Stony Brook University
College of Arts and Sciences

DEPARTMENT OF BIOCHEMISTRY AND CELL BIOLOGY

Annual Newsletter Fall 2022

CONTENTS

Newsletter editor: P. Wolfskill

NOTES FROM THE CHAIR

2021 was an exciting year in the Department of Biochemistry and Cell Biology, full of searches and new faculty hires. After several months of negotiations, I signed on as Chair of the Department in September 2021. I am grateful to my colleagues for their vote of confidence and to Nicole Sampson, Dean of the College of Art and Sciences, and Bill Wertheim, Dean of the Renaissance School of Medicine, for their support. The Administration has committed significant new resources to the Department that will enable us to hire several new faculty over the next few years.

The 2021-2022 winter/spring was especially busy with two concurrent tenure-track faculty searches: a Structural Biology search and a Biochemistry/ Molecular Biology of Infectious Diseases search. After a host of interviews, dinners and recruiting trips, we were delighted to welcome a new junior faculty, Dr. Stuti Sharma, to Biochemistry. Dr. Sharma uses cryo-electron microscopy (cryo-EM) to study membrane proteins, with a special focus on v-ATPases. Stuti arrived in September 2022 and her lab is located on the first floor of the CMM building in the Center for Structural Biology. We carried out two additional searches and hired Dr. Stefan Tafrov as a Biochemistry Lecturer and Dr. Enju Lima as the cryo-EM Facility Manager. We are excited to welcome Stuti, Stefan, and Enju and look forward to their exciting contributions to the research and teaching missions of the department. This coming fall and winter promise to be equally busy, as we begin searches for three new faculty at the Assistant Professor level.

The Department mourns the passing of our long-time friends, colleagues, and former Chairs, Mel Simpson and Bill Lennarz. They created a lasting legacy for us all and will be missed. Please read Remembrances of Mel Simpson and a tribute to Bill Lennarz on our Departmental website (https://www.stonybrook.edu/commcms/biochem).

Spring 2022 also brought the departure of our long-term colleague Sandy Simon, who retired after 50 years of research , service and teaching contributions in the department. Sandy was a strong advocate, unique voice, and unwavering supporter of the department. We wish him good health and continued success in his retirement.

On a brighter note, our faculty continue to receive national and international recognition, honors, and awards. I wish to congratulate Mike Airola and Chi-Kuo Hu on their outstanding achievements. Mike won the 2022 Walter Shaw Young Investigator Award in Lipids, was selected as a 2022 Alfred P. Sloan Research Fellow,

and won the Godfrey Excellence in Teaching Award. Chi-Kuo received the 2021 New Innovator Award from the National Institutes of Health (NIH), and the Glenn Foundation for Medical Research and American Federation for Aging Research (AFAR) grant. Additionally, in the past year, our faculty received 10 new grants. I wish to congratulate all the recipients: Erwin London, Nancy Hollingsworth, and Vitaly Citovsky (NIH R35 grants), Vitaly Citovsky and Nurit Ballas (SBU Seed grants), Aaron Neiman, Bernadette Holdener, Steve Glynn, and Wali Karzai (NIH R01 grants).
We will continue our efforts to make the Biochemistry and Cell Biology Department stronger, more diverse, and welcoming and we appreciate and rely on your enduring support. Thank You.
Sincerely,
Wali Karzai, Professor and Chair

WELCOME TO OUR NEW FACULTY MEMBER STUTI SHARMA

Stuti is originally from Kolkata, India and she moved to the United States for her PhD in 2011. She did her graduate work under the mentorship of Dr. Stephan Wilkens at SUNY Upstate Medical University in Syracuse, NY, where she studied the regulatory mechanism of the yeast vacuolar H + ATPase (V-ATPase). The V-ATPase is an essential ATP dependent proton pump located on the endomembrane system of all eukaryotes, where it maintains optimum pH in cellular compartments. This enzyme is autoregulated by reversible disassembly, and in the Wilkens' lab, Stuti investigated this regulatory mechanism using the lipid nanodisc technology coupled with biophysical tools. For her postdoctoral research, she moved to Boston, where she learned single particle cryo electron microscopy (cryo-EM) under the mentorship of Dr. Maofu Liao at Harvard Medical School. In the Liao lab, Stuti applied cryo-EM to investigate the mechanism of two membrane transporters: a bacterial ATP binding cassette (ABC) transporter involved in lipoprotein transport, called LolCDE, and the yeast mitochondrial ATP synthase enzyme.

In the last few years, the V-ATPase has emerged as a hub for cellular signaling, with involvement in satellite functions such as metabolic homeostasis, autophagy and immune response. Similarly, the field of cryo-EM has advanced rapidly, and we can now address mechanistic questions that seemed rather far-fetched a few years ago. In her new lab, Stuti will use cryo-EM, combined with biophysical tools to understand how the V-ATPase can "multitask" to accomplish multiple functions. Stuti is excited to be part of such a diverse and dynamic department and looks forward to contributing to its cutting-edge research.

MCB & BSB GRADUATE PROGRAM ANNOUNCEMENTS

The Molecular and Cellular Biology (MCB) and Biochemistry and Structural Biology (BSB) Ph.D. programs train students in cutting edge biological sciences and prepare them for careers in academia and industry. Dr. Benjamin Martin became director of the MCB program this year, taking over for Dr. Wali Karzai who is now chair of the Biochemistry and Cell Biology Department. Dr. Steven Glynn continues to direct the BSB program, and Amy Saas serves as the administrator for both programs. Last year 19 students graduated with Ph.D. degrees (MCB: Dr.'s Julie Anne Bettke, Hsiang-Chen Chou, Yixin Hu, Kenneth Lam, Muyang Li, Victoria Mingione, Megan Cecilia Mladinich, Samia Mohammed, Chun-Hao Pan, Eric Paulissen, Sydney Snaider, Dongyan Song, and Xiaoyu Zhao; BSB: Dr.'s. Stephen Collins, Elliot Crooks, Daeun Noh, Lauren Prentis, Pavana Suresh, and Alexandra Sarah Weinheimer). After two years of completely virtual recruitment activities, this past spring both programs were able to host accepted students for an on-campus visit. The incoming MCB and BSB classes have 9 and 7 students, respectively. You can read more about the new students at the program websites:
MCB: https://www.stonybrook.edu/commcms/mcb/student-research/Studentscurrentandpast.php#2022
BSB: https://www.stonybrook.edu/commcms/bsb/student-research/Studentscurrentandpast.php#2022

BIOCHEMISTRY AND CELL BIOLOGY MASTERS PROGRAM

The Biochemistry and Cell Biology Masters graduate program hit its eleven year mark in 2021! Our mission is to provide students with a theoretical and practical understanding of biochemistry and cell biology to prepare them for careers in the life sciences. The success of these goals is measured by the quality of training our students receive, by the value our students bring to the labs in which they perform research, and by our students' ability to achieve their stated long-term goals.

By those metrics, this program is a success. Since 2010, we've admitted one hundred and twenty-nine students, 95% of whom graduated (122 out of 129). Of these 122 graduates, 84% have successfully continued in health science related careers; 43 students entered Ph.D. programs; 15 were admitted to medical, dental or veterinarian schools; while the remainder obtained positions as Research technicians. Our graduates are currently at top-notch research institutes or medical schools, including NYU, Thomas Jefferson University, Albert Einstein, Cornell, Mt. Sinai, Rockefeller, Case Western, Stony Brook, Rutgers, Purdue, Imperial College, UK, Cold Spring Harbor, Scripps, Univ. Utah, Univ. Indiana, UC Santa Cruz. The private sector has also benefited from our graduates who have obtained positions at Regeneron, Pfizer, Pillar Biosciences, and Nanoprobes to name just a few.

For anyone interested in more detailed information about the BCB MS program outcomes over the years, please contact me. I am very proud of our students whose accomplishments cannot be overstated so I'm happy to share these data!

Congratulations to our 2021 graduates (see p. 17), whose accomplishments are particularly noteworthy as these students persevered through COVID. Shout out to Joseph Bennet, who will be entering Rutgers Med School in Fall 2022, Horia Popa who began his Research Associateship at Pillar Biosciences, MA, and Jia Lu who will be joining the MCB Ph.D. program at Stony Brook.

The 2021-2022 Class

Top row -Jiao Chai, Lirong Chan, Adrienne Giannone, Xinran Li; Bottom row-Angelina Mullarkey, Jack Rogers, Andrew Sillato, Jonathan Wine (not shown: Colette Kodym).

The 2021-2022 class, shown above, promises to be equally successful. These students are currently performing research in areas spanning Biochemistry, Cell Biology, Biochemistry, Genetics, and Neurobiology. We are proud of our students, faculty, and alumni for their efforts in making our BCB MS program a success.

