

## CONTENTS

## Annual Newsletter Fall 2021

Message from the Chair	1
Welcome New Faculty	2
PhD Program Announcements	2
BCB MS Graduate Program Announcements	3
I-STEM Updates	4
Undergraduate Awards	5
Faculty Updates	6-12
Thank You Aaron!	12
Recent Publications	13-17
Noteworthy: Awards and Promotions	18
Alumni News	19
How to Donate	20

Newsletter editor: P. Wolfskill

## MESSAGE FROM THE CHAIR

Despite pandemic-related adjustments such as online instruction and mask-wearing in the laboratories, this was in many ways a normal year in the Department of Biochemistry and Cell Biology. Our undergraduate majors continued to excel, our post-docs and graduate students continued to publish important new discoveries, and our faculty continued to be successful in obtaining new grant funding. All these accomplishments are described in the Newsletter, but a few highlights from the year:

At the May Commencement ceremony, Biochemistry major Nita Wong was named a Ward Melville Valedictorian and almost half of the Biochemistry majors graduated with Distinction (Magna, Summa, or Cum Laude).

Our newest faculty member, Assistant Professor Chi-Kuo Hu, arrived from Stanford University in January. Chi-Kuo's lab studies the fascinating process of dormancy, a natural form of suspended animation, in the African Killifish.

Distinguished Teaching Professor Nancy Hollingsworth was elected a Fellow of the American Association for the Advancement of Science.

My term as chairman of the Department ends this September. I want to wish the best of luck to the incoming chair, Wali Karzai. The last six years have been eventful, to say the least, and it has been a privilege to serve in this position. As this is my last "Message from the Chairman", I would like to thank some of the people who have made my life easier during this time. I have greatly appreciated the efforts of the Departmental staff: Carol Juliano, Diane Rodriguez, Keil Thomas, and Pam

Wolfskill, in doing all the hard work while I got all the credit. I am grateful to my faculty colleagues for their collegiality and support. Whenever I had to call for volunteers, someone always stepped up. Speaking of stepping up, I am very proud of the BCB faculty for their massive efforts to adapt and teach all of our courses remotely the last three semesters. Being chairman has made me realize how important it is for the department to have monies available that are not subject to the whims of the state legislature or NIH budget changes, which is why I started the BCB Endowment for Excellence. Many thanks to all of the donors who have contributed and helped the endowment to grow - I hope that alumni and friends of the Department will continue to support the BCB endowment in the future. Finally, I'd like to thank the students and postdocs in my lab who have had to endure my benign neglect for the last six years. I am looking forward to spending far more time in the lab - I hope they are looking forward to that as well.

*Aaron Neiman, Professor and Chair*



## WELCOME TO OUR NEW FACULTY MEMBER CHI-KUO HU



Chi-Kuo grew up and completed his college education in Taiwan. He received his PhD from Harvard Medical School. He joined Tim Mitchison's lab as a graduate student to study how a perfectly rounded cell breaks symmetry during cell division. With the encouragement to pursue a unique research direction, he joined Anne Brunet's lab at Stanford University as a postdoc working on the African killifish *Nothobranchius furzeri*, a then-not-so-well-known organism in science. Specifically, he is interested in diapause, a suspended embryonic state that preserves life for an extended period of time without physiological tradeoff. Using the short-lived

African killifish that he developed as a research system for vertebrate diapause, he can studies not only the signaling pathways and mechanisms underlying diapause but also translates these mechanistic insights from diapause into adult homeostasis, cancer, and aging. His overarching goal is to establish a new model of dormant biology and how it affects our active phase of life.

In 2021, he is looking forward to his new position as an assistant professor in the Department of Biochemistry and Cell Biology. Dr. Hu feels fortunate to have been mentored by many devoted and caring individuals at various stages of his scientific career. He will especially like to emulate the supportive and individualized approaches from his PhD mentor Tim Mitchison and his postdoc mentor Anne Brunet. Both Tim and Anne recognize the differences between individuals and provide well-balanced freedom and guidance in research to help each member in the lab reach their own personal goals. As Tim's training emphasizes vision and the big picture, and Anne's training focuses on delivery and details, Dr. Hu aspires to find a good balance between the big picture and details, all tailored on a case-by-case basis. The department is excited for him to contribute to both research and teaching, as both are equally important and complement each other.

## MCB & BSB GRADUATE PROGRAM ANNOUNCEMENTS

The Molecular and Cellular Biology (MCB) and Biochemistry and Structural Biology (BSB) programs provide graduate students with training at the forefront of modern biological sciences. Dr. Wali Karzai continues to serve as MCB Director and BSB is led by Dr. Steven Glynn.

Last year, nine students successfully graduated with PhD degrees (MCB: Drs Kung-Chi Chang, Deborah Kim, Arnav Choksi, Jessica Imperato, and Hsiang-Chen Chou; BSB: Drs Iva Chitraker, Ruda Santos, Forrest Bowling and Valerie Khayyo).

The MCB and BSB programs were not spared the impact of the COVID19 pandemic, with delayed arrivals at Stony Brook for several of our incoming students in 2020-21. Our students here on campus dealt magnificently with the challenges that arose from the temporary closure of labs, social distancing restrictions, and both learning and teaching in new online classes. We greatly hope that the Fall 2021 semester will

provide the opportunity for both our students and faculty to meet again in person.

The incoming MCB class contains eight students and the incoming BSB class has four students.

We look forward to meeting these students in the Fall and helping them join our vibrant community of early career scientists.

Sincerely,

*Wali Karzai, MCB Program Director*

*Steven Glynn, BSB Program Director*

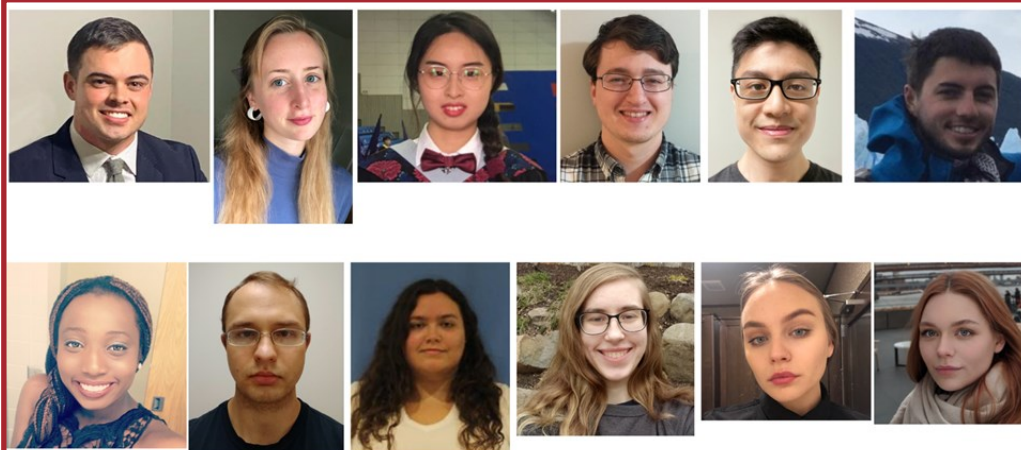
Please visit our websites:

[www.stonybrook.edu/mcb/](http://www.stonybrook.edu/mcb/)

[www.stonybrook.edu/bsb/](http://www.stonybrook.edu/bsb/)

## BIOCHEMISTRY AND CELL BIOLOGY MASTERS PROGRAM

**T**he **Biochemistry and Cell Biology MS graduate program** aims to prepare our graduate students for careers in the life sciences by providing a strong foundation in both theoretical and practical biochemistry and cell biology. As measured by our student career outcomes, we are meeting our goals. We were pleased that a group of our December 2020 BCB MS



graduates decided to continue their studies as PhD students here at Stony Brook. They include Maryam Azmi (Genetics), Rakshika Balasubramaniyam (Molecular and Cellular Biology), Katie Donnelly (Genetics), and Andrew Resnick (Pharmacology). Congratulations are also in order for students in that class who landed great research positions or chose to pursue PhD elsewhere. They include Jitika Rajput (PhD program at Purdue), Pei-Ni Tsai (Research Associate at Dyne Therapeutics, Boston, MA ), Xiang-Ying Wu (Research Associate at BioTimes Irvine, CA), Rakshi Balasubramaniyam (Research Technician at Aldatu

Biosciences, Boston, MA) and Andrew Hillowe (Research Technician in the Kaczocha lab at Stony Brook).

This year's 2020-2021 class of 12 students (shown in the picture above) deserve an especially enthusiastic congratulations for having stuck it out during the year of COVID, excelling in both their academic studies and research activities.

Sincerely,

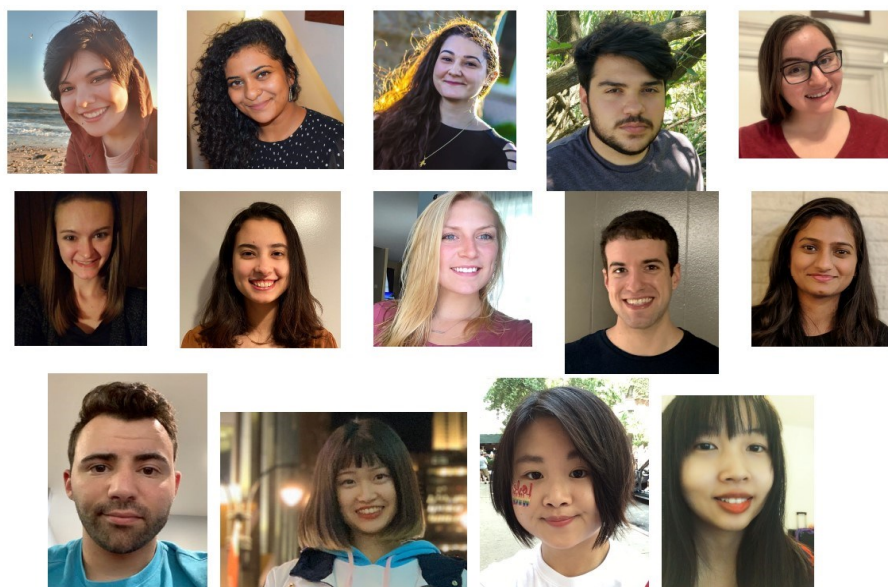
*Neta Dean, BCB MS Program Director*

**The Fall 2020 Incoming Class (shown above) contains 12 students .**

Top row from left: Joseph Bennett, Anna Fratta, Jia Lu, Alex Kozikowski, David Kwun, Horia Popa.

