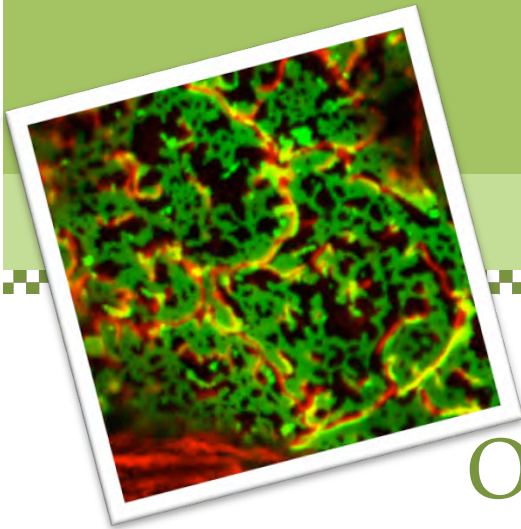


Annual Newsletter
2010



On the Cover:

Lipid rafts and actin-based membrane ruffles on a cultured fibroblast. (Left image)

This fibroblast is transfected with two proteins: placental alkaline phosphatase (PLAP), which is anchored in the plasma membrane by lipid, and an activated form of RhoG. RhoG rearranges the actin cytoskeleton that underlies the plasma membrane, forming membrane ruffles. The actin filaments that form the “backbones” of these ruffles are stained in red with phalloidin. In this cell, clustering of cell-surface PLAP with antibodies (green) induced formation of lipid rafts. This image of a portion of the top surface of the cell shows rafts interacting with ruffles. At later times, ruffles will close on themselves to form macropinocytic vesicles that remove the rafts from the cell surface. D. Brown, *unpublished data*.

Low-density lipoprotein receptor family mediated endocytosis in the mouse visceral endoderm. (Right image)

Prior to development of the placenta, low-density lipoprotein receptors (LRPs) located in the visceral endoderm of the mammalian embryo facilitate nutrient uptake, digestion, and secretion. The molecular chaperone MESD (mesoderm development) is essential for apical localization of Megalin (an LRP family member) in the visceral endoderm, and endocytosis is severely impaired in *Mesd* mutant embryos. In this photo endocytosis in the visceral endoderm was visualized by incubating the 7 day mouse embryo with 50nM receptor associated protein (RAP) tagged with AlexaFluor 488 (green). Embryos were then fixed and counterstained with Alexa 594-Phalloidin to mark cell boundaries (color-corrected to magenta in Photoshop) and DAPI to mark nuclei (blue). Image taken from: MESD is essential for apical localization of megalin/LRP2 in the visceral endoderm (2011) Janet K. Lighthouse, Liqun Zhang, Jen-Chih Hsieh, Thomas Rosenquist and Bernadette C. Holdener, *Developmental Dynamics* 240:577–588.

Contents

- 1 **On The Cover: LRP & PLAP**
- 2 Table of Contents
New Masters Program
- 3 Departmental Retreat 2010
Notes From the Chairman
- 4 CESAME Update
- 5 Undergraduate
Biochemistry Society (UBS)
Young Investigators
Review (YIR)
- 6 Undergraduate & Graduate
News

Other Newsworthy Items
- 7 Faculty Updates
- 8 Faculty Updates Continued
Research Faculty Updates
- 9 Postdoctoral Research
- 10-11 2010 Departmental Roster
- 12-14 2010 Publications
- 15 Office of Scientific Affairs
(OSA) Advertisement
- 16 In Closing



The inaugural BCB MS class, Fall 2010 (from left to right) Steve (Sundeep) Reddy, Sharee Sandler, Michael Tramantano, Michelle Bylicky, Lana Corbo, Nithya Sivaram Yuemeng Mao, Theresa Buck (Thomas Vigilante oops, perhaps a future member?), Neta Dean (Director). Not present for the photo-op are Surya Bhamidipaty, Mel Pillar Espailat, and Caroline Lee.

New Masters Program

In Fall 2010, the Department of Biochemistry and Cell biology proudly welcomed the inaugural class of the Biochemistry and Cell Biology (BCB) Master of Science Graduate program (Neta Dean, Director). We owe gratitude to Bernadette Holdener, Harvard Lyman, and Peter Gergen for their efforts in planning the program, to Beverly Piazza for her administrative help, and to Peter Gergen and Neta Dean for preparing and submitting the program proposal for NY State approval.

Designed to be completed in three semesters, the BCB MS program aims to prepare students for careers in research, teaching, biotechnology, or further advanced studies in health and life sciences. Our hope is that that the combination of theory and hands-on research experience will provide our graduates the skills that should make them competitive in the emerging job markets. All ten of the incoming students are conducting research with members of our department as well those in Microbiology, Neurobiology, and Pharmacology. As part of the new program, our department also began offering two new graduate courses to improve lab and research skills: *Introduction to Research in Biochemistry and Cell Biology* (BCB551) and *Advanced Laboratory Methods in Biochemistry and Cell Biology* (BCB 552). Details of the BCB MS program can be found at:

<http://www.stonybrook.edu/biochem/graduate/bcb.html>

Department Retreat at The Old Field Club



The Biochemistry and Cell Biology held its first departmental retreat on May 25 at the Old Field Club. The retreat began with an “ice-breaker” where students, postdocs and faculty tried to guess the identity of other faculty members from their baby pictures. This was followed by lunch and oral presentations from various BCB labs. Students and postdocs had additional opportunities to present their work in two one-hour poster sessions. The day was a great opportunity for people in the BCB department to get to know each other and learn about other people’s research. The second annual BCB retreat is scheduled for May 26 at the Old Field Club.

Notes from the Chairman



In spite of New York State’s budget woes, we are very excited about our future in the Department of Biochemistry and Cell Biology. We are currently doing two searches for new faculty, one for a Structural Biologist and the other for a Cell and/or Developmental Biologist. We have several excellent candidates and hope to have two new faculty in place by fall 2011. In addition, we are excited about the recent recruitment of Dr. Ken Kaushansky as the new Dean of the School of Medicine. Dr. Kaushansky is the former Chair of Medicine at UCSD Medical School where he oversaw the doubling of the Department (to over 400 faculty) while there.

Dr. Kaushansky has held NIH grants and is committed to growing biomedical research at Stony Brook. As a part of this, he has announced plans for a new Cancer Center and Biomedical Imaging facility.