Sincerely,

Neta Dean, BCB MS Program Director

The 2022-2023 class

Top row from left:Victoria Coman, Passioly Coste, Emily De Onis, Helen Neiman

Bottom Row from left: Cynthia Ouedraogo, Sara Page, Ryan Swick, Brandon Thrope, Declan Wallace

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 by David Bynum, and has grown to become a national leader in STEM education research, teacher education and community outreach. I-STEM has been an incubator of innovative, interdisciplinary collaborations within the university and the surrounding communities. I-STEM is presently 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 over $30M in external grant funding, including approximately $9M in current funding.
• Assisting with the educational plans of 13 current and recent NSF Early CAREER awards across various departments at the university.
• Creating a Ph.D. Program in Science Education in 2010, which has graduated 20+ students and currently enrolls 24 students.

•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 NY 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 $6.8M in fellowships and scholarships to postdoctoral, graduate, undergraduate, and high school students who have been actively involved in research or teaching in STEM disciplines.

• After a break due to COVID, I-STEM's Teaching Labs have restarted operations and are anticipating having 4000+ student visitors this year. Teaching Labs are offered in biology, geoscience, chemistry, sustainable chemistry and physics. Summer programs are offered in all sciences, mathematics, and engineering disciplines.

• 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

Grants Awarded to I-STEM in 2021-2022

National Science Foundation: (2022-2025). Robert Noyce Teacher Scholarship Program.
Authentic STEM Laboratory Research Experiences for Prospective Science Teachers
PI: L.Padwa; Co-PIs: K. Sheppard, C. Gough.

National Science Foundation: (2023-2025). Improving Undergraduate STEM Education (I-USE) Physics Transitions to Remote Adaptable Instruction in the Laboratory (PhysTRAIL)
PI: A. M. Kelly; Co-PI: K. Sheppard.

National Science Foundation: (2022-2026). Innovative Technology Education for Students and Teachers (I-TEST). Quantum Education for Students and Teachers (QuEST) PI: A. M. Kelly.

UNDERGRADUATE AWARDS FOR BCB MAJORS CLASS OF 2022

2022 Ward Melville Valedictorians
Jessi Chen
Ulada Dubovik
Jonas Lopez
Shrey Thaker

Biochemistry majors graduating with distinction
25 Summa Cum Laude graduates
22 Magna Cum Laude graduates
19 Cum Laude graduates

Phi Beta Kappa Biochemistry Graduates

Jessi Chen, Vlada Dubovik, Fabliha Fairuz, Riya Gandhi, John O'Hare, Sara Page, Aiden Peleg, Shivasuryan Vummidi, Lin Zhao (Hongxiang), Emma Keegan, Zarya Shaikh

State University of New York Chancellor's Award

Sasha McKay

Shrey Thaker

University Provost's Award

Riya Gandhi

2022 Raymond Jones Award in Cell Biology

Shivasuryan Vummidi

2022 Irwin Oster award in Genetics

Qixuan (Jason) Weng

Andrea DeRosa

2022 Excellence in Biochemistry Award (academics, TA service, and research)

Jessi Chen, Alexis Choi, Jong Wan Choo, Natalie Dzikowski, Riya Gandhi, William Khayyo, Jonas Lopez, Aiden Peleg, Gaurav Sharma, Nicholas Siegel, Shrey Thaker, Shivasuryan Vummidi, Qixuan (Jason) Weng, Hongxiang Zhao

2021-2022 Biochemistry major graduates completing honors thesis

Fairuz Fabliha (Advisor: Dr. Sian Piret): Studies of Endotoxins in Acute Kidney Injury (AKI) in Mice and Humans

Shrey Thaker (Advisor: Jennie Williams): Colon Cancer Racial Disparity: An Inclusive in vitro Study of Novel Fluoropyrimidine F10 and its potential Synergy with Dietary Micronutrient Lupeol

Shivasuryan Vummidi (Advisor: John D. Haley): Feedback Signaling Pathways in MET-Amplified Non-Small-Cell Lung Carcinoma

Qixuan (Jason) Weng (Advisor: Nancy Hollingsworth): The Pif1 Family Helicases Promote Fidelity of Meiotic Recombination

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

Andrea DeRosa (Advisor: David Matus): The investigation of the role of histone deacetylase hda-1 in anchor cell invasion and cell cycle regulation in Caenorhabditis elegans

Daniel Wong Gutierrez (Advisor: Michael Airola): Structure and Function of the C-Terminal Domains of Human Perilipins 4 & 5

Samy Sasoun (Advisor: Sharon Pochron): Exposure to crumb rubber leachate but not AMPA impacts survivorship and speed of negative phototaxis in the brown planarian (Dugesia tigrina)

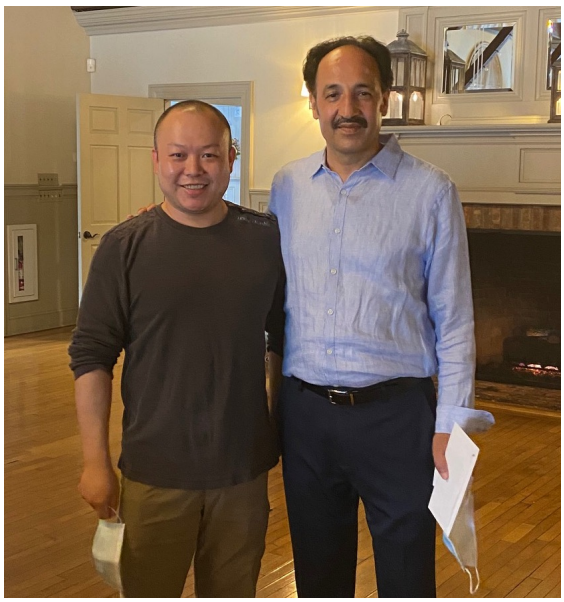
Sydney Tran (Advisor: Peter Gergen): Investigating the Involvement of slp and opa in Mesoderm Cardiogenesis Using Toll2 as a New Marker in Drosophila Embryos

2022 Biochemistry majors on the 2021-2022 iGEM (internationally Genetic Engineered Machines) team
Eva Paruch
Ya Jing Chen
Maira Riaz

2022 Summer undergraduate research awards to biochemistry majors:
Jason Linzer (URECA Biology Alumni Research)
Eva Paruch (URECA Biology Alumni Research)
Ya Jing Chen (Explorations in STEM)
Gabriella Vaccaro (Explorations in STEM)
Joyce Chen (Frances Velay Women and Science Research Fellowship)
Dennis Chu (URECA)
Chrisopher Jannotta (URECA)
Annie Lin (URECA)
Amy Phi (URECA)
Maira Riaz (Explorations in STEM)
Nilufer Dilmen (URECA Biology Alumni Research)
Noshin Shakawat (URECA Biology Alumni Research)
Lyrikah Rodrigues (URECA)

2022 Undergraduate summer research awards to non-majors working with BCB Faculty
Meghan Italo (URECA)

FACULTY UPDATES



Wali Karzai awarding Kai Zhang the prize for Best Poster at the 2022 departmental retreat

MICHAEL AIROLA

The Airola lab enjoyed another exciting year filled with science, fun and continued growth. The lab welcomed three new PhD candidates, Franceine Welcome, Rideeta Raquib and Khalayi Aywa and a Master's student Jonathan Wine from the BCB program.

We congratulated Franceine Welcome on her election as a Gilliam Fellow from the Howard Hughes Medical Institute, a first for a Stony Brook graduate student. This prestigious fellowship provides $53,000/year for 3 years to support Franceine studies and also includes mentorship training for Mike and funds to enhance a more diverse, equitable, and inclusive culture in the Department and at the University. https://news.stonybrook.edu/university/sbu-professor-grad-student-win-sbus-first-gilliam-fellowship/

Daniel Wong-Guiterrez, an undergraduate researcher in the lab, graduated with his BS in Biochemistry in December 2021. Daniel completed an impressive honor's thesis based on his research in the lab and will join the Biochemistry and Structural Biology program this year to pursue his PhD.

Tereza Vitkovska also graduated with her Master's degree in December. She has continued to work in the lab and is currently applying to medical schools.

In other news, Mike was honored to receive the Godfrey Excellence in Teaching Award, an award given to 4 Stony Brook faculty each year. Mike was also selected as the Walter A. Shaw Young Investigator in Lipid Research from the American Society of Biochemistry and Molecular Biology, a Sloan Research Fellow in Chemistry (an award that seeks to stimulate fundamental research by early-career scientists and scholars of outstanding promise), and the lab received a grant from the Feldstein Medical Foundation to develop new therapeutic agents for systemic fungal infections.

Some lab members also attended several in person conferences. This includes the Experimental Biology meeting in Philadelphia, where senior graduate student Yong Mi Choi gave a talk that was well received. Franceine, Shujuan, and Mike also attended a phospholipid meeting in Jupiter, Florida where Mike and Shujuan gave talks, and everyone showed off their "best" dance moves.

In addition to the awards and lab fun, the lab made several scientific discoveries in the areas of lipid research and drug development and we are looking forward to reporting some of these new findings in the following year.