Bottom row: Eghosa Okungbowa, Yuri Stanishevskiy, Natalia Swieki, Lauren Todd, Diana Vitkovska, and Teresa Vitkovska.

For details of our program see <https://www.stonybrook.edu/commcms/biochem/education/graduate/biochemistry-and-cell-biology-ms>



**The December 2020 Graduating Class (shown left) contains 16 students** From left to right **Row 1** -Maryam Azmi, Rakshika Balasubramaniyam, Kalliopi Chatzis, Michael Ciccone, Noelle Derosé. **Row 2**- Katie Donnelly, Mariam Elhawary, Cassidy Hallum, Andrew Hillowe, Jitika Rajpot. **Row 3** - Andrew Resnick, Pei-ni Tsai, Xiang Ying Wu, Yang Wu. Not shown are Karen Calabrese, Ramya Bondalapati.

## THE INSTITUTE FOR STEM EDUCATION (I-STEM)

### *The Institute for STEM Education*

**(I-STEM)**, which is housed in the Biochemistry Department, was founded in 2007, and has grown to become a national leader in STEM education research, teacher education, and community outreach and is directed by Biochemistry and Cell Biology faculty member Keith Sheppard.

***I-STEM has made notable contributions to STEM teaching, research, and policy at the University including:***

- Generating more than \$33.6M in external grant funding, including \$6.6M in current grant funding.
- Assisting with the educational plans of 13 recent and current NSF Early CAREER awards across various departments at the University.
- Creating a PhD Program in Science Education in 2010, which has now graduated 24 students and currently enrolls 18 students. Students in the program have published 24 peer reviewed journal articles in the last two academic years and made more than 30 national conference

presentations.

- Faculty are active in state and national STEM educational policy activities, serving on editorial boards, writing policy statements, serving on advisory panels and meeting with key state leadership staff.

***I-STEM is a major provider of high-quality STEM Teacher Education:***

- Offers a full complement of BS and MAT programs in all STEM education fields and is one of the major producers of STEM teachers in the state.
- I-STEM is the regional hub for the New York State Science and Mathematics Master Teacher program with more than 90 appointed master teachers.
- I-STEM has been awarded a National American Physical Society 5+ Award for five of the last six years for its high production of Physics Teachers.

***I-STEM is a leading provider of high-quality STEM outreach and student support:***

- I-STEM has awarded \$6.5M in fellowships and scholarships to postdoctoral, graduate, undergraduate,

and high school students who have been actively involved in research or teaching in STEM disciplines

- Before COVID, more than 5,000 students annually attended our Teaching Labs, with 85% of all Long Island school districts participating. As we recover from the pandemic we are anticipating returning to full scale operations starting in January 2022. These Labs are offered in biology, geoscience, chemistry, sustainable chemistry and physics. We are also anticipating returning to full-scale operations for our summer camps in Summer 2022 .

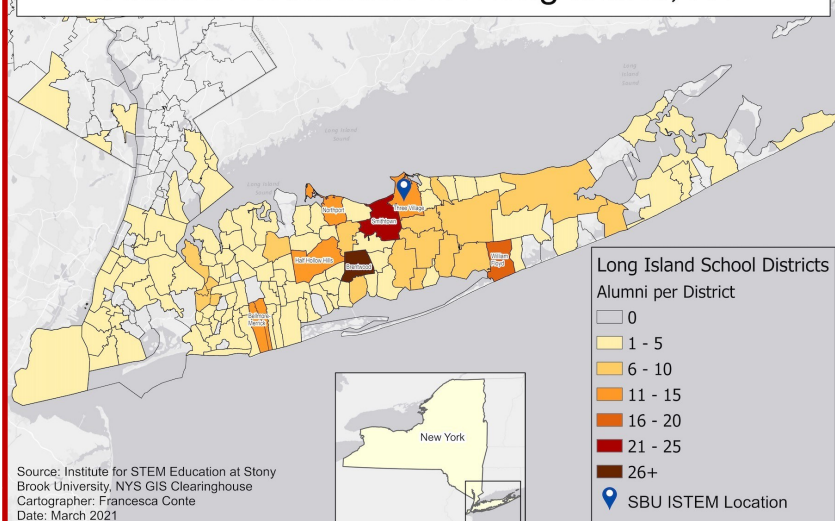
- I-STEM has established research and professional development partnerships with the wider scientific community at Cold Spring Harbor Laboratories, Brookhaven National Laboratories, STEM Hub, American Museum of Natural History, New York Botanical Garden, as well as NYS schools and community colleges.

*Dr. Keith Sheppard*

*Director, Institute for STEM Education*

*Associate Professor, Biochemistry and Cell Biology*

### Stony Brook University's Science Teacher Alumni Distribution on Long Island, NY



Alumni map (*left*) for Science Teachers produced at Stony Brook since 2000.

## UNDERGRADUATE AWARDS FOR BCB MAJORS CLASS OF 2021

### 2021 Ward Melville Valedictorian

Nita Wong

### Biochemistry majors graduating with distinction

14 students Summa Cum Laude

18 students Magna Cum Laude

21 students Cum Laude

### Phi Beta Biochemistry major graduates

Jeri Ann Ramilo, Shreya Seepersaud, Rohan Shah, Sydney Sirota, Neha Somineni

### University Provost's Award for Biochemistry major graduates

Jose Guerra, Jordan Roiland, Sydney Sirota, Nita Wong

### Biochemistry major graduates completing honors thesis

Navid Ashrafi (Advisor: Dr. Luberto): Regulation of human Sphingomyelin Synthase 1 translation through its 5' untranslated region

Lexin Chen (Advisor: Dr. Hsiao): Ionic liquid surfactant assisted interfacial polymerization for high flux composite reverse osmosis membranes

Jose Guerra (Advisor: Dr. Simmerling): Molecular Dynamics Simulations of Mismatched Base pairs in the active site of RB69 DNA Polymerase

Ananya Lyengar (Advisor Dr. Hearing): Regulation of Zinc Finger Protein-451 and Interaction with Adenovirus Protein E4-ORF3

Jordan Roiland (Advisor Dr. Ojima): Drug Discovery in the Endocannabinoid System: Truxillic Acids as FABP5-Selective Inhibitor

Sydney Sirota (Advisor Dr. Matus): Examining the role of cell cycle in cell fate decisions in *Caenorhabditis elegans*

Rohan Shah (Advisor Dr. Kaczocha): FABP5 Inhibition in Treating Osteoarthritis Pain

### 2020-2021 non-majors completing honors thesis in Biochemistry & Cell Biology Department labs

Adanna Ibeku (Advisor Dr. Pisconti): Immune Rejection Mechanisms involved in Gene Therapy for Duchenne Muscular Dystrophy

Angela Musco (Advisor Dr. Wullmuth): Using calcium dynamics to assess the clinical outcome of NMDA receptor mutations



Congratulations to Neha Somineni (left) and Sydney Sirota (right) on their Stony Brook University graduation (with honors!) and all their hard work in the Matus lab! Expect to see great things from both of these amazing women in STEM!

### Biochemistry majors on the 2021 iGEM (internationally Genetic Engineered Machines) team

Nighi Huynh & Annie Lin

### Biochemistry major summer research awards

Gaurav Sharma (Advisor Dr. Boon): Kenneth Nicholas Award (Chemistry)

William Khayyo (Advisor Dr. Wollmuth): URECA Biology Alumni Research Award

Merin Davis (Advisor Dr. Piret): URECA Biology Alumni Research Award

Ian Winkeler (Advisor Dr. Seeliger): URECA Biology Alumni Research Award

Fabliha Fairuz (Advisor Dr. Piret): URECA

Siobhan Cohen (Advisor Dr. Biegon): URECA

### Undergraduate summer research awards for non-majors working with Biochemistry & Cell Biology Department Faculty

Daniel Wong Gutierrez (Dr. Airola): BIO Explorations in STEM (Wortzman)

Samuel Escobar (Dr. Martin): Chhabra Awardee

Joelle El Hamouche (Dr. Gergen): URECA Biology Alumni Research Award

Michael Fung (Dr. Gergen): URECA

Morgan Fish (Dr. Gergen): URECA

Anya Fang (Dr. Matus): URECA

## FACULTY UPDATES



### **MICHAEL AIROLA (above center)**

The Airola lab continues to study the structure, function, and inhibition of lipid modifying enzymes. Although it was a tough year, there were several exciting developments. First and foremost, Dr. Valerie Khayyo and Dr. Forrest Bowling both successfully defended their PhD. Valerie and Forrest were part of the Biochemistry and Structural Biology program and helped setup the Airola lab four years ago. They will be sorely missed both scientifically and personally. We also celebrated the graduation of Noelle Derosé and Mariam Elhawary who both obtained their master's degrees in Biochemistry and Cell Biology; as well as two undergraduate researchers, Nimi Patel and Tahrira Huq. The lab welcomed several new members, including PhD graduate students Douglas Marr and Franceine Welcome, master's student Tereza Vitkovska, and an undergraduate student Daniel Wong-Gutierrez. Other members of the group include senior scientist Dr. Shujuan Gao, and PhD graduate students Yong-Mi Choi, Lingshuang Wu, and Taylor Rahn. We are thrilled to report the publication of several exciting manuscripts including the first two manuscripts from the Airola lab. One manuscript was published in *Nature Chemical Biology* with Forrest as the first author. This paper reported the first structure of human phospholipase D and provided insight into how this signal transduction enzyme is activated by lipids and protein effectors. Valerie published the first structure of a lipin phosphatidic acid phosphatase, which is

a key enzyme in regulating fat storage as triglycerides. Her paper was published in *Nature Communications* and selected as an F1000 prime paper. In other news, Mike co-started a virtual lipid webinar series to give students/postdocs the opportunity to present their work during the covid-19 shutdown. Valerie and Forrest kicked off the series and started a hugely successful series that is now sponsored by the American Society of Biochemistry and Molecular Biology and continues to attract ~300 scientists each session. Despite the shutdown, Mike was able to present the Airola lab research through virtual talks at UNC Chapel Hill, McGill University, Brookhaven National Lab, the 61<sup>st</sup> International Symposium of Advances in Biological Regulation, and the Webinar on Sphingolipid Biology. Lastly, Mike was awarded a new grant from the Feldstein Medical Foundation to develop new therapeutics against fungal pathogens, which are sorely needed.