Although funding levels at NIH are at all time lows, our faculty continue to submit and receive significant funding. Biochemistry had higher Sponsored Programs Spending (a measure of our grant dollars) in 2010 than any other basic science department in the School of Medicine and tied for first with Physics and Astronomy in the College of Arts and Sciences. In particular, several of our faculty (Drs. Nancy

Hollingsworth, Aaron Neiman, and Rolf Sternglanz) together with faculty from Microbiology (Drs. Bruce Futcher, Janet Leatherwood) were successful in obtaining a new Program Project Grant entitled, Rewiring of gene expression in the meiotic state, funded for 5 years.

Sincerely,

Robert S. Haltiwanger



Center for Science and Mathematics Education (CESAME)

The Center for Science and Mathematics Education, directed by *David Bynum*, has the goal of increasing the quality, quantity and diversity of the nation's science and mathematics talent pool.

Center activities began in 1993, the umbrella organization Long Island Group Advancing Science Education (LIGASE) was formed in 1996, and LIGASE and components of mathematics education were combined in 2007 to create CESAME. CESAME has now received over \$ 20 M in external funding, and these awards have resulted in collaborations with all science and math departments, as well as the Schools of Engineering, Medicine, Journalism, and Marine and Atmospheric Sciences. CESAME sponsored activities now range from K to postdoctoral and faculty levels, and across Long Island, New York State and the nation.

In May David received a four-year \$ 1.5 M Howard Hughes Medical Institute (HHMI) Undergraduate Science Education award to integrate, expand and create new activities in student research, faculty development, curriculum development and outreach. This is the 5th consecutive four-year award David has received from HHMI, and their support has been instrumental in creating CESAME and providing new opportunities for students and faculty at all levels. In June David and *Keith Sheppard*, Associate Director of CESAME and director of the doctoral program in Science Education, gave a

presentation, *Entrepreneurship and Science Education – A University Perspective*, at the annual meeting of the Science and Mathematics Teacher Imperative in Cincinnati. In April Keith gave the keynote address at the annual meeting of the Long Island Science Education Leadership Association. In June Keith received a \$ 750,000 NSF Robert Noyce Scholarship grant, a continuation of a previous award. This award provides fellowships for science and mathematics teachers to teach in high-needs schools. In September CESAME co-sponsored the Bruce Albert's Lecture, *Science and the World's Future*, which outlined strategies for science education for the next decade. In September, Keith welcomed the first class of 12 students into the doctoral program in Science Education. When these students graduate we expect them to become university faculty, leaders in education and policy makers at the regional, state and national levels. In October David and Susan Stapleton from Western Michigan University presented a workshop, *Sustaining, Growing and Improving Teacher Education Programs* at the HHMI program directors meeting in Bethesda, MD.

Linda Padwa, Associate Director of the Science Education Program, is a co-principal investigator of the NSF Robert Noyce Scholarship Program. To date, she and Keith have awarded scholarships to 46 students. *Caren Gough* directs field placement of teachers and last summer directed the Real World Science workshop for 42 high school teachers from throughout New York. At the opening ceremonies Dr. James Watson of Cold Spring

Harbor Laboratories was the keynote speaker. *Zuzana Zachar* has directed the Masters Degree in Teaching Biology Program since it started in 1998, which has graduated more than 170 teachers.

The Biotechnology Teaching Center (BTC), directed by *Joan Kiely*, provides inquiry-based molecular biology laboratories to 5,000 high school students each year. She also taught a workshop on Modeling the Molecular World in collaboration with the Milwaukee School of Engineering. She is a guest lecturer at the Dolan DNA Learning Center at Cold Spring Harbor and is developing a course on protein structure and analysis in collaboration with BNL. These activities led to Joan being featured in the Protein databank Newsletter last fall. *Dan Moloney* is the principal investigator on two major National Institutes of Health grants, the *Bridges to the Baccalaureate* and the *Minority Access to Research Careers*. He also teaches a biotechnology course for non-majors, directs the Biotechnology Summer Camp and teaches in the BTC.

Judy Nimmo oversees all aspects of CESAME activities and has been a major contributor to its growth during the past 15 years. Laboratory manager *Delon Callender* is responsible for laboratory management and safety. *Debbie Pelio* administers Science Education activities and assists with all aspects of day-to-day operations of the Center.



Undergraduate Biochemistry Society

The Undergraduate Biochemistry Society was founded on the premise of providing a venue for those with an interest in the science to discuss and develop their understanding of it. The staple of UBS has always been its faculty seminars, in which distinguished faculty members of the University provide members with an in-depth look into their research, and the creative process behind experimentation. This year, **Dr. Kenneth Marcu** gave members a multi-faceted look into the world of NF-KB signaling and osteoarthritis, and **Dr. Harvard Lyman** gave a lecture on photobiology. On a special evening, **Dr. Robert Haltiwanger** participated in an intimate discussion about his research on glycobiology and the various aspects of running a laboratory.

In the Fall 2010 semester, UBS saw record numbers in attendance, due in large part to its incorporation of mentor-lead review sessions in classes like organic chemistry. In addition, UBS has become active in providing members with insightful seminars about navigating the

various paths of academia, including applying to medical and graduate schools. The society continues to flourish, and with many new educational and developmental programs in the works, the future looks bright indeed.



Undergraduate Education Awards

Academic Achievement in Biochemistry:

(GPA of 3.75 or higher)

Bianco, Christopher Paul; Chin, Dong Woo; Chu, Liana; Ghazipure, Saad Zubair; Gim, Sarah Jiseon; He, Jackie Zhuojun; Jaison, Berly Ann; Kataria, Anglina; Knockenhauer, Kevin Edward; Kong, Constance; Martinez, Nichol Stephen; Melo, Diana Patricia; Napolitano, Nicole Anne; Pavel, Samsad Ahmed; Poon, Ka Fut; Sabu, Priya; Tejani, Ali H.; Valestra, Paul Kristan; Vinayagasundaram, Rama; Vinayagasundaram, Uma; Werneburg, Glenn Thomas; Wong, Puishan Kosina; Yang, Yumee; Yang, Lily Lee Kwan.

Summa Cum Laude (GPA of 3.86 or higher)

Bianco, Christopher; He, Jackie; Kataria, Anglina; Knockenhauer, Kevin; Melo, Diana; Napolitano, Nicole; Pavel, Samsad; Valestra, Paul; Vinayagasundaram, Ramal; Werneburg, Glenn; Yang, Yumee.

Magna Cum Laude (GPA of 3.71-3.85)

Chin, Dong Woo; Chu, Liana; Ghazipura, Saad; Gim, Sarah; Jaison, Berly Ann; Kong, Constance; Martinez, Nichol; Poon, Ka Fut; Sabu, Priya; Tejani, Ali; Vinayagasundaram, Uma; Wong, Puishan; Yung, Lily.