NURIT BALLAS

Nurit Ballas continues to investigate the cellular and molecular mechanisms underlying the neurodevelopmental disorder Rett syndrome (funded by NIH). This year she was also a recipient of an OVPR Seed grant. She continues to serve on graduate student committees, as a reviewer on NIH and other extramural grant mechanisms, and as Editorial Board Member for the journal Scientific Reports (Nature Publishing Group). Lab members include: Jialin Sun (graduate student), Chana Rosenzweig (Volunteer, pre-Medical School), and Ron Lev (Stony Brook undergraduate).

PAUL BINGHAM, ZUZANA ZACHAR, AND SHAUN STUART

We have continued to make encouraging progress in our work on the basic science supporting the clinical targeting of the altered metabolism of cancer cells. One central focus of our work is the continued improvement of our understanding of the detailed mechanisms and clinical performance of CPI-613, the lead compound in a drug family we invented and patented here at Stony Brook. This drug selectively targets several major features of the mitochondrial metabolism of tumor cells. The two most important developments in this work over the last year are as follows.

First, CPI-613 drug cocktails are currently in several, diverse

FACULTY UPDATES

Phase II and Phase III clinical trials. While one large Phase III pancreatic cancer (PDAC) trial (Avenger 500) did not meet some of its important goals, post-hoc analysis of these data showed a robust response in one sizable patient subpopulation. Though the details of this analysis are currently confidential, we have high confidence that we can identify this responsive subpopulation going forward.

Our current hope is that the FDA will grant full approval for CPI-613 cocktails in these particular patients in the near future (probably after collection of some additional trial data). This would represent a major step forward in this journey and for the University. Moreover, should this approach prove as successful as current data indicate, we anticipate that we can extrapolate from this success to substantially enlarge that fraction of patients populating this CPI-613 cocktail-sensitive group.

Second, we published the next major basic science paper from our ongoing work on the clinically relevant properties of CPI-613 (below). In overview, we discovered the simple, universal basis of variable sensitivity/resistance to CPI-613 in diverse cell lines (and, presumably, in patients). Moreover, our preclinical work shows how these straightforward routes to CPI-613 clinical resistance can be effectively targeted in vivo, including with agents previously approved for use in other contexts by the FDA.

We, thus, hope to be able to stand up new investigational trials to clinically validate these new insights in the very near future. Pending such validation, we expect to be able to successfully deploy CPI-613 cocktails against many or most major carcinomas.

VITALY CITOVSKY

Vitaly was a recipient of a MIRA (R35) grant from NIH/ NIGMS. Vitaly continues to be funded by 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 (Faculty Opinions).

Vitaly continues to serve on the Departmental Awards Committee, the Administrative Review Committee (ARC) of the University Senate, the CAS Senior Promotion and Tenure committee (PTC-S), and the CAS Academic Judiciary committee (PTC-S), and the CAS Academic Judiciary Committee. Vitaly was invited as plenary speaker at the 6th International Conference on Transgenic Plants & Transformation Technologies, Vienna, Austria; also, Vitaly was an invited participant of the NSF-sponsored workshop "Cross-Disciplinary Study of Post-transcriptional and Post-translational Modifications".

Current lab members are: undergraduate students Laith Hana, Jody Huie, Shirley Jiang, John Kaba, Eva Lai, Karen Lin, Andrea Murati,Ryan Seecharan, Chao Feng Zhang, Nicole Zhao, Amy Zheng, Michelle Zhu;Masters student) Anna Fratta; postdocs Benoit Lacroix, Mi Sa Vo Phan, Phu Tri Tran; and affiliates Kate Creasey Krainer and Sondra Lazarowitz.

NETA DEAN

Research in the Dean lab continues to study protein glycosylation and its regulation during fungal cell wall synthesis. The Dean lab welcomed several new members, including Nilufer Dilmen and Kareem Halwah, both Stony Brook University undergraduate biochemistry majors. We also bid farewell to Yexin Su, who began his graduate studies in Medicinal Chemistry at University of FA. Honors were awarded to Nilufer Dilmen, who was recognized for her outstanding academic achievements with a URECA 2022 summer fellowship.

In other news about Dean lab alums, Nidhi Patel (graduated 2020) began medical school at Stony Brook Medical School, Greg Chionchio (SBU 2018) graduated from Zucker School of Medicine, NY. Binghao Zhang (BCB MS, 2018) left his position as a Research Associate at GRMH-GDL, Guangzhou, China and began his Ph.D. studies at the Guangzhou National Laboratory, at the Institute of Biomedicine and Health. Another shout out for Shiyu Wang (BCB MS, 2018) who left her position as Research Tech at Johns Hopkins to begin her Ph.D. studies in the Molecular and Cellular Biology Department, University of Illinois, Urbana-Champaign.

PETER GERGEN

The research in the Gergen laboratory continues to focus on investigating transcriptional regulation of gene expression in the early Drosophila embryo with an emphasis on understanding the regulatory function of the Runt transcription factor. Much of the current effort involves mining the very rich dataset obtained by Yasuno Iwasaki's ChIP-Seq experiments antibodies for the Odd-paired (Opa) transcription factor. Yasuno also continues to serve as an extremely effective

FACULTY UPDATES

mentor for undergraduate researchers. Sydney Tran graduated in December 2021 with an honors thesis describing her work investigating the role of opa and sloppy-paired (slp) in cardiogenesis using Toll2 as a new marker. BIO BA major Morgan Fish presented the work she did with URECA support in the summer of 2021 on slp regulation by Runt and Odd-skipped at the URECA Celebration in May 2022. Meghan Italo, also a BIO BA major, received a URECA Biology Alumni Research award to support her efforts in the summer of 2022 and we look forward to her participation in the URECA Celebration in May 2023!

Other news:
Gergen Lab Alumni on the move - Sunita Kramer (PhD 1992) relocated from her position at Rutgers to be the Dean of the School of Science and Professor of Biology at the College of New Jersey. Jennfier Shapp (MS 2017) moved to take a position as a Research Associate II at the Broad Institute of MIT and Harvard in Cambridge, MA.

Almost all news from the last year involves the underlying theme of the world's emergence from Covid. One marker of this was an official in-person inauguration of Maurie McInnis as the University President in fall of 2021, even though she joined Stony Brook in the summer of 2020.

Peter continued for an eleventh year as the Director of the Undergraduate Biology Program. A major effort of the Biology Program has been to facilitate research participation by Stony Brook students. The Entering Research Workshop offered by Undergraduate Biology that was disrupted by Covid in the spring of 2020 returned virtually in the fall of 2021 and then resumed as an in-person activity in the Spring of 2022. Similarly, the INSPIRE (Include New Students by Peer Introduction to Research Experience) program that provides a first- or second-year student from an historically under-represented group an opportunity to shadow a senior undergraduate researcher was able to restart in the spring of 2022. Although the Biology Program's participation in the iGEM (International Genetically Engineered Machines) competition for undergraduates continued throughout the pandemic the seventh and eighth iGEM teams were forced to participate in the International iGEM Giant Jamboree virtually in the fall of 2020 and 2021. We are proud to report that Stony Brook's ninth team is preparing to attend the 2022 iGEM Giant Jamboree in-person in Paris, France this October! The Convocation for the Biochemistry and Biology Programs also returned to an in-person event in May of 2022 and celebrated the largest graduating class of Stony Brook BIO and BCH majors in history. We were honored to finally be joined by Dr. Francis Farraye (BCH '78), Professor of Medicine, Mayo Clinic College of Medicine and Science in Fort Lauderdale, FL who was originally on tap to be the Alumni Speaker in May 2020. Also pleased to report that with support from alumni and friends the Biology Program was able to provide support for 15 of the 45 SBU undergraduates who participated in faculty mentored research projects in the biosciences during the summer of 2022.

The emergence from Covid also describes Peter's efforts in directing the NIH-funded IMSD-MERGE T32 graduate training program. Cohorts of five incoming PhD students across nine different graduate programs in the biosciences are recruited annually. The fall 2021 cohort included three students that started in the Fall of 2020 that described themselves as pseudo first year students based on the lack of in-person activities during their first year of graduate school. The Heads-Up workshop for new IMSD PhD students was offered during the fall of 2021 (rather than in the summer) with a recent return to doing this just prior to the start of the fall semester for the second cohort of new PhD students in August 2022. Similarly, the Excellence in Mentoring Workshop with 2nd year PhD students and their mentors started in the spring of 2022 with session I on Zoom in January followed by the second and third sessions being held in-person. The IMSD project was also awarded a supplement to develop the FIRST (Fostering Inclusive Research Scientist Training) Workshop for Graduate Program Directors and Staff to foster safe and inclusive training environments for underrepresented trainees in the biomedical sciences. This four-session workshop was offered this past summer and involved 17 different faculty and staff from nine different graduate training programs.

Peter also continues to be active in the National Institute on Scientific Teaching, a non-profit organization dedicated to empowering and inspiring the transformation of STEM education through evidence-based teaching practices. Stony Brook was the host institution for the last pre-Covid in-person Summer Institute on Scientific Teaching in August 2019. Peter

Fun with the green screen at the departmental retreat

FACULTY UPDATES

was a co-leader of the 2022 Northeast Regional Summer Institute on Scientific Teaching held at Macmillan Learning in Manhattan in August 2022.