### **NURIT BALLAS**

Nurit Ballas continues to investigate the cellular and molecular mechanisms underlying the neurodevelopmental disorder Rett syndrome (funded by NIH). She continues to serve on graduate student committees, as a reviewer on different NIH study sections and as Editorial Board Member for the journal *Scientific Reports* (Nature Publishing Group). Lab members include: Jialin Sun (graduate student), Austin Irwin (Volunteer, pre-Medical School), Christina Rodrigues and Ron Lev (Stony Brook undergraduate).

### **VITALY CITOVSKY**

Vitaly continues to be funded by NIH/NIGMS, NSF, NSF/USDA/NIFA, and BARD. Vitaly continues to serve on Editorial Boards of PLOS ONE, *Scientific Reports* (Nature Publishing Group), *Biochemical and Biophysical Research Communications* (BBRC), F1000 Research, *Frontiers in Plant-Microbe Interactions*, *Frontiers in Plant Physiology*, *Plant Signaling & Behavior*, and *Communicative and Integrative Biology*, and is a member of the Cell Biology section of Faculty 1000 Biology. Vitaly continues to serve on the Departmental Awards Committee, the Administrative Review Committee of the University Senate, the CAS Senior Promotion and Tenure committee (PTC-S), and the CAS Academic Judiciary Committee.

### **LAB MEMBERS**

Undergraduate students: Laith Hana, Jody Huie, John Kaba, Ryan Seecharan, Chao Feng Zhang, Michelle Zhu

Postdocs: Benoit Lacroix, Mi Sa Vo Phan, Phu Tri Tran

## FACULTY UPDATES

### NETA DEAN

Research in the Dean lab continues to study protein glycosylation and its regulation during fungal cell wall synthesis. The Dean lab welcomed a new member, Maia Hoshino (Stony Brook University Biology undergraduate) who joined Yexin Su. We said goodbye to Rakshi Balasubramaniyam (BCB MS graduate student) who graduated and left us (temporarily) to work as a Research technician at Aldatu Biosciences in Boston, Douglass Marr, who began his PhD studies in the MCB program at SBU, and Nidhi Patel, who began her MD career at Rutgers. Rakshi will happily be returning to Stony Brook in 2022 as an MCB PhD student. Congratulations also go out to Yexin Su, who graduated SBU and will be starting his PhD studies in 2021 at the University of Florida.

### DALE DEUTSCH

This year Dale Deutsch was again working on a Toll Professorship that supported him for the [development of a cannabis course](#). He taught such a course (Bio 231) last summer and had about 50 students, mostly undergraduates, but some from other universities. Also there was a sprinkling of graduates (one a bud-tender in a dispensary), and even a high school teacher. He will be teaching it again this summer after which he is officially retired but has stated that he may volunteer again next year as an Emeritus.

### J. PETER GERGEN

Research in the Gergen lab continues to investigate the function of the Runt transcription factor in pattern formation during *Drosophila* embryogenesis. Our in-depth studies on *sloppy-paired-1 (slp1)* as a useful model to understand Runt's context-dependent activities as both a repressor and an activator of transcription continue and have expanded to define the role of the Zn-finger transcription factor Odd-paired in regulating two distinct cis-regulatory enhancers that mediate regulation by Runt and other pair-rule transcription factors. Other efforts have extended our studies on the non-autonomous interactions between the *slp1* enhancers to other targets of Runt, including the *wingless* gene and different members of the family of *Toll* receptors whose metameric expression patterns in the early embryo are regulated by Runt.

John Musumeci concluded a successful gap year during which he continued his research on cis-regulatory elements of the Toll2/18-wheeler locus while working as an adjunct instructor in BIO 365 and BIO 361 and has now departed for medical school at Albany Medical College. Other in-person lab activities

started to recover from the pandemic with undergraduate Sydney Tran joining John and Yasuno Iwasaki in the lab during the fall and with the subsequent return of Aditi Kaveti and addition of Alexander Mairoana in the spring semester. Undergraduate Morgan Fish started in the lab in the summer of 2021 with support from a URECA award to support a fulltime research experience. Alumni on the move - former graduate student Saiyu Hang moved across the country from his postdoctoral position at Harvard Medical School to take a position as a Scientist in the Department of Immunology at Genentech. Former Master's program student Jinelle Wint completed her PhD with Howard Sirotkin in Neurobiology and took a position as the Assistant Dean for Academic Affairs at the Stowers Institute for Medical Research in Kansas City. Also delighted to report that former graduate student Lisa Prazak has been promoted to Associate Professor with tenure in the Biology Department at Farmingdale State College. Dr. Gergen continues to serve as the Director of the Undergraduate Biology Program and is the Principal Investigator and Project Director of an NIH-funded IMSD graduate training program award of over two million dollars to Stony Brook University to broaden participation of under-represented and disadvantaged students in biomedical research careers.

### STEVEN GLYNN

The Glynn lab continues to investigate how mitochondria achieve quality control of their essential protein and lipid components. This work is supported by the NIH and the Barth Syndrome Foundation. The lab welcomed a new BSB graduate student, Mariella Quispe-Carbajal, in April 2021. Mariella will be studying how mitochondrial ATP-dependent proteases recognize specific degradation signals present within proteins to prompt their destruction and regulate cellular activities. Diana Vitkovska, a BCB Masters student, also joined the lab in Spring 2021 and is studying how newly imported mitochondrial membrane proteins are chaperoned across the intermembrane space prior to insertion into the bilayer. In the past year, our research technician, Charlie Horn, left the lab to take a position at Regeneron Pharmaceuticals and Ying Wu graduated with a BCB Master's degree and has joined a biotechnology firm in California.

### YUSUF HANNUN

While remote mentorship was ongoing through the winter and spring, Dr. Hannun's lab has welcomed back in person mentorship this summer for all levels of students. We currently have one recent high school graduate and five

## FACULTY UPDATES

undergraduates in the lab, three of which are from SBU.

In April we congratulated SBU undergraduate Haisam Amin on his receipt of the Sass Foundation-Arena Scholars award. <https://sassfoundation.org/>. This award provides \$4,000 to support his summer research activities. Haisam is working with senior lab member Dr. Evgenii Boriushkin; and will present his URECA project proposal titled “Mechanisms of Glycosphingolipids Regulation by Oncogenic KRAS in Colon Cancer” this August.

That same month we also congratulated recent SBU graduate Erika Nemeth, as one of two recipients of the 2021 SUNY Chancellor’s Award for Student Excellence (CASE). <https://news.stonybrook.edu/homespotlight/two-sbu-students-receive-suny-honors-for-academic-excellence/>. Erika has been in Dr. Hannun’s lab since late 2018, under the mentorship of senior member Dr. Daniel Canals, and will be attending the Icahn School of Medicine at Mount Sinai in the fall.

Graduate student Mohammad Mojtaba Sadeghi, with senior lab member Mohamed Salama, published his review titled “Protein Kinase C as a Therapeutic Target in Non-Small Cell Lung Cancer” <https://www.mdpi.com/1422-0067/22/11/5527/htm>.

Presumptive PhD candidate Samia Mohammed will defend her thesis this month, and has been notified that her paper titled “Sublethal Doxorubicin promotes migration and invasion of breast cancer cells: Role of Src Family non-receptor tyrosine kinases” will be accepted by the journal Breast Cancer Research.

Senior lab member and Assistant Professor of Research, Dr. Daniel Canals, published his work title “The doxorubicin-induced cell motility network is under the control of the ceramide-activated protein phosphatase 1 alpha. <https://faseb.onlinelibrary.wiley.com/doi/full/10.1096/fj.202002427R>

And we are all proud to congratulate Dr. Chris Clarke, who recently was awarded two NCI RO1s and has now fully transitioned to an independent PI position within the lab group.

### BERNADETTE HOLDENER

**Bernadette Holdener**, in collaboration with Dr. Robert Haltiwanger at University of Georgia, is investigating the role of a unique disaccharide modification during embryonic development. In particular the Holdener lab is figuring out why sugar modifications on groups of proteins with Thrombospondin type I repeats (O-linked glucose-fucose disaccharide) and EGF motifs (O-glucose) are important for normal development of the brain, lung, and skeletal system.

Understanding the molecular basis for the developmental defects in the mouse mutants will provide a better understanding of what causes common human birth defects including craniofacial and skeletal abnormalities, hydrocephalus, and bronchopulmonary dysplasia. Bernadette was invited to present the results of these studies at the 2021 American Society of Biochemistry and Molecular Biology Annual Meeting (ASBMB) and presented her findings in the Departments of Biochemistry and Cell Biology and Ophthalmology Grand Rounds at Stony Brook University. Bernadette was promoted to Full Professor and continues to co-teach the core Developmental Biology course for the Biology Major Developmental Genetics Biology track with Dr. Thomsen. She serves as the Director of Undergraduate Biochemistry Majors, is a member of the Biochemistry and Cell Biology Executive and IACUC committees, and Chairs the Stony Brook University Stem Cell Research Oversight committee.

**Holdener Lab Fun News:** Dr. Sanjiv Neupane, postdoctoral fellow in the lab presented studies as the 2020 Annual Glycobiology Society meeting where he received an award for outstanding poster. Andrew Sillato, BS graduated in May 2021 and is joining the Biochemistry and Cell Biology Master’s program at Stony Brook. Dr. Andrew Taibi, former BCB MS student in the lab received his PhD from University of Utah and is a Process Development Scientist at Recursion Pharmaceuticals. His job will be to scale up cultures for high volume screening and validation of drugs for groups of rare diseases. In May, Dr. Charles DeRossi, former Hofstra University MS thesis student and research technician in the lab, was appointed as Assistant Professor in Mt. Sinai’s Department of Pediatrics. Dr. Janet Lighthouse, former graduate student in the lab, and Assistant Professor of Pharmaceutical Sciences in Wegman’s School of Pharmacy at St. John Fisher College received an internal grant from St. John Fisher College to explore how FDA approved SGLT2 inhibitors impact fibroblast activation.

### NANCY HOLLINGSWORTH

Nancy gave a seminar to the Biochemistry and Cell Biology Department at Stony Brook in April and was a member of the SUNY-wide Advisory Council on Distinguished Teaching Professorships. Nancy was selected as a fellow of the American Association for the Advancement of Science (AAAS). She received an NIH MIRA five-year grant that started April 1. Nancy’s lab currently consists of a former BCB Master’s student, Bob Gaglione, who is working as a Research Tech, Andrew Ziesel, a senior graduate student in the Genetics program, Lihong Wan, a Senior Research Scientist and Jason



## FACULTY UPDATES

Weng, a rising senior. In addition, Nancy continues to collaborate with Tracy Callender, a former graduate student and IRACDA postdoc in the Hollingsworth lab, who is now an Assistant Professor with her own lab at SUNY Farmingdale.