Magna Cum Laude (GPA of 3.50-3.70)

Aronchik, Yelena; Bogush, Nikolay; Bylicky, Michele; Chan, Wai Ting; Chen, Mei Hsuan; Diop, Mbaye; Gaddam, Sushma; Goldberg, Allison; Jain, Sejal; Khanam, Dilruba; Kunaparaju, Sindhura; Kunca, Vladimir; Polito, Christopher; Shah, Rian; Zheng, Wu.

Honors Awards:

Kataria, Anglina; Knockenhauer, Kevin; Noor, Harris; Vinayahasundaram, Uma; Werneburg, Glenn.

Young Investigators Review

The Young Investigators Review (YIR) is Stony Brook's undergraduate journal of science. The goal of YIR is to provide the entire campus community with a way to learn about the most recent science research news at Stony Brook and to showcase the work that is being done by talented undergraduate researchers on campus. YIR provides an outlet for students who are enthusiastic about science writing and research to engage in this communication with all the members of our university. Published annually, YIR covers a wide scope of topics in the form of original scholarly articles, reviews, commentary, interviews, science news, and more.

In 2010, YIR published an online spring semester issue. It featured original student research reports on the regulation of chloroplast synthesis from the Department of Biochemistry and on a new micropatterning technique from the Department of Biomedical Engineering. The issue included reviews on the therapeutic potential of stem cells, the complexity of Lyme Disease, and the importance of the Atomic Force Microscope; interviews with Dr. Prives on the nicotinic ACh receptor and Dr. Fowler on his research and teaching, and much more. The complete issue can be found at www.younginvestigators.com.

On May 3, 2010, YIR hosted its Second Annual Symposium, presenting Dr. Robert Weinberg of the Whitehead Institute of MIT. Dr. Weinberg delivered a keynote address on his discovery of the h-Ras oncogene and Rb tumor suppressor gene to an audience of over 300 people. Throughout the day, the YIR Symposium presented faculty speaker Dr. Elizabeth Boon from the Chemistry Department and three student speakers who presented their research on the gating of NMDA receptors, cancer stem cells, and optical imaging of cardiac electromechanics. Over twenty students from the departments of Medicine, Biochemistry, Microbiology, Neurobiology, Ecology, Electrical Engineering, and others participated in the Symposium's poster session, which was concluded at the end of the day by a poster award presentation led by Dr. Simon, Dr. Karzai, and Dr. Bingham. The Symposium was a large success and the YIR staff plans to continue this exciting tradition.

The YIR staff is currently working on and planning to publish a new issue in April of 2011.



Undergraduate & Graduate Program News

Undergraduate Program Highlights

In the **Dean** lab, **Qiao Lu** received a Howard Hughes Summer Fellowship to study the role of class V myosin MYO2 during hyphal formation in *Candida albicans*. Qiao Lu presented his project at the annual URECA celebration and was featured as URECA Researcher of the Month.

Former **Gergen** lab undergraduate student researcher **Conrad Tenenbaum** started graduate school in the Molecular Biology Program at Princeton after taking a year off to hone his research skills working with Mary Kritzer in the Neurobiology Department here at Stony Brook. Hoping to follow a similar path, **Chris Bianco**, a former Gergen lab undergraduate and Biology Banner Bearer started as a Research Technician in the lab of Erich Mackow in the Microbiology Department. Current undergraduates **Liuqing Xing**, **Seema Sawh**, **Angelita Tan** and **Chowdhury Sajid** are working hard to maintain the quality of the contributions from Stony Brook undergraduates to the progress of research in the Gergen lab.

In the **Haltiwanger** lab, **Hillary Moss** received a Howard Hughes Summer Fellowship to work on O-Fucose structures of *Drosophila* Notch, and Ahmed Rab received a URECA Summer Research Fellowship to work on mapping sites of glycosylation on *Drosophila* Notch.

In the **Holdener** lab, **Jessica Maschi-Perez** is a MARC fellow.

In the **Lyman** lab, **Rachel Salatká's** paper: *Photobiological Regulation of Chloroplast Synthesis* appeared in the Spring 2010 issue of the Young Investigator's Review. She is now a graduate student at Stony Brook. **Nehal Shah** and **Muskan Ghota** continue their work on the minimum photosynthetic reaction center required for positive phototaxis in *Euglena gracilis*. **Zanab Mian** continues her work on the role of Calcium in positive phototaxis in *Euglena gracilis*. **Xiaoshuai [Joanna] Yuen** continues her work on the photo-induced second messenger IP₃ regulating light-mediated chloroplast synthesis in *Euglena gracilis*. **Hamna Zafar** and **Malack Hamade** are working on the kinetics of light-mediated chloroplast synthesis in *Euglena gracilis*. **Aysha Juthi** is working on the mutant, Na180 of *Euglena gracilis*, a photosynthetic mutant with unstable chloroplasts.

Graduate Program News

The Biochemistry and Structural Biology (BSB) graduate program (Erwin London, Director) is now just over 10 years old. The Fall 2010 class was the largest so far, with 7 students, including one MD/PhD student. The program has 27 students total, with 12 working in the Biochemistry and Cell Biology department.

This year the BSB and MCB will be applying for a renewal of their joint NIH Molecular, Cellular and Structural and Biology (MCSB) training grant, which supports a number of Ph.D. students in their second and third year of studies. We are optimistic that with our excellent trainees and their accomplishments, renewal is likely, but the funding NIH climate is a difficult one. Keep your fingers crossed!

Graduate Program Highlights

From the **Haltiwanger** lab, **Esam Al-Shareffi**, **Christina Leonhard-Melief**, **Nadia Rana**, and **Deepika Vasudevan** all attended and presented posters at the annual meeting of the Society for Glycobiology in St. Pete Beach, Florida, from November 7-10. **Esam** and **Deepika** both received travel awards from the Society to attend the meeting.

From the **Hollingsworth** lab, **Tracy Callender**, Ph.D. (Molecular and Cellular Biology Graduate Program) completed her doctorate. She is continuing on in the Hollingsworth lab for a short time to finish up some projects.

From the **Gergen** lab, **Lisa Prazak** moved on to take a postdoctoral position with Josh Dubnau at Cold Spring Harbor Laboratory. Although she has at least temporarily left the field of transcription regulation, she remains faithful to the use of *Drosophila* as her model system of choice. In conjunction with this departure, **Saiyu Hang** has become the mainstay graduate student in the Gergen lab and plays an important role in helping to train other students at all levels while also moving his own research project forward.

From the **London** lab, **Hui-Ting Cheng** graduated with a Ph.D. from the MCB program in 2010.

