULTY HIGHLIGHT: MEET CARLOS GORBEA

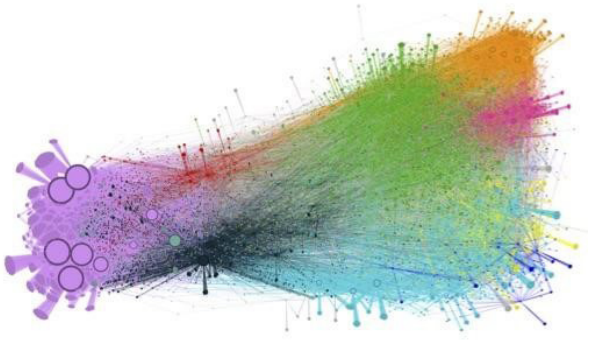
Carlos Gorbea is a Research Associate Professor in the Cazalla Lab. Carlos completed his graduate studies at Virginia Tech, where he did his Master's work with David F. Smith on glycosphingolipid expression, and completed his Ph.D. in the laboratory of Judy Bond, where he worked on the characterization of meprins A and B, two membrane-bound metalloproteinases of the mouse kidney. He then moved here to Utah where he joined Marty Rechsteiner's lab in 1993. While in Marty's lab he worked on the role of the anaphase promoting complex in the degradation of MAD2, a component of the mitotic checkpoint, and also worked on different aspects of proteasome biology. He then joined the lab of Neil Bowles (U of U Pediatrics) where he focused on cardiotropic enteroviruses that lead to cardiomyopathy.



In 2013, Carlos returned to Biochemistry to work in Demian Cazalla's lab, where he has concentrated his efforts on the characterization of non-coding RNAs, called HSURs, that are expressed in virally infected T cells. Carlos and members of the Cazalla lab have demonstrated that HSURs recognize and downregulate host mRNAs relevant to viral infection.

FACULTY HIGHLIGHT: MEET JARROD JOHNSON

Jarrod Johnson has held a long-standing interest in host-virus interactions. He did his graduate studies at the University of North Carolina, where he trained in classical virology and gene delivery, working in the laboratory of Jude Samulski. After graduate school, he sought out a postdoctoral fellowship with Dan Littman at New York University and began studying the complex relationship between HIV and specialized cells in our innate immune system. In the Littman laboratory, he optimized a lentiviral system to make genetic perturbations in



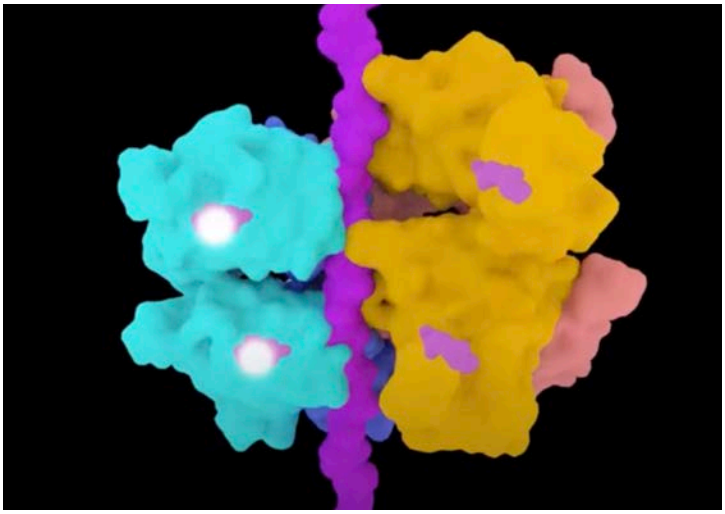
primary blood-derived cells and began studying how some cells, such as dendritic cells, are capable of detecting virus components through a cryptic sensing pathway, which we now know to be the cGAS-STING axis of innate immunity. Jarrod then moved to Seattle to study HIV innate immunity through the lens of systems biology, embarking on a second postdoctoral fellowship with Alan Aderem at the Center for Infectious Disease Research.

Jarrod joined the Department of Biochemistry in January of 2018 as a Research Assistant Professor. He recently published a manuscript in Cell Reports, entitled: "A comprehensive map of the monocyte-derived dendritic cell transcriptional network engaged upon innate sensing of HIV." Jarrod plans to continue studying HIV and disentangling innate immune signaling, which will hopefully lead to new antiviral strategies, new immunotherapies, and widen the path towards a cure.