STEVE GLYNN

The Glynn lab continues to investigate how mitochondria achieve quality control of their essential protein and lipid components. Recently, we have been examining how degradation signals initially discovered in yeast mitochondrial proteins may be conserved in humans, and how proteases control the flux of phospholipids between mitochondrial membranes. This work is supported by NIGMS and the Barth Syndrome Foundation. In September, the lab welcomed AJ Sillato, a BCB Master's student who is studying the function of heterohexameric variants of mitochondrial proteases, and in December, Ariana Robinson joined as a Research Technican. Marcela Muricy, an undergraduate researcher, was awarded the Frances Velay Fellowship and the Ellen Geis Research award to support her work in the lab during Summer 2022. Marcela will be studying how mutations discovered in patients with Barth Syndrome impact the membrane binding of Tafazzin, an enzyme required for mitochondrial phospholipid maturation.

BERNADETTE HOLDENER

In collaboration with Dr. Robert Haltiwanger at the University of Georgia, we are investigating the role of protein glycosylation in embryonic development. The Holdener lab uses mouse mutations to determine why sugar modifications on groups of proteins with Thrombospondin type I repeats (O-linked glucose-fucose disaccharide) or Epidermal Growth Factor motifs (O-glucose) are important for embryo development. 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 lung and cardiovascular abnormalities. In July, Drs. Haltiwanger and Holdener received a new NIH multi-PI R01 award to investigate the impact of blocking the addition of O-glucose on fibrillin and latent TGF-beta binding protein EGFs during lung and cardiovascular development. Bernadette and Dr. Thomsen continue to co-teach the core Developmental Biology course for the Biology Major Developmental Genetics track. 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 Member and Alumni Updates: Dr. Sanjiv Neupane, PhD, senior postdoctoral fellow in the lab attended the 2021 Structural Birth Defects Trainee Symposium and participated in the 2022 GetHired workshop, both organized by the Society for Developmental Biology Society. He also presented his research at the Department of Biochemistry and Cell Biology annual retreat. Dr. Charles DeRossi, PhD, former MS student and research technician in the lab, and now Assistant Professor, Icahn School of Medicine at Mount Sinai received a Young Investigator Award and funding from the Polycystic Kidney Disease (PKD) foundation to study the role of glycosylation and mannose metabolism in congenital hepatic fibrosis developed in patients affected with autosomal recessive polycystic kidney disease. Dr. Michael Feldman, MD, PhD, former high school student in the lab, was promoted to Medical Director in Clinical Development at Vertex. He continues to work as an attending physician in Lung Transplant at MGH in the department of Medicine/Division of Pulmonary and Critical Care Medicine. Dr. Lance Lee, PhD, former MCB graduate student in the lab, and now Associate Professor of Pediatrics, Sanford School of Medicine of the University of South Dakota served on the organizing committee for the On the Move 2021 conference, an annual national meeting covering the latest research and clinical advancements in the field of primary ciliary dyskinesia (PCD) with an audience of researchers, clinicians, and patients/families. Dr. Janet Lighthouse, PhD, former MCB graduate student in the lab, and now Assistant Professor of Pharmaceutical Sciences in Wegman's School of Pharmacy at St. John Fisher College was extremely satisfied to receive a teaching award for the 2021-2022 academic year from the first year pharmacy students, confirming she is going in the right direction! She also received a 1-year grant from the AACP (American Association of Colleges of Pharmacy) to evaluate how Sodium-glucose Cotransporter-2 (SGLT2) inhibitors affect fibroblast activation. Dr. Andrew Taibi, PhD, former BCB MS student in the lab, was recently named as the Technical Lead at Recursion. As part of their partnership with Roche/Genentech, Andrew manages a team of scientists tasked with scaling up neural cell culture models for inference-based phenotypic screening for neurological diseases. He finds his job incredibly exciting and feels fortunate to have the opportunity to do something with so much potential to impact patients.

NANCY HOLLINGSWORTH

Nancy gave a seminar at the Department of Biology at New York University in October 2021 and presented a talk at the New York Academy of Sciences Genome Integrity meeting in April 2022. In June, she attended the Meiosis Gordon Research Conference in New Hampshire, along with Andrew Ziesel, a senior graduate student in the lab, and Bob Gaglione, a former Master's student and now technician in the Hollingsworth lab. Andrew and Bob also attended the Meiosis Gordon Research Seminar, a meeting organized and run by graduate students and

FACULTY UPDATES

postdocs just prior to the Meiosis GRC. Andrew and Bob presented posters at both meetings and Andrew gave an excellent talk at the Meiosis GRC. Last summer, a new student, Raunak Dutta, joined the lab from the Biochemistry and Structural Biology Program. In summer 2021, Nancy mentored Sabrina Chen, a high school student who was a semi-finalist in the Regeneron Science Talent Search competition based on her research. The lab also welcomed back Evan Cheng for a summer research project prior to his starting his undergraduate education at New York University in fall 2021.This summer, Cody Cheng, a rising high school sophomore, worked in the lab, and did a great job on a difficult project. It was with mixed emotions that we said good-bye to Jason Weng in May 2022 when he graduated summa cum laude from Stony Brook with a double major in Biochemistry and Biomedical Engineering. Jason received Honors in Biochemistry based on the research he performed during the last four years in the lab, as well as the Irwin Oster award for Genetics. Jason made important experimental, technical and intellectual contributions to our research and will be greatly missed. He is starting a PhD program in Biophysics at the University of California, Berkeley in Fall 2022 and we wish him all the best! As of fall 2022, the Hollingsworth lab personnel will be: Lihong Wan (senior research scientist), Andrew Ziesel (Genetics graduate student), Bob Gaglione (Research Technician), Raunak Dutta (BSB Graduate student), David Murtha (undergraduate student) and Jonathan Caradonna (undergraduate student). In addition, Nancy and Tracy Callender, a former student and postdoc in the lab, and now Assistant Professor at SUNY Farmingdale, are continuing their long-term research collaboration.

CHI-KUO HU

The dormant biology lab now is officially up and running. We have a full spectrum of new members who joined us in the past year, from high school students, undergrads, Master students, Ph.D. students, and research specialists. Our amazing Master student Lu Jia successfully completed her Master Degree, received offers from multiple Ph.D. programs, and accepted the offer from the MCB program to keep her talent at Stony Brook. Our lab meeting finally is starting to feel like a lab meeting. Our wonderful undergrad Joyce Chen was awarded the Frances Velay Fellowship for her summer research in our lab. Now with our various lab equipment ready, we are together set to explore the fun of doing research in the coming year.

WALI KARZAI

The Karzai lab welcomes Melanie Cragan and Amanda Lopacinski (Ph.D. students from the MCB program), and Felo Shenouda, a talented research specialist and former Stony Brook undergraduate student. We continue to study 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.

Dr. Karzai agreed to serve as the Chair of Biochemistry and Cell Biology, continues to serve as the Director of the Center for Infectious Diseases, and as course director for GRD 500 and MCB 503 (Molecular Genetics).

ERWIN LONDON

Erwin's NIH MIRA award, "Transformative Lipid Exchange Approaches to Study Membrane Organization", was renewed for another five years. Erwin is the honoree of a special Issue (in press) of the J*ournal of Membrane Biology* on the topic of Membrane Biophysics. He presented virtual talks at the student organized CCMB Biologue (Center for Cellular and Molecular Biology, Hyderabad, India) in Sept. 2021, SUNY Binghamton, Dept. of Chemistry, Binghamton, NY in Nov. 2021, and to the American Chemical Society Spring Meeting, Division of Colloid and Surface Chemistry. Session on Biomembrane Synthesis, Structure, Mechanics, and Dynamics in March 2022.

Chi-Kuo Hu and an African killifish

FACULTY UPDATES

Erwin continues to serve as a member of the Postdoctoral Fellowship Award Committee for the Life Sciences Research Foundation. Lab members in mid-2022 included research assistant professor Guangtao Li, research scientist, Shinako Kakuda, and Ph.D. students Betty Du and Bingying Xia.

ED LUK

Ed Luk and members of his lab continue to study the regulation of chromatin structure and gene expression. Their work is supported by an R01 research project grant from the NIH. Current team members include Leonidas (Louie) Pierrakeas, Cynthia Converso, Lirong Chen, Avalon Perry, and Eva Paruch. Louie and Cindy are PhD students in the MCB program. Louie is investigating an unconventional chromatinparticle and its role in gene silencing. He is a co-author of a paper (currently under revision) that reports the very first structure of this unconventional chromatin particle. Cindy is studying the targeting mechanism of a chromatin remodeling enzyme in yeast. She recently developed a biochemical assay to decipher the chromatin marks responsible for targeting the enzyme to specific genomic sites. Lirong is a MSc student in the BCB program. She has taken on a collaborative project with Ben Martin's Lab to study chromatin regulation in zebrafish embryos. She discovered that a transcription factor important for stem cell maintenance activates a critical DNA replication gene by regulating its chromatin structure. Avalon and Eva are undergraduate students. They joined Ed's lab recently and are biochemists in training.