From the **Marcu** lab, **Sylvia Samaniego** successfully defended her PhD thesis (entitled: "Contributions of the inhibitor of kappa B kinases (IKKs) in macrophages and neutrophils after Francisella tularensis live vaccine strain (LVS) infection") in the Genetics Graduate Program. Sylvia is now looking for a Postdoctoral position in Europe and may return to the lab in 2011 as a Research Scholar to do some additional experiments.

OTHER NEWSWORTHY ITEMS

From the **Gergen** lab, former graduate students **Greg Golling** and **Chih-Cheng Tsai** were promoted to Associate Professor this year at Taft College, and the UMDNJ Robert Wood Johnson Medical School, respectively. Their former labmate **Sunita Gupta-Kramer**, also on the faculty at UMDNJ is proud to announce the arrival of a daughter Anika Kramer in April. Must be something in the water this year as former student **Xiaoling Wang**, currently a postdoc in the Roeder lab at Rockefeller University also welcomed the arrival of a son, Yiming (Tiger) Wang in October.

From the **Holdener** lab, **Soah Kim**, BS in Bioengineering, is a research technician for at Weil Cornell Medical School. **Janet Chang**, PhD Molecular and Cellular Biology is a Post doc in Dr. Daniel Greif's lab at Yale. **Mary Wines-Samuelsen**, PhD Genetics is a Research Assistant Professor in the Department of Biomedical Genetics at the University of Rochester, NY. **Lance Lee**, PhD Molecular and Cellular Biology is an Associate Scientist, Sanford Children's Health Research Center at Sanford Research University of South Dakota and Assistant Professor, Department of Pediatrics, Sanford School of Medicine of the University of South Dakota.

High School News

Ms. Shilpa Kannan worked with Christina Leonhard-Melief in the **Haltiwanger** lab as part of the Simons Summer Research Program, and based on her work she became a semi-finalist in the Siemens Science Competition.

Ms. Priyanka Patel, worked in the **Lyman** lab, as a student from Ward Melville High School, she continues her work on the *Euglena* mutant P₄ZUL where she has shown that the chloroplast instability is due to a progressive loss of chlorophyll while the amount of Phaeophytin of Photosystem II remains constant.

Mr. Kevin Chen from Ward Melville High School earned recognition as a Regional Finalist in the Siemens Competition in Math, Science and Technology. Kevin's work in the **Gergen** lab involved the identification and characterization of a cis-regulatory element from the *Drosophila wingless* gene that mediates regulation in response to Runt and other DNA-binding transcription factors in the early embryo. Kevin's was recognized as a National Semi-Finalist in the Intel Science Talent Search. **Ms. Pamela Wax**, a student from Harborfields High School was also honored as an Intel National Semi-finalist based on her research project in the **Gergen** lab investigating the dose-dependent effects of the Fushi-tarazu transcription factor on gene expression during *Drosophila* segmentation.

Faculty Updates

Paul Bingham I consulted with Japanese public television (NHK) on the production of a four part documentary on the evolutionary origins of modern humans. This work included program development advice as well as extensive on-camera work. Most interesting was an extensive interview and a full day's shoot at the remarkable prehistoric Hopewell site at Newark, Ohio. This was a most illuminating experience. I acquired a new respect for the demanding rigors of film making. In collaboration with Prof. Zuzana Zachar and members of our group we have continued to investigate the fundamental mechanisms of the new class of anti-cancer drugs we originally discovered. The patent on these drugs is held by the University and they are currently in Phase I/II human clinical trials. In collaboration with Joanne Souza we have continued to explore our interests in the evolution of human social cooperation. We are currently planning at least one new book on this work as a follow-up to our recently published book *Death from a Distance and the Birth of a Humane Universe*. In collaboration with Joanne Souza we have continued to expand our long-standing educational research project, including new pedagogical and technical approaches to teaching large live courses and online courses. In the process of this work we taught our three-credit, 300-level course on human evolution, behavior and history to ca. 800 Stony Brook undergraduates last year. As well our online graduate teaching project has more than doubled in enrollment over the last year.

Deborah Brown was invited to give talks on her work at a FASEB conference on Biomembranes in Snowbird, Utah, and at a Special Interest Subgroup meeting on Clathrin-Independent Endocytosis at the American Society for Cell Biology Annual Meeting in Philadelphia. She also presented her work at a Gordon conference on Lysosomes & Endocytosis. Grad student Azad Gucwa (Genetics) welcomed a new little cell biologist, Dylan Archer Gucwa, into the world in June.

Vitaly Citovsky was a recipient of a new grant from DOE. He also continues to serve on Editorial Boards of *Virology*, *Plant Physiology*, *Molecular Plant Pathology*, *Frontiers in Plant-Microbe Interactions*, *Frontiers in Plant Physiology*, *Plant Signaling & Behavior*, *Communicative and Integrative Biology*, *The Open Plant Science Journal*, and *Gene Regulation and Systems Biology*, and is a member of the Cell Biology section of *Faculty 1000 Biology*.

Neta Dean was invited to give a talk in November 2010 at Boston University, Boston Massachusetts on fungal recognition by macrophages.

Dale Deutsch and his laboratory are in still in good spirits since they still have NIH funding, a major four year grant and just about to finish up two, two year NIH "Stimulus" grants. Nadine, Ulloa, a graduate student in the laboratory is working on her second paper and diligently towards the completion of her PhD by summers end. Martin Kaczocha, who received his PhD last year has decided to stay on for a while in the laboratory as a postdoctoral fellow. He has also applied for a R21 NIH grant this year. He received a Hughes Teaching Award through Dr. Bynum's center and is teaching some lectures in Bio 365 this year under the guidance of Drs. Sternglanz and Karzai. Dr. Jing Sun, a talented molecular biologist is working for her second year in our laboratory. She is helping with various projects in the laboratory including protein purification for some protein crystallization studies we are undertaking in collaboration with Dr. Huilin Li, who has facilities at Brookhaven National Laboratory and has become a full time professor in Biochemistry and Cell Biology. To support this work, we received a small seed grant from the Provost's office and hope to use this as the basis of another main grant in 2012.

J. Peter Gergen was appointed the Director of Undergraduate Biology in September. In this position he is responsible for coordinating the efforts of the Departments of Biochemistry and Cell Biology, Ecology and Evolution, and Neurobiology and Behavior in delivering the undergraduate curriculum that is central to the Biology and Biochemistry majors. On the research front Gergen gave talks at the 51st Annual Drosophila Research Conference in Washington, D.C and the 17th International RUNX meeting in Hiroshima, Japan. He continues to serve as a full member of the Minority Programs Review Committee panel for the National Institute of General Medical Sciences and has participated as a member of the Career Development Panel for the Leukemia and Lymphoma Society for the last three years.