FACULTY HIGHLIGHT: MEET PETER SHEN

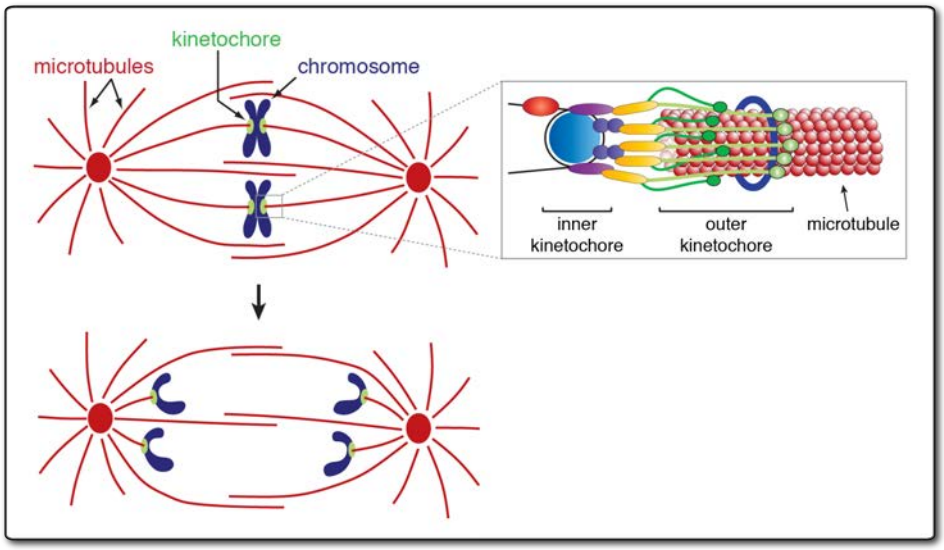
Peter became an Assistant Professor in 2017 after 5 years in the department as a spectacularly productive postdoc with Adam Frost and research faculty member running the cryo-EM core facility. Peter's group is focused on determining the structures of large and heterogenous protein complexes using cryo-electron microscopy (cryo-EM). He is on the leading edge of structural biologists taking advantage of recent dramatic advances in cryo-EM instrumentation and data processing to obtain high-resolution structures of complex and heterogenous protein machines that have resisted prior structural efforts. Such protein complexes are very challenging to purify to homogeneity, but Peter has used cryo-EM and computational methods to "virtually" purify suitable complexes in diverse configurations from heterogeneous mixtures.

Peter's lab works on a variety of challenging systems, including the ribosome, protein unfolding machines, RNA processing enzymes, and membrane proteins. Peter's work has already lead to a bevy of high-profile publications and grants, including the prestigious NIH MIRA award. Along with Chris Hill and Erhu Cao, Peter has helped to make Biochemistry a powerhouse structural biology environment, combining excellent coursework, training, and research opportunities. He is also collaborating with Janet Iwasa on an innovative NIH-funded project to develop an interactive online course to help train the next generation of cryo-EM researchers (Cryo-EM 101, see *The Cryo-EM Revolution* above). In addition to being a much sought-after mentor and collaborator, Peter also plays a key role in attracting the best and most diverse students to Utah in his role as recruiting co-chair for the Bioscience interdisciplinary graduate programs.



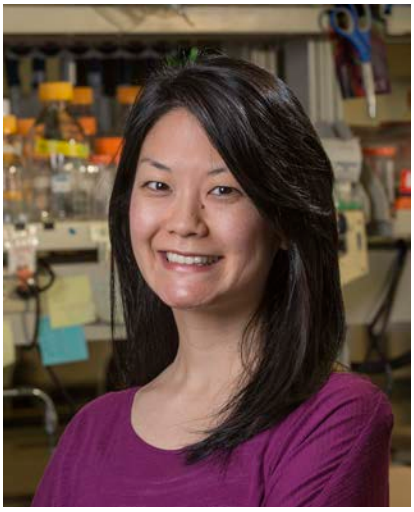
FACULTY HIGHLIGHT: MEET MATT MILLER

Matt is originally from Denver, CO. He earned his bachelor's in biology from Carleton College in 2001, and then worked at NatureWorks LLC (2001-2006), combining metabolic engineering and genetics to develop biocatalysts for the production of biodegradable plastic. Following that experience in the private sector, he returned to academia where he developed an interest in chromosome mechanics. He earned his PhD in 2012 from MIT, where he worked in Angelika Amon's lab studying meiotic cyclin-dependent kinase regulation and the consequences of misregulation. Matt conducted his postdoctoral training in Sue Biggins' lab at the Fred Hutchinson Cancer Research Center where he investigated the mechanisms by which tension stabilizes kinetochore-microtubule attachments.