BEN 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 several members this past year. Arwa Al Anber graduated with her Ph.D. from the Molecular and Cellular Pharmacology program. She is now an assistant professor at Hashemite University in Jordan. Eric Paulissen received his Ph.D. from the Molecular and Cellular Biology program and is now a postdoctoral fellow in Gage Crump's lab at the University of Southern California. Postdoctoral fellows Rebecca Adikes, Nicholas Palmisano, and David Gray left the lab. Rebecca is an assistant professor at Siena College, Nicholas is a lecturer at Adelphi University, and David Gray is an assistant director of the UCLA undergraduate research center. Undergraduate student Samuel Escobar graduated and will be applying to medical school in the upcoming year. The lab hosted Max Yang, a Simon's Program high school student this summer, and also had three new undergraduates join (Frederick Peetz, Zhifei Zeng, and Julia Zhu). MCB Ph.D. student Samantha Stettnisch was awarded an NIH F31 predoctoral fellowship.

AARON NEIMAN

The current members of the Neiman Lab are Jae-Sook Park (Research Assistant Professor), Greisly Nunez and Kai Zhang (Ph.D. Students), Jiyao Chai (Masters student), Emily Cioppa (undergraduate), and Professor Emeritus Rolf Sternglanz. As ever, the lab focuses on the process of sporulation in yeast to explore how cellular architecture is rearranged during differentiation. Jae-Sook's current work centers on the regulation of the lipid transfer protein Vps13 and its human ortholog VPS13A. Greisly, Kai, and Jiyao are all investigating different aspects of Spindle Pole Body function during sporulation.

In January, Aaron organized "Yeast Sporulation", a day-long virtual meeting of labs from around the U.S. who study sporulation. Greisly gave a presentation at that meeting. Greisly and Kai both gave presentations of their work (a talk and a poster, respectively) at the Departmental retreat in May, where Kai won an award for best poster. In January, Aaron spoke at the bimonthly "VPS13A forum" – a virtual meeting for investigators around the world who are focused on VPS13A and its related neurological disorders. Aaron serves as an Associate Editor of the Journal of Fungi and edited a special issue of that journal entitled "Formation and Function of Fungal Ascospores".

STEVEN SMITH

Steven Smith will be stepping down as the director of the Center for Structural Biology in Fall 2022. In the lab, we still have two major on-going research projects. The first is on G protein-coupled receptors. Lauren Todd, who completed her MS degree in Biochemistry and Cell Biology in May has taken over our work on rhodopsin and is working on the mechanism of congenital stationary night blindness. The second research focus is on Alzheimer's disease (AD). Brandon Irizarry and Elliot Crooks, both BSB graduate students, are planning to graduate by the end of summer 2022.

FACULTY UPDATES

JERRY THOMSEN

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.

On the developmental biology side, Marko Horb, Jerry's first graduate student and present Director of the National Xenopus Resource (MBL, Woods Hole) has been generating X. tropicalis mutants in genes of long-term interest in the lab, such as Pqbp1 and Wbp11 RNA splicing factors, Vg1 and other growth factors, and neurodegenerative disease genes linked to TGF-beta, Wnt and FGF signaling. Phenotypic and molecular characterization of mutant embryos and surviving tadpoles and frogs are underway, but studies would move faster in a better funding environment.

The regeneration projects are investigating signaling mechanisms that are unique or common between the sea anemone, *Nematostella vectensis* and the *Xenopus* tadpole. *Nematostella* can regenerate its whole body, and the *Xenopus* tadpole can regenerate a variety of body parts while young, but it loses regenerative ability as it metamorphoses into a frog (why this change happens is interesting to the field). Present focus is on deciphering the roles of cell signaling pathways using small molecule chemical screening. We have shown that Wnt and other pathways are required to regenerate the "head" of the polyp – the part with the mouth and tentacles. We have also discovered that autophagy is required for head formation (e.g. Bossert & Thomsen 2017, JoVE) and have been following that up by asking whether autophagy regulates dedifferentiation to generate stem cells, or mobilizes nutrients, to build the missing tissues. Xenopus tadpoles have been tapped to ask this question for the vertebrate model. Cnidarians and vertebrates last shared a common ancestor about 550 million years ago, so these studies will help inform which regenerative mechanisms are unique or have been conserved over evolution.

Researchers in the lab over the past year included Dr. Patricia Bossert (Scientist) working on autophagy and nutritional effects of regeneration, and BCB Master's student Jack Rogers together with undergraduates Kevin Fung and Kristi Fung (no relation) on the small molecule screening project. 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. On the funding side we are hopeful – an R03 small project grant to support the chemical screening for regenerative mechanisms received a 2% score and has been "promised" funding sometime this year.

LONNIE WOLLMUTH

Our group had a successful year. We published 3 primary research papers as well as had 2 major reviews. The one in Pharmacological Reviews is the major one in the glutamate receptor field and was nearly 200 pages long…lots of work. It is an update of our review published in 2010 and while a pain is a huge service to the field.

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, structural and physiological 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).

In person seminars/meetings also resumed and I gave talks at Case-Western, Biophysical Society, Ion Channel Gordon Research Conference, Canadian IUPAC meeting, and the Federation of European Neuroscience meeting… which sadly is being held in Paris, France, one of my favorite cities. We are also organizing and hosting the iGluR2022 research conference at Stony Brook University this summer. Students presented posters at the Biophysical Society (Miaomiao He) and the zebrafish meeting (Josiah Zoodsma). Joel Thomas, an undergraduate, was awarded a URECA 2022 Summer fellowship.

After a successful stint in the lab, Noele Certain will graduate in the Summer of 2022 and is off to work a post-doc at Yale! Cuilee Sha is a new MD/PhD student in our group.

PUBLICATIONS 2021—2022

MICHAEL AIROLA

Li, F.L., Wu, Z., Gao, Y.Q., Bowling, F.Z., Franklin, J.M., Hu, C., Suhandynata, R.T., Frohman, M.A., **Airola, M.V**., Zhou, H., and Guan, K.L.(2022). Defining the proximal interaction networks of Arf GTPases reveals a mechanism for the regulation of PLD1 and PI4KB. *EMBO J*. 17:e110698.

Simoes, M., Saleh, A., Choi, Y.M., **Airola, M.V.**, Haley, J.D., and Coant, N. (2022). Measurement of neutral ceramidase activity in vitro and in vivo. *Analytical Biochemistry* 643:114577.

de Sá, N.P., Taouil, A., Kim, J., Clement, T., Hoffman, R.M., Burke, J.E., Rizzo, R.C., Ojima, I., Del Poeta, M., and **Airola, M.V.** (2022). Structure and inhibition of *Cryptococcus neoformans* sterylglucosidase to develop antifungal agents. *Nature Communications* 12:5885.

Gu, W., Gao, S., Wang, H., Fleming, K.D., Hoffmann, R.M., Yang, J., Patel, N., Choi, Y.M., Burke, J.E., Reue, K., and **Airola, M.V**. (2021). The middle lipin domain adopts a membrane-binding dimeric protein fold. *Nature Communications* 12:4718.

Lahrouchi, N., Postma, A.V., Salazar, C.M., De Laughter, D.M., Tjong, F., Piherová, L., Bowling, F.Z., Zimmerman, D., Lodder, E.M., 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, J.Y., Burn, S.C., Mustafa, H., Ambrose, M., Moss, T., Jacober, J., Niyazov, D.M., Wolf, B., Kim, K.H., Cherny, S., Rousounides, A., Aristidou-Kallika, A., Tanteles, G., Ange-Line, B., Denommé-Pichon, A.S., Francannet, C., Ortiz, D., Haak, M.C., Harkel, A.D.J.T., Manten, G.T., Dutman, A.C., Bouman, K., Magliozzi, M., Radio, F.C., Santen, G.W., Herkert, J.C., Brown, H.A., Elpeleg, O., van den Hoff, M.J., Mulder, B., **Airola, M.V**., Kmoch S., Barnett, J.V., Clur, S.A., Frohman, M.A., and Bezzina ,C.R. (2021). Bi-allelic loss-of-function variants in PLD1 cause congenital right-sided cardiac valve defects and neonatal cardiomyopathy. *J. Clin. Invest.* 131:142148

Bowling, F.Z., Frohman, M.A., and **Airola, M.V**.(2021). Structure and regulation of human phospholipase D. *Adv. Biol. Regul.* 79:100783

Otsuka, Y., **Airola, M.V.**, Choi, Y.M., Coant, N., Snider, J., Cariello, C., Saied, E.M., Arenz, C., Bannister, T., Rahaim, R., Hannun, Y.A., Shumate, J., Scampavia, L., Haley, J., and Spicer, T. (2021). Identification of Small Molecule Inhibitors of Neutral Ceramidase (nCDase) Via Target Based High Throughput Screening. *SLAS Discovery* 26:113-121

NURIT BALLAS

Sun, J., Osenberg, S., Irwin A, Ma, L-H., Lee, N., Xiang Y., Li, F., Wan., Y-W., Park., I-H., Maletic-Savatic, M., and **Ballas, N**. (2022) Mutations in the transcriptional regulator MeCP2 severely impact key cellular and molecular signatures of human astrocytes during their maturation. *Cell Reports*, in press.