### WALI KARZAI

**Wali Karzai** continues to serve as the Director of the Molecular and cellular Biology (MCB) graduate program. He was elected as the Director of the Center for Infectious Diseases (CID). As the CID director, he oversees the daily operations of the center and coordinates the activities of the BSL2 and BSL3 facilities, which provide support for researchers working with infectious diseases, bacterial and viral pathogens, across campus. Dr. Karzai serve as course director for BIO 362 (Biochemistry II), MCB 603 and 604, GRD 500, and course codirector for MCB 503 (Molecular Genetics).

The Karzai lab continues its investigations of quality control mechanisms in protein synthesis and directed proteolysis by AAA+ enzymes. We have focused our recent efforts on understanding the mechanistic details and biological functions of two highly conserved AAA+ enzymes, Lon and ClpXP. Our efforts on the biochemical and structural analysis of the ATP-fueled Lon nanomachine yielded unprecedented insight into how this key protease engages substrates and harnesses the energy of the ATP binding and hydrolysis to unfold and degrade its protein substrates. Our studies of the mechanism by which the AAA+ ClpXP protease is targeted to tmRNA rescued ribosomes have yielded unique insights into how adaptor proteins guide AAA+ enzyme to specific subcellular locations. The results of this fascinating study (Adaptor-Guided Recruitment of the AAA+ Protease ClpXP to tmRNA-Rescued Ribosomes), with broader implications for the targeting of other AAA+ enzymes, have been submitted for publication and are currently under review.

**Karzai Lab members:** Graduate students: Dr. Thiago Rodrigues, Dr. Junjei Feng, Arnav Choksi; Undergraduate student: Felopater Shenouda.

### ERWIN LONDON

Erwin continues to be Principal Investigator on an NIH MIRA award “Transformative Lipid Exchange Approaches to Study Membrane Organization” and just completed an NSF grant “Cyclodextrin-Catalyzed Exchange to Control Lipid Composition and Lipid Asymmetry: From Liposomes to Cells.” The lab was also awarded a supplement on the MIRA award to purchase a microscope with FLIM (fluorescence lifetime imaging) capabilities. Erwin also continues to serve as a

member of the Postdoctoral Fellowship Award Committee for the Life Sciences Research Foundation and just completed his last year as a regular Member of the N.I.H. Biochemistry and Biophysics of Membranes Study Section (term 2017-2021). Lab members in mid-2021 included research assistant professor Guangtao Li, postdoctoral research associate, Shinako Kakuda, and PhD students Pavana Suresh, and Bingchen Li.

### ED LUK

**Ed Luk** and members of his group are back in the lab doing experiments after months of disruptions caused by the SARS-CoV2 pandemic. The Luk lab continues to receive funding from the NIH on an R01 research grant. Current team members include **Leonidas (Louie) Pierrakeas**, **Cynthia Converso**, **Scott Yang**, **Alex Rhee**, and **Avalon Perry**. Louie, a former MSc student of the BCB program, has been accepted into the MCB PhD program and is now doing his dissertation work in Ed’s lab. He is studying alternative histone packaging arrangements that are important for genome regulation. Cindy and Scott enter year 3 of their pre-doctoral training in the MCB program. Cindy recently developed a new biochemical approach and found that the activity of a chromatin remodeling enzyme is modulated by specific DNA sequences on the nucleosomal substrate. Scott discovered that a component of the transcription machinery plays a key role in remodeling chromatin structures around promoters. Alex is a technician in the lab. He has been developing a technology that uses yeast to identify recombinant antibody against protein targets. Avalon is a junior at Stony Brook. She recently joined Ed’s lab and is a biochemist in training.

### BENJAMIN MARTIN

The Martin Lab performs research to address questions related to cancer metastasis and stem cell biology. The cancer metastasis work focuses on a critical part of the metastatic cascade called extravasation, which is when circulating tumor cells exit blood vessels in new parts of the body. The stem cell work seeks to understand the normal biology of cells called neuromesodermal progenitors, which give rise to the spinal cord and skeletal muscle of vertebrate animals (including humans), and to use neuromesodermal progenitors to model other stem cell related questions. Both general lines of research use zebrafish as a model system.

The lab said goodbye to two talented technicians this year. Maria Jose (Majo) Gachay-Garay left to begin a PhD program at MD Anderson Cancer Center, and longtime tech Neal Bhattacharji started a position with a new zebrafish group at Regeneron Pharmaceuticals. The lab will soon say goodbye to

## FACULTY UPDATES

postdoctoral fellow Becca Adikes (co-mentored with Dave Matus) and PhD student Arwa Al Anber. Becca will be leaving this summer to start a tenure track assistant professor position in the Biology Department at Siena College. Arwa will defend her dissertation in August and then return to her home country of Jordan to begin a university position. The lab welcomed new postdoctoral fellow David Gray, who received his PhD from UCLA and came to Stony Brook as part of the IRACDA program. Undergraduate Sam Escobar was awarded a URECA summer research fellowship to continue his work investigating cell fate decisions in the zebrafish tailbud. PhD student Courtney Tello received a NIH diversity supplement award to support her work in the lab.

***Pictured:** Martin and Matus labs gathered at West Meadow Beach for a going away party for Majo Gacha-Garay.*

### DAVID MATUS

Like everyone else, the beginning of 2021 was filled with anxiety and stress, as we all collectively navigated coming out of a global pandemic. With increased access to Covid-19 vaccines for everyone in the lab this spring, it helped alleviate stress and return some semblance of normalcy to our lab environment. This past spring was also a transition period for the lab, as we said goodbye to several long-standing lab members. Our amazing undergrads, Neha Somnani and Sydney Sirota, mentored by Taylor Medwig-Kinney, a Genetics PhD student in the lab, both graduated with honors this past May. Sydney was featured recently as a URECA (Undergraduate Research & Creative Activities) researcher of the month for her thesis work, which was also received accolades as a poster presentation award at the Developmental Biology New York conference for undergraduates this past November. Genetics program PhD student, Jayson Smith, successfully defended his dissertation describing the role for the highly conserved SWI/SNF chromatin modifying complex in regulating cell invasion and is



starting a postdoc at the University of Chicago later this summer in Dr. Paschalis Kratsios' lab studying neuronal development in *C. elegans*. Finally, Dr. Rebecca Adikes, an NIH-funded postdoctoral fellow in the lab, accepted a faculty position, and will be leaving us in July to start her tenure track position at Siena College in upstate New York, where her new lab will use zebrafish and *C. elegans* to understand how the cytoskeleton is regulated during cell migration in animal development. Michael Martinez, an MD/PhD student in the lab through the Molecular and Cellular Pharmacology PhD program, received a prestigious NIH F30 award which will support Michael's dissertation work and provide funding for the remainder of his MD. Despite the many obstacles in all our way, the end of 2020 and the beginning of 2021 have been productive in lab – as we have published several papers and preprints highlighting research from our lab and collaborations with other labs locally and nationally. We look forward to a fun

and productive summer and Fall 2021!

### AARON NEIMAN

Current members of the Neiman lab are Jae-Sook Park (Research Scientist), Leo Bemena (postdoctoral fellow), Greisly Nunez (Ph.D. student), Kai

Zhang (Ph.D. student), Ken Sweeney (technician), Katie Donnelly (technician), and Rolf Sternglanz (Professor Emeritus) continues to perform experiments and consult on all things yeast. The Neiman lab recently celebrated a return to in-person group meetings after a long 15 months on Zoom. In December, Katie Donnelly finished her Masters thesis and since January has continued to pursue her project working in the lab part-time. Katie will be joining the PhD program in Genetics at Stony Brook this fall. Leo Bemena (postdoctoral fellow) had a paper published in *mSphere* this spring. Leo will be starting in a new position with Charles River Laboratories in Montreal at the end of the summer. Last year, Jae-Sook Park (research scientist) won the Glenn Irvine Prize from the Advocacy for Neuroacanthocytosis Patients. Part of the prize is an opportunity to speak at the International Neuroacanthocytosis meeting. After a year's delay because of Covid, Jae-Sook finally

## FACULTY UPDATES

got to give her talk this March. Aaron also spoke at that meeting as well as at “Sporulation by Zoom” a national, monthly meeting of labs interested in sporulation.

### DADA PISCONTI

The past year has been difficult for everyone in the world, our lab was no exception. Some of us have experienced tragic losses, others have experienced extreme pain which has come to them in various ways. Somehow, we have managed to hang on and even get papers published, grant proposals submitted, and lots of experiments accomplished. Dada received her Green Card, which meant her tenure is now fully confirmed. Two former undergrads graduated: Adanna Ibeku and Patrick Folan, both with honors. Adanna is going to carry out a prestigious post-bac at NIH while Patrick has remained with us and will be completing his research project before moving on to graduate school.

### STEVEN SMITH

**Steven Smith** continues as the director of the Center for Structural Biology. The facilities for cryo-EM and NMR spectroscopy in the CSB support research in structural biology across campus. The past year has been a challenge as the facility manager for cryo-EM took a position at Brookhaven National Labs, and the faculty member in the department focusing on cryo-EM has relocated to India. In the lab, we still have two major research projects. The first is on G protein-coupled receptors. Andreyah Pope, a former BSB graduate student who has been working on the visual receptor rhodopsin is now a postdoctoral scientist, but will move on in her career in July. The rhodopsin work has been taken over by Lauren Todd, a master’s student in Biochemistry and Cell Biology. Lauren is working on the mechanism of congenital stationary night blindness. Bianca Chandler is working on the  $\beta_2$ -adrenergic receptor, a ligand-activated GPCR. Bianca has just completed her B.S. degree in Biology, but will stay in the lab until the end of the year. The second research focus is on Alzheimer’s disease (AD). Brandon Irizarry, a BSB graduate student, is focusing on the structure of amyloid deposits on brain blood vessels, which is the hallmark of a separate disease called cerebral amyloid angiopathy (CAA). Elliot Crooks has taken on the task of determining amyloid fibril structures by cryo-EM.