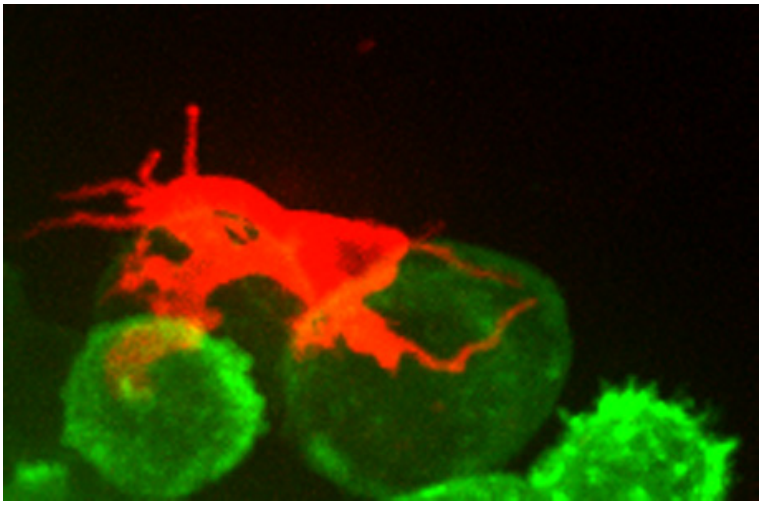


Matt joined the Department of Biochemistry at the University of Utah in May of 2019 and is still fascinated by the question of how cells accurately segregate their chromosomes during division.

FACULTY HIGHLIGHT: MEET MINNA ROH-JOHNSON



Assistant Professor Minna Roh-Johnson is originally from Canada, and completed her BSc and MSc at Simon Fraser University in British Columbia. She then moved to the United States to work with Bob Goldstein at the University of North Carolina at Chapel Hill studying early developmental processes. Completely obsessed with figuring out how cells alter their "skeleton" as they move during normal development, she then turned her attention to understanding how this process works in diseases such as cancer. She did postdoctoral work at Albert Einstein College of Medicine in New York with John Condeelis, who pioneered microscopy techniques to visualize how cancer cells move in animals. Minna then explored other animal models to understand how cancer cells interact with immune cells during metastasis and worked with Cecilia Moens at the Fred Hutchinson Cancer Research Center in Seattle. She discovered that in the tumor, macrophages can "spill their internal contents" to cancer cells, and that those cancer cells that received the contents are more likely to metastasize.



Visualizing macrophage (red) and cancer cell (green) interactions in an intact animals. Adapted from Roh-Johnson et al. (2017) Dev Cell, 43(5):549.

Minna joined the Department in January 2018 as an Assistant Professor, and has built a research program aimed at understanding what is in the macrophage contents that might be driving this metastatic behavior, how the contents are transferred, and more broadly, how the local microenvironment influences metastatic decisions made by cancer cells.

FACULTY HIGHLIGHT: MEET JANET IWASA

Janet has been a tenure-track Assistant Professor since 2018 after a 5-year research faculty stint in the department. Janet is also the department's new Director of Community Engagement. Janet came to Utah "because it had the best scientific environment."

Janet's group is focused on molecular visualizations – using the enormous volume of structural and functional data being produced these days and using it to produce compelling and easy-to-understand animations of complex molecular and cellular processes. As important as visualizing current models for these processes that underlie biology are (as frequently seen on journal covers), Janet's work also provides a valuable tool for generating mechanistic hypotheses and revealing where there are still gaps in our understanding.

In addition to producing these spectacular animations (a collection of which can be seen at animationlab.utah.edu), Janet's lab has been training the next generation of molecular animators and developing accessible tools to enable researchers worldwide to benefit from the insights provided by molecularly accurate animations. Janet's work is also an invaluable outreach tool, helping to educate and inspire the current and future scientists. A great example of Janet's approach in action is her tour-de-force animation of the full HIV lifecycle (http://scienceofhiv.org). Her work can also be seen in numerous high-profile structural biology papers within and outside of the department.