PAUL BINGHAM, ZUZANA ZACHAR, AND SHAUN STUART

Guardado Rivas, M.O., **Stuart, S.D**., Thach, D., Dahan, M., Shorr, R., **Zachar, Z**., and **Bingham, P.M**. (2022). Evidence for a novel, effective approach to targeting carcinoma catabolism exploiting the first-in-class, anti-cancer mitochondrial drug, CPI-613. *PLoS ONE* 17(6): e0269620

VITALY CITOVSKY

Hu, Y., Lacroix, B., and **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., and **Citovsky, V**. (2021) Rapid generation of inoculum of a plant RNA virus using overlap PCR. *Virology* 553, 46-50.

Tran, P.T. and Citovsky, V. (2021) Receptor-like kinase BAM1 facilitates early movement of the Tobacco mosaic virus. Commun. Biol. 4, 511.

Lacroix, B. and Citovsky, V. (2022) Agrobacterium. In Brenner's Encyclopedia of Genetics Third Edition (S. Maloy & K. Hughes, eds.), Elsevier, in press.

PUBLICATIONS 2021-2022

Lacroix, B. and **Citovsky, V**. (2022) Crown gall tumors. In *Brenner's Encyclopedia of Genetics* Third Edition (S. Maloy & K. Hughes, eds.), Elsevier, in press.

Lacroix, B. and **Citovsky, V**. (2022) Genetic factors governing bacterial virulence and host plant susceptibility during Agrobacterium infection. *Adv. Genet.*, in press.

NETA DEAN

Dean, N., Jones, R., DaSilva, J., Chionchio, G. and Ng, H. (2022). Mnn10/Anp1-dependent N-linked outer chain glycan is dispensable for *Candida albicans* cell wall integrity. *Genetics* 221:iyac048.

Xiang, M.H., Xu, X.X., Wang, C.D., Chen, S., Xu, S., Xu, X.Y., **Dean, N**., Wang, N., and Gao, X.D. (2022). Topological and enzymatic analysis of human Alg2 mannosyltransferase reveals its role in lipid-linked oligosaccharide biosynthetic pathway. *Communication Biology* 5:117.

PETER GERGEN

Prazak, L., Iwasaki, Y., Kim, A.-R., Kozlov, N., King, K. and **Gergen, J.P**. (2021). A dual role for DNA-binding by Runt in activation and repression of sloppy-paired transcription. *Mol Biol Cell* Epub Aug 25

STEVE GLYNN

Glynn, S.E. (2022). 'AFG-like protein 3'. *The Handbook of Proteolytic Enzymes* 4th edition, volume 1 Metallopeptidases. Neil Rawlings (ed), Elsevier.

BERNADETTE HOLDENER

Neupane S*, Berardinelli S.J., Cameron D.C.*, Grady R.C., Komatsu D.E., Percival C.J., Takeuchi M., Ito A., Liu T.W., Nairn A.V., Moremen K.W., Haltiwanger R.S., and **Holdener B.C.** (2022). O-fucosylation of thrombospondin type I repeats is essential for ECM remodeling and signaing during bone development. *Matrix Biol.* 107:77-96.

Neupane S.*, Goto J., Berardinelli S.J., Ito A, Haltiwanger R.S., and **Holdener B.C.** (2021). Hydrocephalus in mouse B3glct mutants is likely caused by defects in multiple B3GLCT substrates in ependymal cells and subcommissural organ *Glycobiology* 31:988-1004. (Selected for Journal Cover)

NANCY HOLLINGSWORTH

Park, J. S., Hu, Y., **Hollingsworth, N. M.**, Miltenberger-Miltenyi, G., and Neiman, A. M. (2022). Interaction between VPS13A and the XK scramblase is important for VPS13A function in humans. *J Cell Sci*. Epub 11 Aug.

WALI KARZAI

Coleman, J.L., Benach, J.L., and **Karzai, A.W**. (2021). Endogenous and Borrowed Proteolytic Activity in the Borrelia. *Microbiol Mol Biol Rev*. 85(2).

ERWIN LONDON

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. *Biochemistry*, 60, 1964-1970. *co-corresponding authors.

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). *J. Biol. Chem*. 297:101010.

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. *Langmuir* 37, 11611-11617 *co-corresponding authors.

PUBLICATIONS 2021—2022

Bryan, A.M.*, You, J.K.*, Li. G., Kim, J., Singh, A., Normile, T., Morstein, J., Trauner, D., Farnoud, A., **London, E**. and Del Poeta, M., (2021). Cholesterol and sphingomyelin are critical for Fcγ receptor-mediated phagocytosis of Cryptococcus neoformans by macrophages" , *J. Biol. Chem*. 297:101411. *equal contributions

Kakuda, S.*, Suresh, P.*, Li, G., and **London, E**. (2022). Loss of plasma membrane lipid asymmetry can induce ordered domain (raft) formation *J. Lipid Res*. 63:100155 *equal contributions

Suresh, P., and **London, E**. (2022) Using cyclodextrin-induced lipid substitution to study the structure and function of ordered membrane domains (rafts) in cells. Biochim. Biophys. Acta 1864, 183774.

Bag, N., **London, E.**, Holowka, D.A, and Baird, B.A. (2022). Transbilayer Coupling of Lipids in Cells Investigated by Imaging Fluorescence Correlation Spectroscopy. *J. Phys. Chem. B*. 126, 2325-2336.

ED LUK

Nozawa, K., Takizawa, Y., Pierrakeas, L., Sogawa-Fujiwara, C., Saikusa, K., Akashi, S., **Luk, E**, and Kurumizaka, H. (2021). Cryo-electron microscopy structure of the H3-H4 octasome without histones H2A and H2B. *bioRxiv* (Preprint).

BEN MARTIN

Paulissen, E. and **Martin, B.L**. (2022). A chemically inducible muscle ablation system for zebrafish. *bioRxiv*. (Preprint).

Mondal, C., Gacha-Garay, M. J., Larkin, K., Adikes, R., Di Martino, J., Chien, C. C., Fraser, M., Eni-aganga, I., Agulla-Pascual, E., Ozbek, U., Naba, A., Gaitas, A., Fu, T. M., Upadhyayula, S., Betzig, E., Matus, D., **Martin, B. L**., and Bravo-Cordero, J. J. (2022). A Proliferative to Invasive Switch is Mediated by srGAP1 Downregulation Through the Activation of TGFβ2 Signaling. *Cell Reports*. In Press.

Paulissen, E. and **Martin, B.L**. (2022). Myogenic regulatory factors Myod and Myf5 are required for dorsal aorta formation and angiogenic sprouting. *Dev Biol*. 490:134-143.

Martin, B.L. and Steventon, B. (2022). A fishy tail: Insights into the cell and molecular biology of neuromesodermal cells from zebrafish embryos. *Dev Biol*. 487:67-73.

Martin, B.L. (2022). Mesoderm induction and patterning: Insights from neuromesodermal progenitors. *Semin Cell Dev Biol*. 127:37-45.

Paulissen, E., Palmisano, N. J., Waxman, J. S., and **Martin, B.L**. (2022). Somite morphogenesis is required for axial blood vessel formation. *eLife*. 11:e74821.

Morabito, R. D., Adikes, R. C., Matus, D. Q., and **Martin, B. L**. (2021). Cyclin-Dependent Kinase Sensor Transgenic Zebrafish Lines for Improved Cell Cycle State Visualization in Live Animals. *Zebrafish*. 18:374-375.

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*. 22:6200

Nakamura, T. S., Suda, Y. Muneshige, K., Fujieda, Y. Okumura, Y., Inoue, I., Tanaka, T., Takahashi, T., Nakanishi, H., Gao, X-D., Okada, Y, **Neiman, A. M**., and Tachikawa, H. (2021) Suppression of Vps13 adaptor protein mutants reveals a role for PI4P in regulating Vps13 function. *PLoS Genetics*, 17:e1009727.

Neiman, A.M. (2021). Special Issue: Formation and Function of Fungal Ascospores. *J Fungi* 7:618

KEITH SHEPPARD

Ofem, B., Beeth, M., Doering, J., Fink, K., Konz, R., Mohr-Schroeder, M.J., Polizzi, S.J., Roehrig, G., Rushton, G. T., & **Sheppard, K**. (2022). An Exploration of Communities of Practice in the STEM Teacher Context: What Predicts Ties of Retention? *Journal of STEM Teacher Education*.