**GERALD THOMSEN** (Pictured: *Thomsen lab tadpoles*)

**Jerry Thomsen’s** lab is pursuing how cell-cell interactions, signaling pathways, and gene regulatory circuits regulate cell fate



decisions and pattern formation during animal development and regeneration. We use the African Clawed Frog, *Xenopus laevis*, the Tropical Clawed Frog, *Xenopus tropicalis*, and the sea anemone *Nematostella vectensis* as model organisms to probe the mechanisms and evolution of developmental and regenerative processes.

Lab focus over the past pandemic year has been on using genetics in *Xenopus tropicalis* to continue evaluating the functions of developmental regulators that we have uncovered with past efforts. These include a GTPase named *Gtpbp2* that we have shown functions in BMP and Wnt signaling (Kirmizitas et al., 2014; 2016), two mRNA splicing factors, *wbp11* and *pqbp1* that we have shown regulate FGF signaling (Iwasaki & Thomsen 2014) and a maternal growth factor *Vg1*, that induces mesoderm in vertebrates. Thomsen lab alumnus Marko Horb and his lab at the National Xenopus Resource (MBL, Woods Hole) have been helping to generate and evaluate *X. tropicalis* mutants in these genes. Phenotypic and molecular characterization of mutant embryos and surviving tadpoles and frogs are underway, albeit slowly given the many constraints imposed by the pandemic. Nevertheless, the initial results are very promising.

## FACULTY UPDATES

The regeneration projects are investigating the signaling mechanisms that allow a *Nematostella* polyp to regenerate its whole body. Present focus is on deciphering the roles of cell signaling pathways, particularly Wnt and others that specify the “head” of the polyp – the part with the mouth and tentacles. We have also discovered that autophagy is required for head formation and have been examining more details about the actions of this autophagy in polyp regeneration (e.g. Bossert & Thomsen 2017, JoVE). *Xenopus* tadpoles have joined the regeneration studies to ask whether mechanisms operating in sea anemone regeneration also function in tadpole tail and limb regeneration. Since cnidarians and vertebrates last shared a common ancestor about 550 million years ago, our studies will help inform whether regenerative mechanisms are unique or have been conserved over evolution.

Researchers in the lab over the past year included Dr. Patricia Bossert (Scientist) and SBU undergraduates Serena Lee (a 2019 Regeneration Science Talent semi-finalist) and Kevin Fung. Jerry has also been active in the lab as much as possible. Jerry presently teaches in BIO 325, Animal Development (with Bernadette Holdener), BIO 327 Developmental Genetics (with Dave Matus), and MCB 657 (Graduate Developmental Biology) with various faculty.

### LONNIE WOLLMUTH

Synapses are specialized structures that control the flow of information between neurons in the brain. Alterations in synaptic transmission contribute to neurological and psychiatric

diseases, such as epilepsy, autism, and schizophrenia. Research in the Wollmuth group addresses biophysical and molecular mechanisms underlying fast synaptic transmission in the brain, focusing predominantly on those synapses that use glutamate as a neurotransmitter. Much of our work is done in collaboration with Dr. Helen Hsieh, a pediatric surgeon at SBU Medicine. Details of our research program and activities can be found at our webpage ([www.wollmuthhsieh.com](http://www.wollmuthhsieh.com)).

Despite the pandemic, our group had a busy and successful year. We identified ways to continue to move science forward while also social distancing/working remotely. Zoom of course helped but lab members worked hard to follow guidelines and protocols so that we could safely carry out research in the lab. All did an outstanding job!

Students presented posters at virtual conferences such as the Society for Neuroscience (Gabriella Moody, Noele Certain) and the zebrafish meeting (Josiah Zoodsma). Noele Certain was awarded a Turner Dissertation Fellowship and notably a F99/K00 award (a diversity fellowship for Predoctoral to Postdoctoral Advancement in Neuroscience). William Khayyo, an undergraduate, was awarded a URECA 2021 Summer fellowship.

After a successful stint in the lab, including multiple first author papers, Gabriella Moody graduated in the Spring of 2021 and is off to work in industry! Jay Gupta is a new MD/PhD student in the lab.

### THANKYOU NOTE TO OUTGOING DEPARTMENT CHAIR

Dear Aaron,

On behalf of everyone in the Department of Biochemistry and Cell Biology, I would like to say thank you for your six years of outstanding leadership as Chairman.

Your unfailing support for faculty, researchers, students and staff has meant everything to us. You have tirelessly given your time and resources to improve the department. You have brought kindness, empathy and understanding to every encounter. We have always appreciated your solutions to the inevitable dilemmas, and your great sense of humor.

Thank you for being such an excellent and wise academic leader.

Sincerely,

Carol Juliano, Assistant to the Chair

Department of Biochemistry and Cell Biology

## PUBLICATIONS 2020—2021

- MICHAEL AIROLA** - Lahrouchi N, Postma AV, Salazar CM, De Laughter DM, Tjong F, Piherová L, Bowling FZ, Zimmerman D, Lodder EM, Ta-Shma A, Perles Z, Beekman L, Ilgun A, Gunst Q, Hababa M, Škorić-Milosavljević D, Stránecký V, Tomek V, de Knijff P, de Leeuw R, Robinson JY, Burn SC, Mustafa H, Ambrose M, Moss T, Jacober J, Niyazov DM, Wolf B, Kim KH, Cherny S, Rousounides A, Aristidou-Kallika A, Tanteles G, Ange-Line B, Denommé-Pichon AS, Francannet C, Ortiz D, Haak MC, Ten Harkel AD, Manten GT, Dutman AC, Bouman K, Magliozzi M, Radio FC, Santen GW, Herkert JC, Brown HA, Elpeleg O, van den Hoff MJ, Mulder B, **Airola MV**, Kmoch S, Barnett JV, Clur SA, Frohman MA, Bezzina CR. (2021) Biallelic loss-of-function variants in PLD1 cause congenital right-sided cardiac valve defects and neonatal cardiomyopathy. *J Clin Invest* Mar 1;131(5):e142148
- Bowling FZ, Frohman MA, **Airola MV**. Structure and regulation of human phospholipase D. (2021) *Adv Biol Regul.* Jan;79:100783
- Otsuka Y, **Airola MV**, Choi YM, Coant N, Snider J, Cariello C, Saied EM, Arenz C, Bannister T, Rahaim R Jr, Hannun YA, Shumate J, Scampavia L, Haley JD, Spicer TP. Identification of Small-Molecule Inhibitors of Neutral Ceramidase (nCDase) via Target-Based High-Throughput Screening. (2021) *SLAS Discov.* Jan;26(1):113-121
- Bowling FZ, Salazar CM, Bell JA, Huq TS, Frohman MA, **Airola MV**. Crystal structure of human PLD1 provides insight into activation by PI(4,5)P2 and RhoA. (2020) *Nat Chem Biol.* Apr;16(4):400-407
- Khayyo VI, Hoffmann RM, Wang H, Bell JA, Burke JE, Reue K, **Airola MV**. Crystal structure of a lipin/Pah phosphatidic acid phosphatase. (2020) *Nat Commun.* Mar 11;11(1):1309
- VITALY CITOVSKY**— Lacroix, B. & **Citovsky, V.** (2020) Biolistic approach for transient gene expression studies in plants. *Methods Mol. Biol.* 2124, 125-139.
- Keren, I., Lacroix, B., Kohrman, A., & **Citovsky, V.** (2020) Histone deubiquitinase OTU1 epigenetically regulates DA1 and DA2, which control Arabidopsis seed and organ size. *iScience* 23, 100948.
- Hu, Y., Lacroix, B., & **Citovsky, V.** (2021) Modulation of plant DNA damage response gene expression during Agrobacterium infection. *Biochem. Biophys. Res. Comm.* 554, 7-12.
- Tran, P.T., Zhang, C.F., & **Citovsky, V.** (2021) Rapid generation of inoculum of a plant RNA virus using overlap PCR. *Virology* 553, 46-50.
- Tran, P.T. & **Citovsky, V.** (2021) Receptor-like kinase BAM1 facilitates early movement of the Tobacco mosaic virus. *Commun. Biol.* 4, 511.
- STEVEN GLYNN**— Li S, Wu Z, Tantray I, Li Y, Chen S, Dong J, **Glynn S**, Vogel H, Snyder M, Lu B. (2020). Quality-control mechanisms targeting translationally stalled and C-terminally extended poly(GR) associated with ALS/FTD. *Proc Natl Acad Sci USA*, 117, 25104-25115.
- YUSUF HANNUN** —Li, F., Xu, R., Lin, C-L., Ji, P., Huang, L., **Hannun, Y. A.**, Obeid, L. M., Chen, Y., and Mao, C. (2020) Maternal and fetal alkaline ceramidase 2 is required for placental vascular integrity in mice. *FASEB J.* 34:15252-15268. PMID: [PMC5956249](https://pubmed.ncbi.nlm.nih.gov/32556249/)
- Al-Rashed, F., Ahmad, Z., Thomas, R., Melhem, M., Snider, A. J., Obeid, L. M., Al-Mulla, F., **Hannun, Y. A.**, and Ahmad, R. (2020) Neutral sphingomyelinase 2 regulates inflammatory responses in monocytes/macrophages induced by TNF- $\alpha$ . *Scientific Reports* in press. PMID: [PMC7544688](https://pubmed.ncbi.nlm.nih.gov/32544688/)
- Thayyullathil, F., Cheratta, A., Alakkal, A., Karthikeyan Subburayan, K., Pallichankandy, S., **Hannun, Y. A.**, and Galadari, S. (2021) Acid sphingomyelinase-dependent autophagic degradation of GPX4 is critical for the execution of ferroptosis. *Cell Death and Disease* (in press) PMID: [PMC7791123](https://pubmed.ncbi.nlm.nih.gov/327791123/)
- Bonica, J. Mao, C., Obeid, L. M., and **Hannun, Y. A.** (2020) Transcriptional Regulation of Sphingosine Kinase 1. Chapter in: *Sphingolipids: From Pathology to Therapeutic Perspectives - A Themed Honorary Issue to Prof. Lina Obeid.* *Cells* 9: 2437 pp 197-208 PMID: [PMC7695205](https://pubmed.ncbi.nlm.nih.gov/327695205/)
- Trayssac, Clarke, C. J., M., Stith, J.L., Snider, J.M., Newen, N., Gault, C.R., **Hannun, Y. A.**, and Obeid, L. M. (2021) Targeting sphingosine kinase 1 (SK1) enhances oncogene-induced senescence through ceramide synthase 2 (CerS2)-mediated generation of very-long-chain ceramides. *Cell Death and Disease* 12: 27. PMID: [PMC7790826](https://pubmed.ncbi.nlm.nih.gov/327790826/)
- Zhang, X., Sakamoto, W., Canals, D., Ishibashi, M., Matsuda, M., Nishida, K., Toyoshima, M., Shigeta, S., Taniguchi, M., Senkal, C. E., Okazaki, T., Yaegashi, N., **Hannun, Y. A.**, Nabe, T., and Kitatani, K. (2021) Ceramide synthase 2-C24:1-ceramide axis limits the metastatic potential of ovarian cancer cells. *FASEB J.* 35:
- Truman, J. P., Ruiz, C. F., Trayssac, M., Mao, C., **Hannun, Y. A.**, and Obeid, L. M. (2020) Sphingosine kinase 1 downregulation is required for adaptation to serine deprivation. *FASEB J.* (in press)