Robert S. Haltiwanger continues to serve as Chair of the Department of Biochemistry and Cell Biology and he is very excited about recruiting several new Assistant Professors to the Department. He served as President of the Society for Glycobiology in 2010, organizing the annual meeting for the Society in St. Pete Beach, Florida, which was held November 7-10. He begins serving as Editor-in-Chief for the journal, *Glycobiology*, in 2011. He attended the Association of Medical and Graduate Departments of Biochemistry Chairs annual meeting in Laguna Beach, California, to confer with his fellow Biochemistry Chairs. He was an invited speaker at the 28th Annual Naito Conference, Glycan Expression and Regulation, at the Shonan Village Center in Kanagawa, Japan, GlycoT-2010 in Tokyo, Japan, and the Annual Meeting of the American Society for Matrix Biology in Charleston, South Carolina. He also gave an invited seminar at the Van Andel

Research Institute in Grand Rapids, Michigan.

Nancy Hollingsworth was Co-Chair of the 2010 Meiosis Gordon Conference held in New London, New Hampshire where she also presented a talk. She was an invited speaker at the FASEB Meeting on Yeast Chromosome Structure, Replication and Segregation in Carefree, AZ and the New York Academy of Sciences Genomic Integrity Discussion Group. She was a member of the planning committee for the Pew Scholars in Biomedical Sciences 25th year reunion meeting which she attended in Duck Key, FL in November. Nancy presented a seminar to the students in the Cold Spring Harbor Yeast Genetics course in July. She served as an ad hoc member on the NSF "Mechanisms of Inheritance" study section in October and has continued to work as an Associate Editor for *Genetics*. Nancy is responsible for one project in the "Rewiring of gene expression in the meiotic state" Program Project Grant that began in March.

William Lennarz continues to serve as Editor-in-Chief of Biochemical and Biophysical Research Communications (BBRC) in October he attended the BBRC Editorial Board Meeting and Symposium in Singapore. He also continues to serve on the Fellowship Award Committee for the Life Sciences Research Foundation.

Huilin Li was a co-organizer and an invited speaker at the "International Workshop on 3D Molecular Imaging by Cryo-Electron Microscopy" held at Institute of Biophysics, Chinese Academy of Sciences in summer 2010. During the trip, he was amazed by the high-speed rail system sprawling across the country. In the 1980s it took him 3 days by ship via the Yangtze River or 14 hours by train to travel from his hometown near Shanghai to Wuhan University where he studied physics. This time it took only a little over 4 hours to return to his alma mater by high-speed train. Huilin served as grant reviewer for NIH and NSF in 2010. His group's research on the *Mycobacterium tuberculosis* proteasome earned him "2010 Man of the Year in Health/Medicine" by The Village Beacon Record, a Long Island North Shore weekly newspaper, and "Brookhaven Lab's Top 5 Scientific Discoveries of 2010". He is invited to speak at the 2nd "Cold Spring Harbor Asia Conference on Membrane Proteins: Structure & Function" to be held in May 2011. He is also an invited speaker at the inaugural "Cold Spring Harbor Asia Conference on Protein Structure Based Drug Design" in September 2011.

Faculty Updates

Erwin London presented seminars at the Fourth International Society for Neurochemistry Special Neurochemistry Conference, Erice, Italy May, 2010, and the Third International Cellular Delivery of Therapeutic Macromolecules Symposium, Cardiff, UK, June 2010. Erwin continued as the Director of the Biochemistry and Structural Biology Graduate Program, as a member of the Editorial Advisory Board for the journals *Biochemistry* and *Protein Science*, as a member of the Editorial Board for the *Journal of Membrane Biology*, and as a member of the Fellowship Award Committee for the Life Sciences Research Foundation.

Harvard Lyman continues as Director of Undergraduate Studies of the Department of Biochemistry & Cell Biology, the Chairman of the Faculty Committee on Health Professions, and a member of the Admissions Committee of the Stony Brook University School of Medicine. He was recently elected as a Senator representing the School of Professional Development.

Kenneth Marcu Together with 3 other institutions (The Hospital for Special Surgery in Manhattan, Harvard Medical School and San Diego State University) Ken was awarded a targeted NIH ARRA RC4 grant for 3 years entitled: "Defining Common Molecular Parameters for Onset and Progression of Osteoarthritis". So in addition to his projects here at Stony Brook, the Rizzoli Institute in Bologna (Italy), the Forth Basic Research Institute of the Ioannina Medical School (Ioannina, Greece), Ken now does some of his research with collaborators in Manhattan, San Diego and Boston.

Aaron Neiman was awarded a renewal of his NIH grant to study the assembly and function of the yeast spore wall. He was also co-PI with Rolf Sternglanz on one leg of a program project grant that was awarded to five laboratories in the Center for Yeast Molecular Genetics and Cell Biology. Aaron served as an ad hoc member of an NIH special emphasis panel and continues to serve as the faculty director for the University Central Microscopy Facility.

Keith Sheppard gave a keynote address at the Long Island Science Education Leadership Association about the Past, Present and Future of Science Education on Long Island, as well as an invited seminar on the teaching of Evolution by Biology Teachers at the New York Atheists Society. Keith also serves as the Program Director for the newly established PhD program in Science Education that started in September 2010.

Steven Smith was an invited speaker at a

Keystone conference on "G Protein Coupled Receptors", a FASEB conference on the "Molecular Biophysics of Cellular Membranes", and the Life Sciences Summit on Long Island. He also gave talks at Mt. Sinai School of Medicine and the Worcester Polytechnic Institute. He continues as the Director of Structural Biology at Stony Brook. A new 500 MHz NMR spectrometer was installed in the Center for Structural Biology during the summer.

Rolf Sternglanz along with four other faculty in the Yeast Center, of a 5 year NIH Program Project Grant to study various aspects of yeast meiosis. In particular, Aaron Neiman and I will study chromatin changes during sporulation in both budding yeast and fission yeast. I continue as Director of the large interdepartmental Molecular and Cellular Graduate Program.