PUBLICATIONS 2021-2022

Richards, Z., Bruckner, T., & **Sheppard, K**. (2022). The History of the Astronomy Regents Examination in New York State. *STANYS Teacher Bulletin*.

STEVEN SMITH

Irizarry B.A., Davis J., Zhu X., Boon BDC, Rozemuller A..JM., Van Nostrand W.E., and **Smith S.O**. (2021). Human cerebral vascular amyloid contains both antiparallel and parallel in-register Aβ40 fibrils. *J. Biol. Chem*. 297(5):101259.

Rajpoot, J., Crooks, E., Irizarry, B.A., Amundson, A., Van Nostrand W.E., and S**mith S.O**. (2022). Insights into cerebral amyloid angiopathy type-1 and type-2 from comparisons of fibrillar assembly and stability of the Aβ40-Iowa and Aβ40-Dutch peptides. *Biochemistry* 61: 1181—1198.

NOTEWORTHY

NEWLY FUNDED GRANTS AND FELLOWSHIPS 2021-2022

MICHAEL AIROLA

Medical Research Grant, Feldstein Medical Foundation. "Developing sterylglucosidase as a therapeutic target for invasive fungal infections"

Sloan Research Fellowship, Alfred P. Sloan Foundation

NURIT BALLAS

Stony Brook Office of the Vice President for Research (OVPR) Seed Award "The molecular and cellular aberrations in human astrocytes derived from female RTT patient iPSCs"

VITALY CITOVSKY

NIH R35 (MIRA) "Writers and Erasers of Ubiquitin Moieties in Control of Cell-to-Cell Transport in Plants"

Stony Brook Office of the Vice President for Research (OVPR) Seed Award "Boron Transport Mechanisms in Plants" (with T. Rasbury, Department of Geoscience, SBU)

PETER GERGEN

NIGMS T32 "IMSD at Stony Brook University: Maximizing Excellence in Research and Graduate Education"

NIGMS T32 Supplement "Fostering Inclusive Research Scientist Training"

NSF ISUE "Facilitating widespread implementation of teaching strategies known to promote student success throughout a state system of colleges" (with Michelle Withers, SUNY Binghamton)

BERNADETTE HOLDENER

NIH R01 "Role of POGLUT2 and POGLUT3 in regulating microfibril structure and function" (with Robert Haltiwanger, University of Georgia)

CHI-KUO HU

NIH DP2: "Understanding diapause and its ability to suspend and preserve life"

Glenn Foundation for Medical Research and AFAR Junior Faculty Grant "Understanding diapause and its ability to suspend aging in vertebrates"

Thomas Hartman Center for Parkinson's Research Grant "Study the aging components causing Parkinson's disease"

NOTEWORTHY

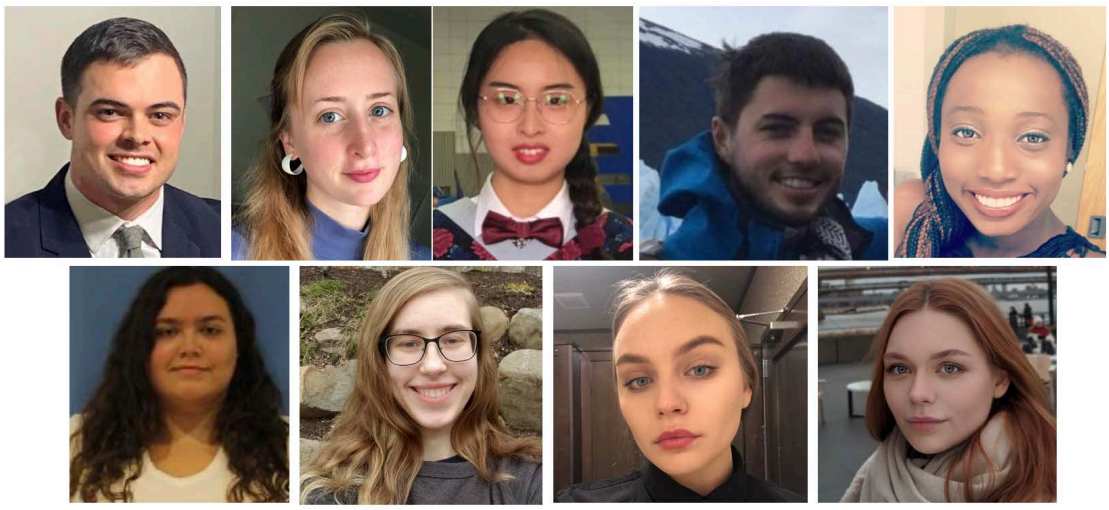
AARON NEIMAN
NIH R01 "Assembly and Function of the Yeast Spore Wall"

Stony Brook Office of the Vice President (OVPR) Revise and Resubmit Award "Mechanisms of de novo membrane assembly"

SAMANTHA STETTNISCH (PhD student, mentor Ben Martin)
NIH F31 predoctoral fellowship

FRANCEINE WELCOME (PhD student, mentor Michael Airola)
Gilliam Fellowship for Advanced Study, Howard Hughes Medical Institute

2021 Biochemistry and Cell Biology Masters program graduating class



Top Row from left: Joseph Bennett , Anna Fratta, Jia Lu, Horia Popa, Eghosa Okungbowa

Bottom row from left: Natalia Swieki, Lauren Todd, Diana Vitkovska, Teresa Vitkovska

NOTEWORTHY

HONORS & AWARDS 2021-2022

MICHAEL AIROLA
Named the "Walter A. Shaw Young Investigator in Lipid Research" by the American Society of Biochemistry and Molecular Biology

ANDREW ZEISEL (PhD student, mentor Nancy Hollingsworth)
Prize for best talk at the BCB Departmental Retreat in 2022

JASON WENG (B.S. student, mentor Nancy Hollingsworth)
Irwin Oster award for Genetics at the SBU graduation in 2022

Franceine Wellcome with her mentor Michael Airola. Franceine was awarded a Howard Hughes Medical Institute Gilliam Fellowship for Advanced Study

NOTEWORTHY

Sandy Simon Retires

In January, Professor Sandy Simon retired after 52 years on the Department faculty. Sandy was one of the earliest hires in the newly formed Department of Biochemistry. He joined the faculty as an Assistant Professor in 1969 after receiving his Ph.D. and performing a short postdoctoral stint at Rockefeller University in New York. Sandy's early work focused on the structure of hemoglobin, particularly interactions between the globin protein and its heme ligand. These studies, throughout the '70s and '80s, were carried out in collaboration with nobel laureate Max Perutz at the MRC Laboratory in Cambridge and then with colleagues at Bell Laboratories. Starting in the '90s, Sandy's lab began to study protease inhibitors secreted by mammalian cells, which in turn led to a focus on tetracycline derivatives and their pharmacological uses as protease inhibitors. Sandy was always very active as a teacher and mentor. Many generations of Stony Brook medical students received their basic training in protein biochemistry from Sandy. In more recent years, he taught undergraduate biochemistry and was responsible developing and teaching an online version of the course for the summer semester. Sandy always had a keen interest in the practical application of his science and that is reflected in his service on the boards of several local biotechnology companies – in some cases, companies founded by his scientific trainees. He leaves a long legacy of scholarship and service and his presence in the department will be greatly missed.

Sandy Simon, pictured shortly after his arrival from Rockefeller.

David Matus moves to Arcadia Sciences

In August, Associate Professor David Matus left Stony Brook for a new position at Arcadia Sciences, a biotechnology startup based in Berkeley, California. David's research at Stony Brook had focused on the interplay between cell migration and cell proliferation during development, using the nematode *C. elegans* as a model system. We wish him the best in his new endeavor.

ALUMNI NEWS

1970s

Kim Hamilton Isaacs MD PhD ('76, B.S. Biochemistry)
I graduated with a BS degree in Biochemistry December 1976 then PhD in Basic Health Sciences in 1981 and MD in 1984 all from Stony Brook. I will be retiring this year as a Professor of Medicine in the Division of Gastroenterology and Hepatology at the University of North Carolina at Chapel Hill after 31 years on the faculty. My area of research was clinical trials in inflammatory bowel disease.

Cheryl Dunayer Lapidus ('77, B.S. Biochemistry)
I retired to Florida in 2020 (right before the pandemic hit) after having spent 43 years in the pharmaceutical industry. Once I got settled, it didn't take long for me to get back to work part time, and remotely, as a consultant in the industry. I am loving retirement, it's the best job ever!

Mark Lehrman ('77, B.S. Biochemistry; worked in Mel Simpson's lab)
Mark is in his 40th year at UT-Southwestern in Dallas. After many years of research in glycobiology as a professor in the Department of Pharmacology, he recently closed his laboratory to accept a full-time administrative position with the medical school Dean's office. He would enjoy meeting with other Seawolves who have landed in the DFW area.

Howard C Rosen ('79, B.S. Biochemistry)
I have been working since my graduation in Cardiac Catheterization/ EP/ Vascular Labs across the country. I started in a Research lab at Montefiore Medical Center in the Bronx and worked in clinical positions as a Registered Vascular Specialist since then. Thank you Stony Brook for my well rounded education and success in my career.