## PUBLICATIONS 2020-2021

- Velazquez, F. N., Hernandez-Corbacho, M., Traysac, M., Stith, J. L., Bonica, J., Jean, B., Pulkoski-Gross, M. J. Carroll, B. L. Salama, M. F., **Hannun, Y. A.**, and Snider, A. J. (2021) Bioactive Sphingolipids: Advancements and Contributions from the Laboratory of Dr. Lina M. Obeid. *Cellular Signalling* 79: 109875
- Bai, A., Bielawski, J., Bielawska, A. and **Hannun, Y. A.** (2020) Synthesis of erythro- B13 enantiomers and stereospecific action of full set of B13-isomers in MCF7 breast carcinoma cells: cellular metabolism and effects on sphingolipids. *Bioorganic & Medicinal Chemistry* 32:116011. PMID: PMC8190827
- Canals, D., Salamone, S., Santacreu, B. J., Aguilar, D., Hernandez-Corbacho, M. J., Ostermeyer-Fay, A. G., Nemeth, E. Haley, J. D., Obeid, L. M., and **Hannun, Y. A.** (2021) The doxorubicin-induced cell motility network is under the control of the ceramide activated protein phosphatase 1 alpha. *FASEB J.* (in press)
- Zhu, H., Klement, J., Lu, C., Redd P. S., Yang, D., Smith, A. D., Poschel, D. B., Zou, J., Liu, D., Wang, P. G., Ostrov, D., Coant, N., **Hannun, Y. A.**, Colby, A. H., Grinstaff, M. W., and Liu, K. (2021) Asah2 represses the p53-Hmox1 axis to protect myeloid-derived suppressive cells from ferroptosis. *The Journal of Immunology* 206: 1395-1404. PMID: PMC7946776
- Xie, S. Z., Kaufmann, K. B., Wang, W., Chan-Seng-Yue, M., Gan, O. I., Laurenti, E., Garcia-Prat, L, Takayanagi, S-i., Ng, S. W. K., Xu, C. J., Zeng, A. G. X., Jin, L., McLeod, J, Wagenblast, E., Mitchell, A., Kennedy, J. A., Liu, Q., Boutzen, H., Kleinau, M., Jargstorf, J., Holmes, G., Zhang, Y., Voisin, V., Bader, G. D., Wang, J., C. Y., **Hannun, Y. A.**, Luberto, C., Schroeder, T., Minden, M. D., and Dick, J. E. (2021) Sphingosine-1-phosphate receptor 3 potentiates inflammatory programs in normal and leukemia stem cells to promote differentiation. *Blood Cancer Discovery* 2:32-53. PMID: [PMC7116590](#)
- Montfort, A., Bertrand, F., Rochotte, J., Gilhodes, J., Filleron, T., Milhès, J., Dufau, C., Imbert. C., Riond, J., Tosolini, M., Clarke, C.J., Dufour, F., Constantinescu, A. A., De Franca Junior, N., Garcia, V., Record, M., Cordelier, P., Brousset, P., Rochaix, P., Silvente-Poirot, S., Therville, N., Andrieu-Abadie, N., Levade, T., **Hannun, Y. A.**, Benoist, H., Meyer, N., Micheau, O., Colacios, C., and Ségui, B. (2021) Neutral sphingomyelinase 2 heightens anti-melanoma immune response and anti -PD-1 therapy efficacy. *Cancer Immunology Research* (in press)
- Rizzo, R., Russo, D., Kurokawa, K., Sahu, P., Lombardi, B., Supino, D., Zhukovsky, M., Vocat, A., Pothukuchi, P., Kunnathully, V., Capolupo, L., Boncompain, G., Vitagliano, C., Zito Marino, F. Aquino, G., Montariello, D., Henklein, P., Mandrich, L, Botti, G., Clausen, H., Mandel, U., Yamaji, T., Hanada, K., Budillon, A., Perez, F., Parashuraman, S., **Hannun, Y. A.**, Nakano, A., Corda, D., D'Angelo, G., and Luini, A. (2021) Golgi maturation-dependent glycoenzyme recycling controls glycosphingolipid biosynthesis and cell growth via GOLPH3. *EMBO J* 40: e107238. PMID: PMC8047446
- Otsuka, Y., Airola, M. V., Choi, Y-M., Coant, N., Snider, J., Cariello, C., Saied, E.M., Arenz, C., Bannister, T., Rhaim, R., **Hannun, Y. A.**, Shumate, J., Scampavia, L., Haley, J. D., and Spicer, T. P. (2021) Identification of Small-Molecule Inhibitors of Neutral Ceramidase (nCDase) Via Target Based High Throughput Screening. *SLAS Discovery* 26: 113-121  
PMCID: [PMC7749003](#)
- Al-Rashed, F., Ahmad, Z., Snider, A. J., Thomas, R., Kochumon, S., Melhelm, M., Sindhu, S., Obeid, L. M., Al-Mulla, F., **Hannun, Y. A.**, and Ahmad, R. (2021) Ceramide Kinase Regulates TNF- $\alpha$ -Induced Immune Responses in Human Monocytic Cells. *Scientific Reports* 11: 8259. PMID: [PMC8050074](#)
- Velazquez, F. N., Zhang, L., Viscardi, V., Trocchia, C, **Hannun, Y. A.**, Obeid, L. M., and Snider, A. J. (2021) Loss of sphingosine kinase 1 increases lung metastases in the MMTV-PyMT mouse model of breast cancer. *PLOS One* 16(5):e025231. PMID: [PMC8158862](#)
- Sadeghi, M, M., Salama, M. F., and **Hannun, Y. A.** (2021) Protein Kinase C as a Therapeutic Target in Non-Small Cell Lung Cancer. *International Journal of Molecular Sciences* Special Issue: Precision Oncology in Non-small Cell Lung Cancer 22: 5527. PMID: [PMC8197251](#)
- Pothukuchi, P., Agliarulo, I., Pirozzi, M., Rizzo, R., Russo, D., Turacchio, G., Nüchel, J., Yang, J-S., Gehin, C. J. C., Capolupo, L., Hernandez-Corbacho, M. J., Biswas, A., Vanacore, G., Dathan, N., Nitta, t., Henklein, P., thattai, M., Inokuhi, J-I., Hsue, V., Plotmann, M., Obeid, L. M., **Hannun, Y. A.**, Luini, A., D'Angelo, G., and Parashuraman, S. (2021) GRASP55 regulates intra-Golgi 1 localization of glycosylation enzymes to control glycosphingolipid biosynthesis. *EMBO J* 40:

## PUBLICATIONS 2020—2021

**BERNADETTE HOLDENER**— Neupane S, Goto J, Berardinelli SJ, Ito A, Haltiwanger RS, **Holdener BC**. (2021) Hydrocephalus in mouse B3glct mutants is likely caused by defects in multiple B3GLCT substrates in ependymal cells and subcommissural organ. *Glycobiology*. 2021 Apr 28;cwab033. doi: 10.1093/glycob/cwab033. Online ahead of print. PMID: 33909046 (**selected for Journal Cover**)

Zhang A, Berardinelli SJ, Leonhard-Melief C, Vasudevan D, Liu TW, Taibi A, Giannone S, Apte SS, **Holdener BC**, Haltiwanger RS. O-Fucosylation of ADAMTSL2 is required for secretion and is impacted by geleophysic dysplasia-causing mutations. *J Biol Chem*. 2020 Nov 13;295(46):15742-15753. doi: 10.1074/jbc.RA120.014557. Epub 2020 Sep 10. PMID: 32913123

**NANCY HOLLINGSWORTH** —Park, J. S., **Hollingsworth, N. M.**, and Neiman, A. M. (2021). Genetic dissection of Vps13 regulation in yeast using disease mutations from human orthologs. *Int. J. Mol Sci.* (in press)

**Hollingsworth, N. M.** (2020) A new role for the synaptonemal complex in the regulation of meiotic recombination. *Genes Dev.* 34:1562-1564. This is an Outlook article about a research paper from the Keeney lab.

**WALI KARZAI** — Shin M, Puchades C, Asmita A, Puri N, Adjei E, Wiseman RL, **Karzai AW**, Lander GC. 2020. Structural basis for distinct operational modes and protease activation in AAA+ protease Lon. *Sci Adv* 6:eaba8404.

Coleman JL, Benach JL, **Karzai AW**. Endogenous and Borrowed Proteolytic Activity in the *Borrelia*. *Microbiol Mol Biol Rev.* 2021 May 19;85(2). doi: 10.1128/MMBR.00217-20.

**ERWIN LONDON**—St. Clair, J.W., Kakuda, S. and **London, E.** (2020) “Induction of ordered lipid raft domain formation by loss of lipid asymmetry” *Biophys. J.* 119, 483-492.

Yano, Y., Hanashima, S., Tsuchikawa, H., Yasuda, T., Slotte, J.P., **London, E.** and Murata, M. (2020) “Sphingomyelins and ent-sphingomyelins form homophilic nanometer-sized subdomains within liquid ordered domains” *Biophys. J.* 119, 539-552.

Li, B., and **London, E.** (2020) “Preparation and Drug Entrapment Properties of Asymmetric Liposomes Containing Cationic and Anionic Lipids” *Langmuir* 36, 12521-12531.

Kakuda, S., Li, B., and **London, E.** (2021) “Preparation and Utility of Asymmetric Lipid Vesicles for Studies of Perfringolysin O-Lipid Interactions” *Methods Enzymol.* 649, 253-276.

Suresh, P., Miller, W.T., and **London, E.** (2021) Phospholipid exchange shows insulin receptor activity is supported by both the propensity to form wide bilayers and ordered domains (rafts) *bioRxiv* 2021.04.27.440802; doi: <https://doi.org/10.1101/2021.04.27.440802>.