Gerald Thomsen continues to work on developmental mechanisms of the frog *Xenopus*, and the sea anemone *Nematostella vectensis*, with major focus on modifiers of TGF-beta signal transduction. Also works on sea anemone development and uses sea anemones for analysis of the evolution of TGF-beta signaling pathways. The lab also is studying cellular and molecular mechanisms of regeneration using the sea anemone and *Xenopus*. Jerry has active grant support from the NIH. Researchers in the lab during 2010 included Research Associate Dr. Yasuno Iwasaki, postdocs Dr. Matt Dunn, Dr. Bill Gillis and Dr. Lidia Sobkow, graduate students Dong-Hyuk Ki, Francesca Nakagawa and Gina Sorrentino, Research Scholar Dr. Pat Bossert, and undergraduate Mark Maloof. Jerry presented research seminars at the University of Arizona, the 13th International *Xenopus* Conference in Banff, Canada (which was co-organized by Jerry's first graduate student, Marko Horb who is at the IRCM in Montreal), and the MBL in Woods Hole. Jerry stepped down from being Director of the SBU Genetics Graduate Program after 5 years.... just in time for Jerry and his wife Julia to welcome their third child, a boy - Luca, to the world on November 25th, 2010. Luca joins his brother Liam (4.5 yrs) and sister Isabela (2 yrs). For Jerry and Julia, regular sleep is but a memory. www.thomsenlab.org

Research Faculty Updates

Markus Eilers research focuses on the structural biology of G protein-coupled receptors (GPCRs). GPCRs are the largest family of transmembrane receptors, share a common 7 transmembrane helix architecture, and are a major drug target. Specific receptors being studied are rhodopsin (the visual receptor for dim light vision), CCR5 (a co-receptor for HIV) and the β_2 -adrenoreceptor (the receptor for

epinephrine). Markus presented a poster at the New York Structural Biology Discussion Group Summer Session 2010.

Hideyuki Takeuchi research focuses on how protein glycosylation regulates numerous intercellular interactions. I focus on the regulatory mechanism of Notch signaling by protein *O*-glucosylation. Under the mentorship of Dr. Haltiwanger, I have shown that a newly identified gene, called *Rumi*, encodes a long-sought protein *O*-glucosyltransferase and that *O*-glucosylation mediated by Rumi is essential for Notch signaling. I will also examine the physiological importance of Rumi in the intestine in the aspects of homeostasis and diseases such as inflammatory bowel disease and colorectal cancer. In 2010, I participated in the Annual Conference of the Society for Glycobiology in Florida.

Shoko Ueki is studying about regulatory mechanism of cell-to-cell molecular transport through cell wall spanning channel structure, plasmodesma, in plant. She is particularly interested in the interaction of the channel with plant virus, and characterized the mechanism of plant viral transport through the structure. During 2010, she published two research articles and one review article in major journals, and presented her work in the Plasmodesmata 2010 Seventh International Conference held at Sydney, Australia, and American Plant Biologist Society North Eastern Section Meeting held at Garden City, NY. Currently she is working with two undergraduate students for her research project.

Carol Galdi Retired!



Carol & Bob on Carol's Last Day

The Biochemistry & Cell Biology Department would like to thank Carol Galdi for her years of service to the Department as Secretary to the Chair. We wish Carol a Healthy & Happy Retirement!

Postdoctoral Research

Tracy Callender from Nancy Hollingsworth's lab: Meiosis is the specialized type of cell division used to produce the gametes required for sexual reproduction. During meiosis, the majority of DNA double-strand breaks are repaired using the homologous chromosomes as templates. This interhomolog repair has been shown to be mediated by three independent factors: the presence of a meiosis-specific kinase Mek1, a meiosis-specific recombinase Dmc1 and the presence of a meiosis-specific protein Hed1. In *dmc1* strains, cells arrest in meiotic prophase and DSB repair is absent. However, the deletion of *hed1* rescues this DSB repair defect and restores sporulation and spore viability. In our studies, mutants in *PCH2*, a widely conserved protein shown to be required for the organization of yeast meiotic chromosome axes, in the *dmc1 hed1* background produces dead spores, a phenotype observed in *mek1* mutants, indicating intersister repair. It has been shown that this spore inviability can be rescued by the presence of Dmc1. My goal is to study the behavior of the joint molecules and crossover formation in these mutants and determine how many interhomolog joint molecules does the presence of *DMC1* restore to the *pch2 hed1* mutants.

Salvatore Chiantia from Erwin London's lab research focuses on the molecular organization of cellular membranes, with particular emphasis on lipid-protein domains and trans-bilayer asymmetry. The plasma membrane exhibit an asymmetric distribution of lipids across the two leaflets of the bilayer. While the sphingolipid-rich outer (exoplasmic) leaflet has a lipid composition prone to lateral segregation and domain formation, the situation in the sphingolipid-poor inner (cytosolic) leaflet is unclear. The interaction between the two leaflets and the passage of information across the membrane, although involved in several biological processes (e.g. signal transduction), are not well understood. In order to investigate the physical mechanisms behind inter-leaflet coupling and the effect of membrane asymmetry on transmembrane proteins, I am using fluorescence spectroscopy and single molecule fluorescence on model membrane systems.

Benoit Lacroix from Vitaly Citovsky's lab is investigating the molecular mechanisms of the transfer of DNA from *Agrobacterium tumefaciens* to host plant genome. More specifically, he has focused on the role of the bacterial type 4 secretion system protein VirB5 in the extracellular space during the early steps of this transfer. During 2010, Benoit Lacroix published a book chapter and a review article, and presented his results at the 74th Annual Meeting of the Northeast Section of the American Society of Plant Biologists. Benoit Lacroix also has supervised the work of four undergraduate students.

Yan Liu from Nancy Hollingsworth's lab focuses on one of the fundamental differences between mitotic and meiotic cells is the source of homology used to repair double strand breaks (DSB). In mitotically dividing cells, recombination is used to repair lesions in replication or exogenous DNA damage, which typically generates non-crossover (NCO) products. In contrast, in meiosis repair of double strand breaks (DSBs) occurs primarily between non-sister chromatids of homologous chromosomes, which generate crossover (CO) products. Meiotic recombination is initiated by DSB catalyzed by the highly conserved protein Spo11. DSBs activate the meiosis specific kinase Mek1 to prevent Rad51 from invading sister chromatids, in part through phosphorylation of an accessory factor, Rad53. My project is to Mek1 substrates involved in regulating recombination. Using in vitro kinase assays containing Mek1 and purified candidate proteins, I have found that the meiosis-specific nuclease, Mms4 are phosphorylated by Mek1. In collaboration with the Gygi lab at Harvard, the in vitro phosphorylation sites have been mapped and I am using genetic approaches to investigate the biological relevance of these Mek1 phosphorylation sites in meiotic recombination in budding yeast.

Shimpei Magori from Vitaly Citovsky's lab focuses on *Agrobacterium*-mediated genetic transformation of plants, which represents the only known natural example of trans-kingdom gene transfer. Our goal is to understand how this elaborate process is regulated by bacterial factors as well as host factors. Specifically, we have been focusing on the VirD5 protein, one of the bacterial

effectors that are known to be translocated from *Agrobacterium* into plant cells. Recently, we demonstrated that VirD5 is necessary to protect another effector, VirF, from the host-induced degradation. Our data reveal a novel counter-defense strategy employed by pathogens against the potential host antimicrobial response. We are currently committed to elucidating the detailed molecular mechanism underlying this phenomenon.