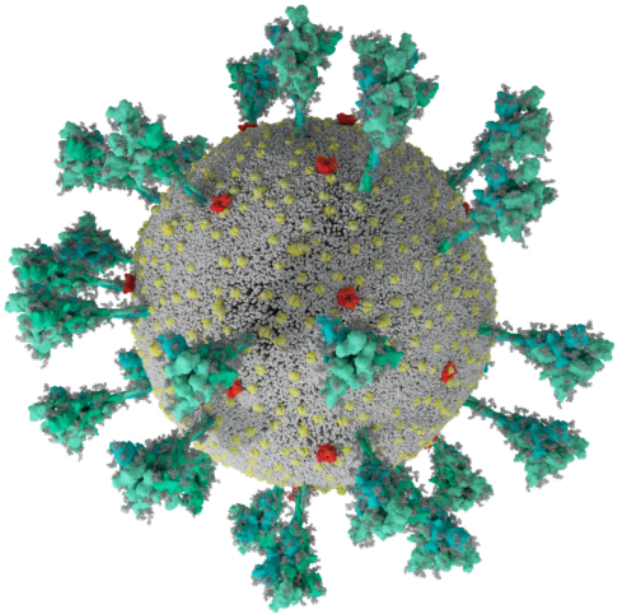
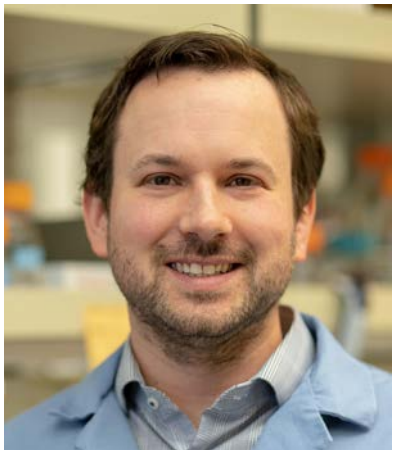


Illustration of SARS-CoV-2 created as part of a project to animate the viral life cycle.

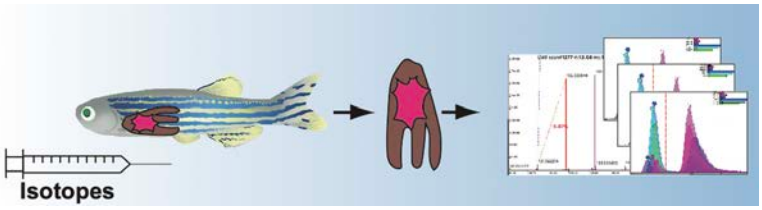
ACKNOWLEDGEMENTS

Newsletter contributors: Dana Carroll, Chris Hill, Adam Hughes, Janet Iwasa, Michael Kay, Rachel Merrill, Amity Mower, and Wes Sundquist.

FACULTY HIGHLIGHT: MEET GREG DUCKER



Greg Ducker became an Assistant Professor in 2018 after a postdoc with Joshua Rabinowitz at Princeton, where he received an American Cancer Society fellowship and a K99 Career Transition Award from the National Cancer Institute. Greg was drawn to Utah by the "really strong department culture and an institution-wide appreciation for the study of metabolic biochemistry." This year, Greg received a Damon Runyon-Rachleff Innovation Award for his innovative collaborative work on liver cancer with Kim Evason at the Huntsman Cancer Institute. Greg is yet another talented import from Minnesota's Carleton College (including Wes Sundquist, Matt Miller, and Nels Elde). He also adds to the large group of faculty who have joined us after participating in our Rising Stars Symposia.



Greg's group focuses on studying cancer metabolism with a special focus on using advanced mass spectrometry techniques to measure how metabolites flow through metabolic pathways in vivo and how these fluxes relate to human disease. Greg is already a highly valued member of our community, making important contributions to graduate teaching as director of the Genetic Engineering course and chairing admissions for the Biological Chemistry graduate program. Greg's enthusiasm for research and cutting-edge expertise in advanced biochemical techniques have already made him a popular mentor and collaborator. Greg further strengthens Biochemistry's already strong metabolism team, including Jared Rutter, Adam Hughes, and James Cox, in addition to being a member of the Diabetes and Metabolism Center and the Huntsman Cancer Institute.