Kakuda, S., Li, G., and **London, E.** (2021) “Loss of plasma membrane lipid asymmetry can induce ordered domain (raft) formation” *bioRxiv* 2021.05.03.442484; doi: <https://doi.org/10.1101/2021.05.03.442484>.

Li., M.-H., Raleigh, D.P., and **London, E.** (2021) “Preparation of Asymmetric Vesicles with Trapped CsCl Avoids Osmotic Imbalance, Non-Physiological External Solutions, and Minimizes Leakage” *bioRxiv* 2021.05.03.442494; doi: <https://doi.org/10.1101/2021.05.03.442494>.

Li, M.-H., Manathunga, L. **London, E.**, and Raleigh D.P. (2021) “The Fluorescent Dye 1,6-Diphenyl-1,3,5-Hexatriene Binds to Amyloid Fibrils Formed by Human Amylin and Provides a New Probe of Amylin Amyloid Kinetics” *bioRxiv* 2021.05.10.443442; doi: <https://doi.org/10.1101/2021.05.10.443442>.

**ED LUK** —Ranjan A., Nguyen V.Q., Sheng L., Wisniewski J., Kim J.M., Tang X., Mizuguchi G., Jou V., Nickels T.J., English B.P., Zheng Q., **Luk E.**, Lavis L.D., Lionnet T., Wu C. (2020) Live-cell single particle imaging reveals the role of RNA polymerase II in histone H2A.Z eviction. *eLife*. DOI: 10.7554/eLife.55667.

Huang Y., Sun L., Pierrakeas L., Dai L., Pan L., **Luk E.\***, Zhou Z\*. (2020) Role of a DEF/Y motif in histone H2A-H2B

## PUBLICATIONS 2020-2021

recognition and nucleosome editing. *Proc. Natl. Acad. Sci. U. S. A.* 117(7):3543-3550. PMID: 32001508. \* co-correspondence

Sun L., Pierrakeas L., Li T., **Luk E.** (2020) Thermosensitive nucleosome editing reveals the role of DNA sequence in targeted histone variant deposition. *Cell Reports.* 30(1):257-268. PMID: 31914392.

**BENJAMIN MARTIN**— Paulissen E., Waxman J.S., **Martin B.L.** (2021). Somite morphogenesis is required for axial blood vessel formation. *bioRxiv.* doi: <https://doi.org/10.1101/2021.04.07.438831>

Adikes R.C., Kohrman A.Q., Martinez M.A.Q., Palmisano N.J., Smith J.J., Medwig-Kinney TN, Min M, Sallee M.D., Ahmed OD, Kim N., Liu S., Morabito R., Weeks N., Zhao Q., Zhang W., Feldman J., Barkoulas M., Pani A.M., Spencer S.L., **Martin B.L.**, Matus D.Q. (2020). Visualizing the metazoan proliferation-quiescence decision in vivo. *eLife*, 9:e63265.

Kinney, B.A., Al Anber, A., Row, R.H., Tseng, Y.J., Weidmann, M.D., Knaut, H., **Martin, B.L.** (2020). Sox2 and canonical Wnt signaling interact to activate a developmental checkpoint coordinating morphogenesis with mesodermal fate acquisition. *Cell Rep.* Oct 27;33(4):108311. doi: 10.1016/j.celrep.2020.108311.

**DAVID MATUS** —Adikes, R. C., A. Q. Kohrman, M. A. Q. Martinez, N. J. Palmisano, J. J. Smith, T. N. Medwig-Kinney, M. Min, M. D. Sallee, O. B. Ahmed, N. Kim, S. Liu, R. D. Morabito, N. Weeks, Q. Zhao, W. Zhang, J. L. Feldman, M. Barkoulas, A. M. Pani, S. L. Spencer, B. L. Martin and **D. Q. Matus** (2020). "Visualizing the metazoan proliferation-quiescence decision in vivo." *Elife* 9.

Ashley, G. E., T. Duong, M. T. Levenson, M. A. Q. Martinez, L. C. Johnson, J. D. Hibshman, H. N. Saeger, N. J. Palmisano, R. Doonan, R. Martinez-Mendez, B. R. Davidson, W. Zhang, J. M. Ragle, T. N. Medwig-Kinney, S. S. Sirota, B. Goldstein, **D. Q. Matus**, D. J. Dickinson, D. J. Reiner and J. D. Ward (2021). "An expanded auxin-inducible degron toolkit for *Caenorhabditis elegans*." *Genetics*.

Azmi, M. A., N. J. Palmisano, T. N. Medwig-Kinney, F. E. Moore, R. Rahman, W. Zhang, R. C. Adikes and **D. Q. Matus** (2020). "A laboratory module that explores RNA interference and codon optimization through fluorescence microscopy using *Caenorhabditis elegans*." *bioRxiv*: 2020.2010.2017.344069.

Smith, J. J., Y. Xiao, N. Parsan, M. A. Q. Martinez, F. E. Q. Moore, N. J. Palmisano, A. Q. Kohrman, M. C. Delos Reyes, R. C. Adikes, T. N. Medwig-Kinney, S. Liu, S. Bracht, W. Zhang, K. Wen, P. Kratsios and **D. Q. Matus** (2021). "The SWI/SNF chromatin remodeling assemblies BAF and PBAF differentially regulate cell cycle exit and cellular invasion in vivo." *bioRxiv*: 2021.2003.2001.433447.

**AARON NEIMAN** — Park, J. S., Hollingsworth, N. M., and **Neiman, A. M.** (2021). Genetic dissection of Vps13 regulation in yeast using disease mutations from human orthologs. *Int. J. Mol. Sci.* in press

Bemena, L.D., Min, K., Konopka, J. B., and **Neiman, A. M.** (2021). A Conserved Machinery Underlies the Synthesis of a Chitosan Layer in the *Candida* Chlamydo-spore Cell Wall. *mSphere* 6:e00080-21.

Chrissian, C., Lin, C. P., Camacho, E., Casadevall, A., **Neiman, A. M.\***, and Stark, R. E\*. (2020). Unconventional constituents and shared molecular architecture of the melanized wall of *C. neoformans* and the spore wall of *S. cerevisiae*. *J Fungi* 6:329.

\* co-corresponding authors

Park, J.-S. and **Neiman, A. M.** (2020). XK is a partner for VPS13A: a molecular link between chorea acanthocytosis and McLeod Syndrome. *Mol. Biol. Cell* 31: 2425-2436.

Paulissen, S. M., Hunt, C. A., Seitz, B. C., Slubowski, C. J., Yu, Y., Mucelli, X., Truong, D., Wallis, Z., Nguyen, H.T., Newman-Toledo, S., **Neiman, A.M.**, and Huang, L. S. (2020). A Non-canonical Hippo pathway regulates spindle disassembly and cytokinesis during meiosis in *Saccharomyces cerevisiae*. *GENETICS* 216:447-462.



## PUBLICATIONS 2020-2021

**DADA PISCONTI** — Jones FK, Stefan A, Kay AG, Hyland M, Morgan R, Forsyth NR, **Pisconti A**, Kehoe O. (2020) *Syndecan-3 regulates MSC adhesion, ERK and AKT signalling in vitro and its deletion enhances MSC efficacy in a model of inflammatory arthritis in vivo*. *Sci Rep.* 24;10(1):20487.

Johnson de Sousa Brito FM, Butcher A, **Pisconti A**, Poulet B, Prior A, Charlesworth G, Sperinck C, Scotto di Mase M, Liu K, Bou-Gharios G, van 't Hof JR, Daroszewska A. (2021) *Syndecan-3 enhances anabolic bone formation through WNT signaling*. *FASEB J.* 35(4):e21246.

Jones FK, Kehoe O, Daroszewska A, van 't Hof JR, **Pisconti A**. (2021) *Syndecan-3: a signaling conductor in the musculoskeletal system*. *Proteoglycans in Stem Cells*, 153:185. DOI: 10.1007/978-3-030-73453-4

Jones FK, Phillips A, Jones AR, **Pisconti A**. (2021) *SDC3 acts as a timekeeper of myogenic differentiation by regulating the insulin/AKT/mTOR axis in muscle stem cell progeny*. *bioRxiv* 2020.08.10.244152

**KEITH SHEPPARD** — Bartoli, M & **Sheppard, K.** (2021) The Origin of the 1200 Minute Laboratory Requirement. *STANYS Teacher Bulletin.* 84(2), 1-12.

Polizzi, S. J., Zhu, Y., Reid, J., Ofem, B., Salisbury, S., Beeth, M., Roehrig, G., Mohr-Schroeder, M., **Sheppard, K.**, & Rushton, G. T. (2021). Science and mathematics teacher communities of practice: Social influences on discipline-based identity and self-efficacy beliefs. *International Journal of STEM Education* 8(1), 1-18.

Ofem, B., Polizzi, S.J., Rushton, G. T., Beeth, M., Couch, B., Doering, J., Konz, R., Mohr-Schroeder, M., Roehrig, G., **Sheppard, K.** (2020). Looking at our STEM Teacher Workforce: How to Model Self-efficacy *Economic Development Quarterly.* 35 (1), 40-52.

### STEVEN SMITH—

Perrin F, Papadopoulos N, Suelves N, Opsomer R, Vadukul DM, Vrancx C, **Smith SO**, Vertommen D, Kienlen-Campard P, and Constantinescu SN. (2020) Dimeric transmembrane orientations of APP/C99 regulate  $\gamma$ -Secretase processing line impacting signaling and oligomerization. *iScience.* 23(12):101887. PMID: 33367225

Pope, A.L, Sanchez-Reyes, O., South, K., Zaitseva, E, Ziliox, M., Vogel, R., Reeves, P.J. and **Smith, S.O.** (2020) A conserved proline hinge mediates helix dynamics and activation of rhodopsin. *Structure* 28:1004-1013.

Fu, Z., Van Nostrand, W.E., and **Smith, S.O.** (2021) Anti-parallel  $\beta$ -hairpin structure in soluble A $\beta$  oligomers of A $\beta$ 40–Dutch and A $\beta$ 40–Iowa. *Int J Mol Sci.* 22:1225.

Perrin, F., Papadopoulos, N., Suelves, N., Opsomer, R., Vadukul, D.M., Vrancx, C., **Smith, S.O.**, Vertommen, D., Kienlen-Campard, P., and Constantinescu, S.N. (2020) Dimeric transmembrane orientations of APP/C99 regulate  $\gamma$ -secretase processing line impacting signaling and oligomerization. *iScience* 23:101887.