Adi Zaltsman from Vitaly Citovsky's lab research focuses on genetic transformation of plant cells by *Agrobacterium*. Focussing on studying the interactions between plants and *Agrobacterium*, the only known bacterium that genetically transforms its (plant) hosts. Specifically, on the process by which the bacterium subverts its host ubiquitin/proteasome system (UPS) to facilitate infection. *Agrobacterium* uses part of the plant's systemic acquired resistance (SAR) designed to destroy invading proteins, to reveal its own TDNA in the correct timing and place –inside the nucleus. *Agrobacterium*, is a unique bacterium capable of transfer of genetic material (single stranded DNA) between prokaryotic and eukaryotic cells, a soil bacterium that causes tumors in plants, by virtue of its ability to transfer DNA from its plasmid to the plant via horizontal gene transfer. Using genetic methods, the transferred DNA can be replaced by any DNA of interest, enabling the latter's introduction into the plant genome. This replacement can produce a genetically modified plant with a new, pre-selected trait of interest. However, during this process, the plant may detect the *Agrobacterium* invasion and activate a defense response against it. We are identifying and characterizing the involvement of basic cellular systems such as targeted proteolysis, and SAR.

2010 Departmental Roster

Faculty Members

Paul Bingham, Associate Professor
 Deborah Brown, Professor
 R. David Bynum, Professor
 Elof Carlson, Professor Emeritus
 Vincent Cirillo, Professor Emeritus
 Vitaly Citovsky, Professor
 Kevin Czaplinski, Assistant Professor
 Neta Dean, Professor
 Dale Deutsch, Professor
 Bernard Dudock, Professor Emeritus
 Frank Erk, Professor Emeritus
 Martin Freundlich, Professor Emeritus
 J. Peter Gergen, Professor
 Robert Haltiwanger, Professor and Chair
 Bernadette Holdener, Associate Professor
 Nancy Hollingsworth, Professor
 Wali Karzai, Associate Professor
 Abraham Kirkorian, Professor Emeritus
 William J. Lennarz, Distinguished Professor
 Huilin Li, Professor
 Erwin London, Professor
 Harvard Lyman, Associate Professor
 Kenneth Marcu, Professor
 Carl Moos, Professor Emeritus
 Aaron Neiman, Associate Professor
 Raghupathy Sarma, Professor Emeritus
 Nisson Schechter, Professor
 Keith Sheppard, Associate Professor and
 Director of Science Ed. Program
 Sanford Simon, Professor
 Melvin Simpson, Professor Emeritus
 Steven Smith, Professor
 Rolf Sternglanz, Distinguished Professor
 Gerald Thomsen, Professor

Other Faculty Appointments

Janet Andersen, Lecturer
 Nurit Ballas, Research Associate Professor
 Markus Eilers, Research Assistant Professor
 Susan Erster, Lecturer
 Michael Destio, Lecturer
 M. Raafat El-Maghrabi, Research Associate
 Professor
 Caren Gough, Lecturer
 Martin Kaczocha, Research Assistant Professor
 Joan Kiely, Director Biotech. Teaching Lab
 Alexander Krichevsky, Research Assistant
 Professor
 Chang-Jun Liu, Adjunct Professor
 Yizhi Meng, Lecturer

Daniel Moloney, Director Biotech.
 Teaching Lab
 Linda Padwa, Lecturer
 Hermann Schindelin, Adjunct Professor
 Matthew Schmidt, Adjunct Visiting Asst.
 Professor
 Richard Setlow, Adjunct Professor
 John Shanklin, Adjunct Professor
 F. William Studier, Adjunct Professor
 Hideyuki Takeuchi, Research Assistant
 Professor
 Shoko Ueki, Research Assistant Professor
 Stephen Wefer, Lecturer
 Zuzana Zachar, Research Assistant Professor
 Gang Zhao, Research Assistant Professor

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 Caroline Burns, Office Assistant
 Eileen Dowd, Administrative Assistant
 Ann Fuhr, Department Administrator
 Carol Galdi, Secretary to Chair
 Carol Juliano, Senior Staff Assistant
 Jessica Kuhn, Secretary II
 Faiqa Mirzai, Clerk II
 Judy Nimmo, CESAME Administrator
 Deborah Pelio, CESAME Staff Assistant
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 Diane Rodriguez, Staff Assistant
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Postdoctorals & Research Scientists

Shivani Ahuja
 Tracy Callender
 Xiangyu Chen
 Salvatore Chiantia
 Matthew Covey
 Jianguang Du
 Matthew Dunn
 William Gillis
 Sunita Gupta
 Yoichiro Harada
 Yasuno Iwasaki
 Martin Kaczocha
 Shinako Kakuda
 Benoit Lacroix
 Guangtao Li
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 Preeti Mehta

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 Jae-Sook Park
 Richa Rawat
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 Paramita Sarkar
 Benoit Sanson
 Lidia Sobkow
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 Jingchuan Sun
 Anton Svetlanov
 Hideyuki Takeuchi
 Tao Wang
 Tong Wang
 Shaoqing Yang
 Xiaohang Yu
 Yao Yu
 Adi Zaltsman
 Gang Zhao
 Martine Ziliox

Postdoctoral Fellow

Salvatore Chiantia

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Wei Ao
 Teddy Betts
 Delon Callender
 Juei-Suei Chen
 Kevin Celestrin
 Richard Grady
 Aya Harada
 Marzena Kazubowska
 Allison Marullo
 Ben Meyer
 Hong Pan
 Evelyn Prugar
 Sabine Keppler-Ross
 Megumi Takeuchi
 Catherine Waddell

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Guilia M. Stellari
 Farzana Yasmin

2010 Departmental Roster

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Patricia Bossert

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Esam Al-Shareffi
Darryl Aucoin
Taimour Baslan
Diya Bhattacharjee
Ian Brett
James Byrnes
Ying Cai
Nikki Calabrese
Rhodora Cristina Calizo
Devin Camenares
An-Yun Chang
Deblina Chatterjee
Fauzia Chaudhary
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Khurshida Shahidullah
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Namratha Sheshadri
Junwei Shi
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Mi Jin Son
Gina Sorrentino
Marcin Stawowczyk
Tzu-Chun Tang
Matt Titmus
Erica Ullman
Nadine Ulloa
Angelina Vaseva
Deepika Vasudevan
Krithika Venkataraman
Assaf Vestin
Bingyin Wang
Xiaoying Wang
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Yifeng Xu
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Marwah Ibrahim
Aysha Juthi
Joshua Kantharia
Avaya Khanijow
Soah Kim
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Dianyi Liu
Tarneet Madaan
Chanyoung Maeng
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Corrine McGuirk
Zanab Mian