1980s

Frank Ross M.D. ('81, B.S. Biochemistry)
I am Associate Director of the Helen and Martin Kimmel Hyperbaric and Advanced Wound Healing Center and Associate Professor of Surgery at NYU Langone Medical Center. One of our fellows recently helped to obtain an IRB and we collected retrospective data on our results treating patients with acute sensorineural hearing loss with hyperbaric oxygen therapy. The results were accepted for brief presentation at the American Association of Otorhinolaryngologists/Head and Neck Surgeons in Philly in September.

Roger Miesfeld ('83, Ph.D. Biochemistry; Advisor, Norm Arnheim)
I am a Distinguished Professor of Biochemistry in the Department of Chemistry & Biochemistry at the University of Arizona in Tucson where I started my career in 1987 as an Assistant Professor. My research interests are centered on regulation of metabolic processes in eukaryotic cells, most recently in Dengue Fever mosquitoes. I served as Department Chair (2014-2019) and as Associate Dean for Academic Affairs in International Education (2019-2021). I have authored four biochemistry textbooks over the years, with my most recent being Miesfeld & McEvoy, "Biochemistry" 2nd Edition at WW Norton Publishing https://wwnorton.com/books/biochemistry.

1990s

Juana E Hernandez M.D. ('94, B.S. Biochemistry)
Juana is in Family Medicine-Obstetrics and Chief, Women Health Service Line in Fayetteville, NC

Patti Cuartas ('96, B.S. Biochemistry and Psychology)
I graduated in 1996 with a BS in Biochemistry, Psychology and a minor in Child and Family Studies. I went on to Physicians Assistant school and recently was named President of New York State Society of Physicians Assistants (NYSSPA).

ALUMNI NEWS

Rory Manning ('96, B.S. Biochemistry)
After completing a brief stint in research, Rory Manning entered the field of education as a teacher of biology and chemistry with the NY City Department of Education and then the Levittown Public Schools. Rory currently serves as the Superintendent of Schools for the Harborfields Central School District located in Greenlawn, NY. He also serves as an adjunct lecturer at Stony Brook University in the School of Professional Development. Rory earned an M.S. in Human Nutrition from the University of New Haven, a post-Masters certificate in Educational Administration from Stony Brook University, and his doctorate in School Supervision and Administration from St. John's University. Rory, his wife Sharon (whom he met while serving as an undergraduate chemistry TA at Stony Brook in 1995) and their three children live in East Northport, NY.

Sunita Kramer ('98, Ph.D. Cellular and Developmental Biology; adviser Peter Gergen)
Sunita has been appointed the Dean for the School of Science and Professor of Biology at The College of New Jersey.

2000s

Pablo Rojo ('02, B.S. Biochemistry)
I have been teaching both high school and community college chemistry for the past 20 years here in Florida where I moved to with my family back in 2002. I have also received two Master's Degrees since my time at Stony Brook. An M.S in Chemistry from the University of South Florida and an M.S in Science Education from Montana State University (this one was mostly done on-line).

C**indy Lee MD** ('03, B.S. Honors in Biochemistry)
Since college graduation, I went onto medical school at Stony Brook, completed a Radiology residency at the Johns Hopkins Hospital, followed by a breast imaging fellowship at University of California San Francisco. I was an Assistant Professor of Radiology at UCSF where I taught and trained medical residents and fellows, before joining the faculty at New York University School of Medicine in 2017. Recently, I was promoted to Associate Professor of Radiology at NYU.

Richard Guttman ('05, B.S. Biochemistry)
Long Island University CW Post Bachelor Degree Business
Western Michigan University, Thomas M Cooley Law School Juris Doctorate
Uppsala University, Uppsala Sweden Summer Law Program
Admitted to the New York State Bar
Admitted US District Court Southern District
Admitted US District Court Eastern District
I have been running my law firm in Tax and Banking Law. I am studying for the Patent Bar Exam. I love to play golf. I am very fond of my time at Stony Brook University and proud to be an alumnus of Stony Brook U.

Zach Tyerman ('08, B.S. Biochemistry)
I attended medical school at Eastern Virginia Medical School, undertook 2 years of basic science and clinical research at University of Virginia, and now I just graduated from General Surgery residency at Northwestern Memorial Hospital in Chicago.

2010s

Rian Shah ('10, B.S. Biochemistry)
Rian is a Pulmonary and Critical Care Physician at the Bronx VA Medical Center.

Adeola Odugbesi, MD ('11, B.S. Biochemistry)
I am currently a Clinical Assistant Professor of Surgery in the Department of Vascular Surgery at the University of Iowa Hospitals and Clinics.

ALUMNI NEWS

Brad Greenstein ('15, M.S. Biochemistry and Cell Biology)
I currently took up a job as a field application scientist for a company called DiaSorin which is in the Immunodiagnostics space. I work with customers to help implement DiaSorin technologies to their laboratories.

Weijing Gu ('18, M.S. Biochemistry and Cell Biology)
I worked 3 years for a neuroscience drug discovery start-up and now I am employed as Field Application Scientist for a BioLayer Interferometry company named Gator Bio in the Bay Area. I am always available to SeaWolves for anything related to job hunting and career development.

Saiful Basir ('19 B.S. in Biochemistry)
I recently defended my Master's of Science degree at the University at Albany Biomedical Sciences department. COVID threw a wrench into everything after graduating in 2019, but these past two years were productive at U Albany. My thesis topic was, "Characterizing and Epitope Mapping Single-Domain Antibodies on Borrelia burgdorferi Protein OspA." With the use of the single-domain Antibodies (VHHs), my group demonstrated the finer resolution epitope mapping of a protein that had been only previously mapped using traditional monoclonal antibodies. Ideally, our VHHs will be used in future as pre-exposure prophylactics for Lyme Disease, in lieu of a proper vaccine. A prophylactic dose can prevent infection in disease-prone areas for the entirety of Lyme season (~April-October).
I had also been interviewing for work while finishing the written portion of my thesis and was luckily offered a position at Regeneron, in Rensselaer, NY. I will be starting in a few weeks.

Maitreyee Kale ('19, B.S. Biochemistry)
I am currently in my 3rd year of medical school at the University of Connecticut!

2020s

Jeri Ann Ramilo ('21, B.S. Biochemistry)
I am attending medical school with aspirations to become a surgeon and I am part of the Class of 2025 at NYITCOM in Old Westbury!

Shivasuryan Vummidi ('22, B.S. Biochemistry)
Currently, I am an MD/MPH student at SUNY Downstate Health Sciences University. My MPH concentration is in Epidemiology, and I am looking forward to using my MPH in conjunction with my MD to help prevent the spread of disease in my communities. I'm thankful for the education and opportunities that Stony Brook provided me over the past 4 years, and I am excited to take this next step toward my career.

Please send us word of what you are up to at:
Biochemistry_Alumni@stonybrook.edu

Mohammed Shabban (MS '19) was featured in the Careers column in the journal Nature: https://www.nature.com/articles/d41586-022-01351-5

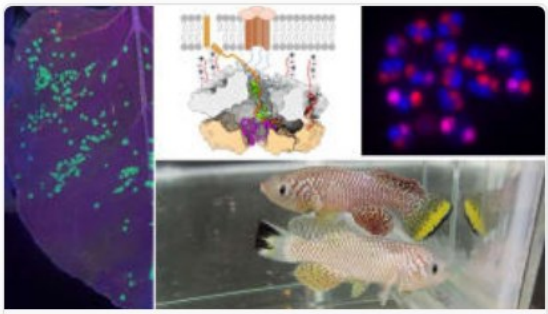
Thank you!

Almost four 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 250 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 the last few years 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).



How to Donate

Donate online at 'Biochemistry and Cell Biology Endowed Fund for Excellence' or 'Biochemistry and Cell Biology Fund for Excellence"

You may also send your gift along with this form to the address below:

Name and Year of Graduation (if applicable):_____

Address:_____

Phone Number:_____

E-Mail Address:_____

□ **YES, I WISH TO CONTRIBUTE TO THE BIOCHEMISTRY & CELL BIOLOGY FUND for EXCELLENCE**

□ **$1,000** □ **$500** □ **$250** □ **$100** □ **Other:**_____

□ Check enclosed (payable to: **Stony Brook Foundation #227060**)

□ **YES, I WISH TO CONTRIBUTE TO THE BIOCHEMISTRY & CELL BIOLOGY ENDOWED FUND for EXCELLENCE**

□ **$1,000** □ **$500** □ **$250** □ **$100** □ **Other:**_____

□ Check enclosed (payable to: **Stony Brook Foundation #366970**)

If you are interested in learning more about how you can support our department, please feel free to contact Hodan Hassan, Assistant Dean for Advancement, at 631-632-4055

mail to: Dept. of Biochemistry & Cell Biology, Stony Brook University, LSB 450, Stony Brook, NY 11794-5215