**LONNIE WOLLMUTH** —Chan, K.\*, J. Nestor\*, T. S. Huerta, N. Certain, G. Moody, C. Kowal, P. T. Huerta, B. T. Volpe, B. Diamond<sup>‡</sup> and L. P. *Wollmuth*<sup>‡</sup> (2020) Lupus autoantibodies act as positive allosteric modulators at GluN2A-containing NMDA receptors and impair spatial memory. **Nature Communications**, 11:1403(2020). (PMCID: PMC7075964). \*Authors contributed equally. <sup>‡</sup>co-senior authors.

Zoodsma, J. D.\*, K. Chan\*, A. A. Bhandiwad, D. Golann, G. Liu, S. Syed, A. Napoli, H. Burgess, H. Sirotkin<sup>‡</sup>, and L. P. *Wollmuth*<sup>‡</sup>. (2020) A model to study NMDA receptors in early nervous system development. **The Journal of Neuroscience.** 40:3631-3645. (PMCID: PMC7189761). \*Authors contributed equally. <sup>‡</sup>co-senior authors.

Baez, A., T. V. Brunt, G. Moody, L. P. *Wollmuth*, and H. Hsieh (2020) Voltage dependent allosteric modulation of IPSCs by benzodiazepines. **Brain Research.** Jun 1;1736:146699. doi: 10.1016/j.brainres.2020.146699.

Amin, J. B.\*, A. Gochman\*, M. He, N. Certain, and L. P. *Wollmuth* (2021) NMDA receptors require multiple pre-opening gating steps for efficient synaptic activity. **Neuron.** 109: 488-501. doi: 10.1016/j.neuron.2020.11.009. (PMCID: PMC7864875).

## NOTEWORTHY

### NEWLY FUNDED GRANTS 2020-2021

Michael Airola: Feldstein Medical Foundation, “Targeting Sterol Glucosidase for the Treatment of Fungal Infections”

Nurit Ballas: NIH R21, “The Cellular and Molecular Signatures of Postnatal Human RTT Astrocytes”

Vitaly Citovsky: BARD Foundation, “Dissecting Genetic Resistance to Tomato Brown Rugose Fruit Virus (ToBRFV), the Emerging Tomato Pathogen”

Peter Gergen: NIH T32, “Initiative for Maximizing Student Development: Maximizing Excellence for Research in Graduate Education”

Steve Glynn: NIH R01, “Using Rebuilt AAA+ Enzymes to Uncover the Mechanisms of Proteolysis at the Mitochondrial Inner Membrane”

Nancy Hollingsworth: NIH R35, “Meiotic Recombination in Budding Yeast”

Chi-Kuo Hu: Hartman Center for Parkinson’s Research, “Study of the aging components causing Parkinson’s disease”

Chi-Kuo Hu: America Federation for Aging Research, “Understanding Diapause and its Ability to Suspend Aging in Vertebrates”

Sanford Simon: BioCogent Ltd., “Tetrahydro-Derivatives of Chemically Modified Curcumins for Enhancing Melanogenesis”

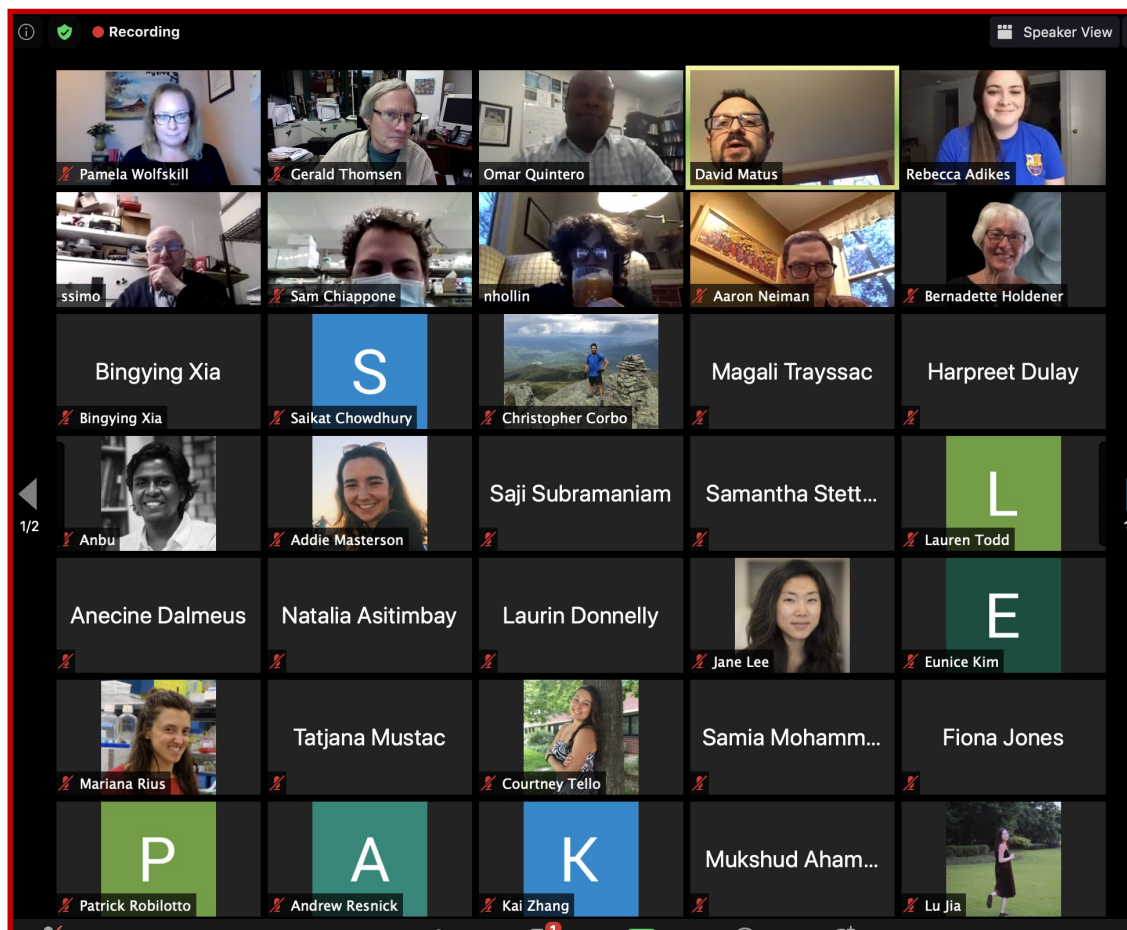
### HONORS & AWARDS 2020-2021

#### **Nancy Hollingsworth:**

Elected a [Fellow of the American Advancement of Science](#) for distinguished contributions to the field of Genetics, particularly the discovery of genes important for meiotic chromosome segregation.

**Bernadette Holdener:** Promotion to Professor

**David Matus:** Promotion to Associate Professor



Pictured above, top row center, is Omar Quintero, Associate Professor, University of Richmond, one of the weekly speakers in our Seminar Series held via zoom in Fall 2020 and Spring 2021 and host David Matus, faculty and students.

## ALUMNI NEWS

Below are some recent updates from BCB alumni. Please send us word of what you are up to at:

[Biochemistry\\_Alumni@stonybrook.edu](mailto:Biochemistry_Alumni@stonybrook.edu)

**Deepika Vasudevan** (PhD '15): "I started in June as an Assistant Professor in the Department of Cell Biology at the University of Pittsburgh, with a secondary appointment in the Department of Ophthalmology. My lab will study how mRNA translation regulation affects photoreceptor cells and will be partly funded by an R00 from the National Eye Institute (NEI)."

**Sunita Kramer** (PhD '98) "I recently got promoted to Associate Vice President for Research and Experiential Education for Rutgers University and I'm also directing a new initiative for undergraduates called the Innovation, Design, and Entrepreneurship Academy ([IDEA](#))."

**Beth Harvey** (PhD '16) is doing postdoctoral work at the University of Pennsylvania. She says, "I am happy to share that during the pandemic shut down in 2020 I prepared a K99 application that was a success! I have been awarded the K99 through the NEI."

Pictured below are PhD graduate students Christian Salazar and Forrest Bowling with Professors Mike Frohmand and Mike Airola who recently published collaborative papers reporting the first structure of human phospholipase D1 (Nature Chemical Biology, 2020) and identified mutations in phospholipase D1 as a factor in congenital heart disease (Journal of Clinical Investigation, 2021).



Above are Drs. Valerie Khayyo and Forrest Bowling who graduated with their PhD in Biochemistry and Structural Biology with Professor Mike Airola.

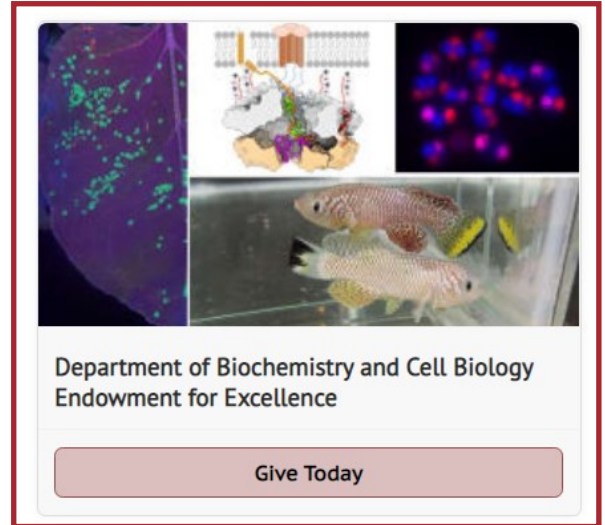
# Thank you!

Almost three years ago we established the Biochemistry and Cell Biology Endowed Fund for Excellence with the long-term goal of creating a source of support for Departmental activities that is not tied to State and Federal budgetary circumstances.

In the short time since we established the Endowment, more than 200 alumni, faculty, and friends of the Department have donated in amounts large and small to help get this effort off the ground. We are deeply grateful for their support.

One of the lessons of this last year has been just how important this project is for the Department. Because of state budget shortfalls caused by the pandemic, we have relied on philanthropic gifts to help during this time, particularly for student support.

Please consider making a donation either to the Endowed Fund for Excellence (for long-term support) or the Excellence Fund (for immediate use).



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Hodan Hassan, Assistant Dean for Advancement, at 631-632-4055

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