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Aparna Nigam
Deepa Nair
Zanab Niari
Pritul Patel
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Ahmed Rab
Seema Sawh
Ryosuke Sasaki
Rachel Salatka
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Nehal Shah
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Abe Williams
Kevin Wong
Liuqing Xing
Lina Xie
Min Li Xi
Sung Ming Yoon
Xiaoshuai Yuen
Hamna Zafar
Daria Zainoullina

Publications in 2010

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- Nancy Hollingsworth**- Callender, T. and N. M. Hollingsworth (2010) "Mek1 suppression of meiotic double strand break repair is specific to sister chromatids, chromosome autonomous and does not require *REC8*." *Genetics* 185: 1-12.
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- William Lennarz**- Funakoshi Y, Negishi Y, Gergen JP, Seino J, Ishii K, Lennarz WJ, Matsuo I, Ito Y, Taniguchi N, Suzuki T. (2010) "Evidence for an essential deglycosylation-independent activity of PNGase in *Drosophila melanogaster*." *PLoS One*. 5(5):e10545.
- Huilin Li**-Wang T, Darwin KH, Li H. (2010) "Binding-induced folding of prokaryotic ubiquitin-like protein on the Mycobacterium proteasomal ATPase targets substrates for degradation." *Nat Struct Mol Biol*. 17, 1352-7.
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- Erwin London**-Shahidullah, K., Krishnakumar, S.S., and London, E. (2010) "The Effect of Hydrophilic Substitutions and Anionic Lipids Upon the Transverse Positioning of the Transmembrane Helix of the Erb b2 (neu) Protein Incorporated into Model Membrane Vesicles" *J. Mol. Biol.*, 396, 209-220.
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- Kenneth Marcu**- Borzi, R-M., Olivotto, E., Pagani, S., Vitellozzi, R., Neri, S., Battistelli, M., Falcieri, E., Facchini, A., Flamigni, F., Penzo, M., Platano, D., Santi, S., Facchini, A. and Marcu, K. B. (2010). "Matrix metalloproteinase 13 loss associated with impaired ECM remodeling disrupts chondrocyte differentiation by concerted effects on multiple regulatory factors." *Arthritis and Rheumatism* 62: 2370-2381.
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- Aaron Neiman**-Yu, Y., Neiman, A. M., and Sternglanz, R. (2010). "The JmjC domain of Gis1 is dispensable for transcriptional activation." *FEMS Yeast Res*. 10:793-801.
- Mathieson, E. M., Suda, Y., Nickas, M., Snyderman, B., Davis, T. N., Muller, E. G., and Neiman, A. M. (2010). "Vesicle docking to the spindle pole body is necessary to recruit the exocyst during membrane formation in *Saccharomyces cerevisiae*." *Mol. Biol. Cell*. 21:3693-3707
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The sea anemone *Nematostella vectensis* is a new model organism representing the phylum Cnidaria, which encompasses sea anemones, corals, jellyfish and hydras. This phylum last shared a common evolutionary ancestor with vertebrates some 650 million years ago, yet the genome sequences of *Nematostella* and *Hydra* reveal that cnidarians and vertebrates share a significant number of individual genes or gene families. Essentially the fundamental toolbox for making a multicellular animal was established in some ancient organism long before the evolutionary diversification of the wide variety of animal types we now know. Ongoing studies in the lab of **Jerry Thomsen** and his collaborators (Mark Martindale and colleagues at U. Hawaii) are exploring how critical vertebrate developmental regulatory genes are deployed and function in *Nematostella* during embryonic development and regeneration. Unlike most vertebrates, *Nematostella* regrows amputated tissues and structures in a robust and rapid fashion, so understanding the cellular and molecular processes regulating *Nematostella* regeneration may provide insight into how diseased or degenerated human tissues and organs can be prompted to regenerate. "Photo by Dr. Pat Bossert of Dr. Thomsen's lab."



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The BCC provides biostatistical guidance and data analysis support for all aspects of a research endeavor. Besides general biostatistical consultations, the BCC statisticians also serve as biostatistical co-investigators on grants and provide short statistics course/workshops for faculty and staff of the Stony Brook School of Medicine. For additional information, services and fees please link to:
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The Central Microscopy Facility provides light and electron microscopy services under ISO Cl. 7 clean rooms. The facility houses two confocal microscopes, both being two-photon capable. One instrument is excellent for both fixed and live-cell imaging. The second instrument is specially constructed to allow imaging of cells within whole organisms. The facility also has an FEI BioTwin transmission electron microscope for thin section or diffraction imaging of samples. Preparation and sectioning of samples for the electron microscope is available. Both the confocal and electron microscopes are overseen by full-time professional staff who are available to train users on the instruments and provide advice on techniques and sample preparation. For additional information, services and fees please link to:
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Bioinformatics Facility

The bioinformatics facility provides a broad spectrum of bioinformatics and IT support to our customers. Services include: general bioinformatics consultation; high throughput sequence, microarray, and pathway analysis; custom software development, etc. For additional information, services and fees please link to:
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Proteomics Facility



The Proteomics Center analyzes protein/peptide/small molecule samples with the help of mass spectrometry. The Proteomics technical staff measure intact masses of proteins/peptides/small molecules, identify peptides based on their sequence, and discover post-translational modifications. Comparisons of protein expressions between different samples are conducted. The center has four different mass spectrometers: a Matrix-assisted laser desorption/ionization time-of-flight mass spectrometer; a triple quadrupole

mass spectrometer; a linear ion-trap mass spectrometer; and a high-resolution, high mass accuracy hybrid mass spectrometer with four different activation methods (Thermo LTQ Orbitrap XL with ETD). In addition, equipment for running 2D gel electrophoresis and analysis are also present. For additional information, services and fees please link to:
<http://www.osa.sunysb.edu/Proteomics/>

Translational Experimental Therapeutics Laboratory (PK)



The Translational Experimental Therapeutics Laboratory (TETL) has been established to facilitate translational medicine by providing *in vivo* data on compound absorption, distribution, metabolism, excretion and toxicity (ADME/T). Compounds identified in the initial phase of drug discovery invariably lack one or more biological properties, such as potency, oral bioavailability, selectivity or toxicity, that are essential for use as a diagnostic or therapeutic in humans. The TETL thus seeks to overcome a major hurdle in academic drug discovery pipeline by providing a mechanism for integrating chemical synthesis with methods to assess compound ADME/T. For additional information, services and fees please link to:
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