HONORS, GRADUATIONS, AND TRANSITIONS

MAJOR FACULTY AWARDS

2017 Dana Carroll elected to the National Academy of Sciences (3rd Biochemistry NAS member in the past 4 years)
2017 Wes Sundquist awarded the UU Rosenblatt Prize for Excellence
2017 Michael Kay was selected for the Distinguished Mentor Award
2017 Dana Carroll was given the UU Distinguished Innovation and Impact Award
2017 Brenda Bass was awarded an honorary degree from Colorado College, her alma mater.
2018 Paul Sigala selected for a Pew Scholar Award (8th Pew/Searle Award to a Biochemistry junior faculty member).
2018 Dana Carroll received the Utah Governor's Award for Science and Technology
2018 Danny Chou was selected for a JDRF Career Development Award
2018 Michael Kay was selected for a Benning Endowed Chair (4th Benning Chair to a Biochemistry faculty member).
2019 Jared Rutter was named a University of Utah Distinguished Professor (6th Biochemistry Distinguished Professor)
2019 Greg Ducker was selected as a Damon Runyon-Rachleff Innovation Awardee (with Kim Evason, HCI),
2019 Brenda Bass was selected for a Jon M. Huntsman Presidential Chair
2020 Chris Hill was elected to the American Academy of Arts and Sciences

MAJOR GRADUATE STUDENT & POSTDOC AWARDS

2017 John Schell (Rutter Lab) received the Prahl Award for the outstanding PhD at the UUHSC
2018 Maria Disotaur (Chou Lab) received the WWC Merck ACS National Research Award
2018 Niladri Sinha (Bass Lab) received the Weintraub Award for outstanding graduate achievement in the biological sciences (one of 13 international recipients, the second time a Biochemistry graduate student has won a Weintraub Award)
2018 Niladri Sinha (Bass Lab) received the Prahl Award for the outstanding PhD at the UUHSC (the 8th time a Biochemistry graduate student has won this award, and the second year in a row).
2019 Jeff Morgan (Rutter Lab) was selected a Stat Wunderkind "Scientific Superstar"

GRADUATIONS & TRANSITIONS

The following students completed their degrees in 2018-2020: Niladri Sinha (Bass lab, Ph.D. 2018), Daniel Reich (Bass lab, Ph.D. 2018), Raghav Kalia (Frost lab, Ph.D. 2018), Nathaniel Talledge (Frost lab, Ph.D. 2018), Sarah Safran (Bass lab, Ph.D., 2019), Claire Bensard (Rutter lab, Ph.D. 2019), James Fulcher (Kay lab, Ph.D. 2019), Giselo Geoghegan (Villanueva lab, Ph.D. 2019), Jin Hwan Kim (Chou lab, M.S. 2019), Stephanie Pearson (Villanueva lab, Ph.D. 2019), Alyssa English (Hughes lab, Ph.D. 2020), Vanja Panic (Villanueva lab, Ph.D. 2020).

We said farewell to the following postdocs in 2018-2020: Feng Zhang (Cao lab), Becky Marvin (Sigala lab), Jason Nogueira (Chou lab), Bobby Yarrington (Carroll lab), Jon VanVranken (Rutter lab), Qing Ye (Villanueva lab), Mingyu Gu (Frost lab), Olga Zurita (Rutter lab), Katja Dove (Rutter lab), Timo Xu (Kay lab), Huan He (Cazalla lab), Gaelle Batot (Hill lab), Brad Naylor (Cox lab), Casey Hemmis (Hill lab), Eric Fredrickson (Rutter/Hill labs), Shugao Zhu (Chou lab), Yaqi Liu (Cao lab), Judi Simcox (Villanueva lab), Jenna Goodrum (Hughes lab), Nico Szabo (Kay lab), Diao Chen (Chou lab), Jan Warncke (Sigala lab), Landa Porushottam (Chou lab), Xuejing Yu (Rutter lab), Joerg Votteler (Sundquist lab), and Sandra Lettlova (Rutter lab).

Several faculty transitioned to new positions in 2018-2020: Claudio Villanueva accepted a position at UCLA, Danny Chou accepted a position at Stanford, and Helena Safavi accepted a position at the University of Copenhagen.

The following staff members have also moved on from the department: Kay Willden (accountant), Jill Wilson (administrative program coordinator), Indira Gutierrez (executive secretary), Sarah Alexander (grants and contracts officer), and Diana Mills (executive assistant).

We are pleased to welcome new staff members: Brandon Trieu (senior accountant), Amity Mower (administrative program coordinator), Cassie Connell (grants and contracts officer), Mandi Peterson (administrative assistant), and Katie Brough (administrative assistant).

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HEALTH
UNIVERSITY OF UTAH

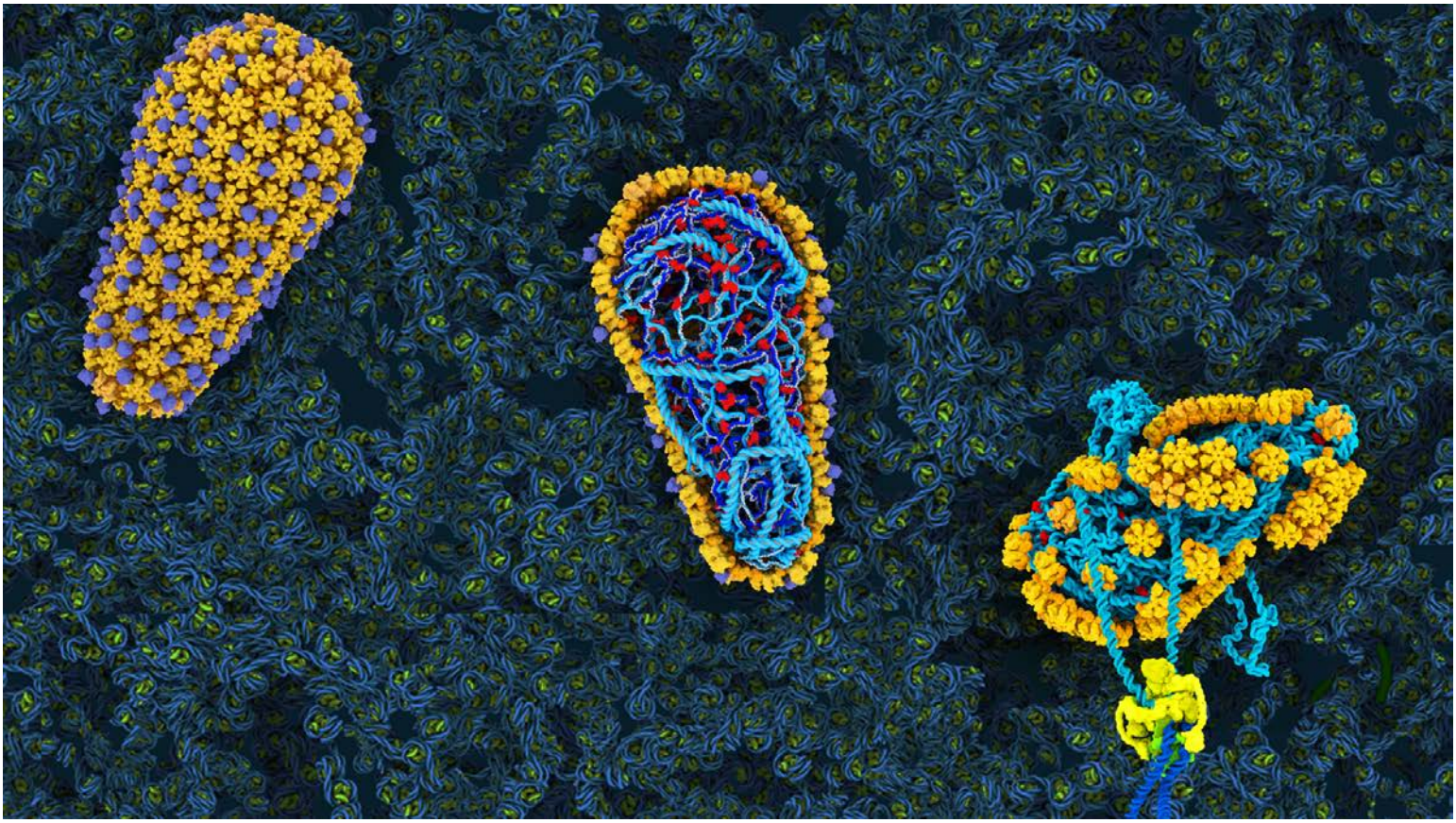

Image showing that HIV capsids can enter the nucleus and complete reverse transcription while largely intact, and then uncoat and integrate into the host DNA. Created by Janet Iwasa to accompany a recent paper entitled “Reconstitution and visualization of HIV-1 capsid-dependent replication and integration in vitro” by Devin Christensen, Barbie Ganser-Ponillos, Jarrod Johnson, Owen Pornillos, and Wes Sundquist (*Science* Vol. 370, Issue 6513). Also see https://healthcare.utah.edu/publicaffairs/news/2020/10/hiv-sundquist.php