

Biological Sciences

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LEHIGH UNIVERSITY

Greetings from the department

Have you ever heard the phrase, "we are all replaceable?" I certainly have and I have probably said it myself. It's easy to see how it might be true when it comes to tasks performed by people we barely know. It might even be comforting to believe that future generations going to Lehigh also will receive the same quality of education as did you.

But I no longer believe in the "replacement" idea. I am sure that the former students of Barry Bean know that while his courses might be taught by others, the education they gained by studying with him is irreplaceable. You will never meet anyone quite like Barry. I certainly know this and I am saddened.



Murray Itzkowitz, Ph.D.
Professor and Chair

At the same time, this Department is changing in many ways and thus the current undergraduates will also have their unique experiences with the faculty. In this newsletter you will see that we are further strengthening our neuroscience program by the addition of Julie Haas and Julie Miwa. Seemingly instantaneous with placing their names on their office doors, their labs were filled with undergraduate researchers. Next year, and in subsequent years, we will be expanding our cell and molecular biology programs with new faculty. This increase in faculty numbers is designed to meet the ever increasing numbers of undergraduate students who choose to major in this department. Currently we have more majors than all other science departments... combined.

In an effort to place our undergraduate research program on a more financially secure footing, Lehigh is actively attempting to build an endowment for this Department. Please contribute if you can.

If you would like to see the actual benefits gained from this program, please visit us when the current undergraduates present their research posters on April 11th. It would also give you an opportunity to meet some of our newest faculty. I hope to see you there!

Murray Itzkowitz, Ph.D.
Professor and Chair

Graduate Student Spotlight

Joshua B. Slee is a Ph.D. Candidate in the Cell and Molecular Biology program

Josh came to Lehigh after earning a Bachelor of Science and a Master of Science in Biotechnology from Marywood University in Scranton, PA. During his time there, he studied exercise-induced asthma and investigated the harmful effects of automobile air pollution on airway function. This work sparked a desire to further understand how the inflammatory process can be harmful in other health disorders. He entered the doctoral program and joined the biochemistry lab of Linda Lowe-Krentz in the summer of 2008.

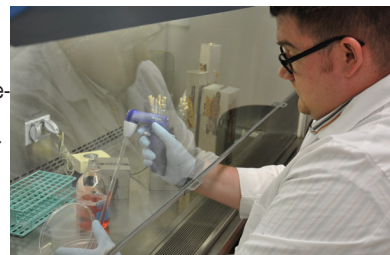
The Lowe-Krentz lab is interested in determining the underlying molecular, cellular, and biochemical processes involved in the development of atherosclerosis (heart disease) and ways to attenuate the disease process. Of particular interest is the study of how blood flow (shear stress) relates to atherosclerosis. Normal shear stress has been shown to be anti-inflammatory and protect against the development of atherosclerosis. A second focus of the lab is to understand the mechanism of action for heparin in the vasculature. Heparin is well-known for its role as an anti-coagulant and also has potential for use as an anti-inflammatory agent in atherosclerotic vasculature.

The lab has published data showing that shear stress in the vasculature mediates whole cell, actin microfilament, and nuclei realignment in the direction of shear stress. These cellular changes have been shown by others to protect against the development of atherosclerosis. Heparin treatment of vascular smooth muscle cells in culture has been shown by the Lowe-Krentz lab as well as others to slow cell proliferation, a hallmark of atherosclerotic vascular smooth muscle cells. The lab has data to support the involvement of a cell surface receptor and downstream signaling involving protein kinase G (PKG) and mitogen-activated protein kinase phosphatase-1 (MKP-1). Independent of PKG and MKP-1 signaling, heparin treatment has also been shown to promote inactivation of Erk, a major player in promoting cellular proliferation.

Josh's dissertation work has focused on identifying proteins involved in mediating the anti-inflammatory effects of shear stress and identifying a receptor for heparin. He has published his work showing that the actin binding protein, cofilin, is involved in facilitating shear stress responses. He has demonstrated that cofilin facilitates proper actin turnover and barrier maintenance in vascular endothelial cells and that these effects are in part regulated through stress kinases, JNK and p38. This project was initiated when Josh worked as the graduate student mentor for the HHMI Biosystems Dynamics Summer Institute summer project in 2008. He is currently conducting experiments to support biochemical data suggesting that the heparin receptor might be a previously uncharacterized transmembrane protein. Josh is employing a combination of cellular, molecular, and biochemical techniques to attack this project from all sides. Identification of the heparin receptor would allow for future research to develop the therapeutic potential of heparin in the treatment of vascular diseases.

When not working on his dissertation, Josh enjoys teaching and guest lecturing in the core biology curriculum in the department and training students working the lab. He has designed and delivered lectures in cellular metabolism and cardiovascular disease physiology. Outside of teaching and working in the lab, Josh and his wife, Kyle, have a certified service and therapy dog named Tucker, who regularly visits nursing homes and special education classes.

Josh was the recipient of Lehigh's Nemes Fellowship in the Fall of 2011. He is also a member of the Delta Epsilon Sigma and Kappa Gamma Pi national honors societies. His work has been presented at national conferences and published in peer-reviewed journals and books.



Department welcomes new faculty

The department of biological sciences is pleased to introduce the newest members of our faculty.



Julie Haas, Ph.D.
Assistant Professor

Julie Haas, Ph.D. earned her undergraduate degree in Music and Mathematics from Indiana University. She then went on to Boston University where she was awarded her Ph.D. in Biomedical Engineering. Dr. Haas's teaching interests include introducing students to the variety and complexity of communication in the brain.

Dr. Haas notes, "My work focuses on the plasticity of electrical synapses in the context of normal and abnormal brain activity. Activity-dependent changes, or plasticity, in the strength of synaptic connections between neurons are vital for nervous system development and for the continuous refinement of the brain's representations of its sensory environment throughout life; plasticity is thought to represent the single-neuron version of learning. Plasticity has been extensively characterized for chemical synapses, but the relationships between neuronal activity and the strength of electrical synapses have been, until now, almost entirely neglected. Because electrical synapses are widespread throughout the brain, it is critical to vastly expand our understanding of whether and how the strength of these synapses might be regulated in a use-dependent manner during natural activity. My research focuses on the basic mechanisms and causes of electrical synaptic plasticity, with an ultimate goal of understanding how this particular form of plasticity shapes brain function."



Julie Miwa, Ph.D.
Assistant Professor

Julie Miwa, Ph.D. is a neuroscientist who was most recently a senior research fellow at California Institute of Technology. She received her undergraduate degree in Neurobiology from University of California at Berkeley and her Ph.D. from The Rockefeller University in Neuroscience. She did post-doctoral work at Rockefeller University and trained at Yale University in the Psychiatry Department.

"The brain's ability to learn is much higher when we are young than when we are mature. What changes in our brain as we age to alter learning potential?" Julie discovered a gene, called *lynx1*, which is expressed during the time the brain transitions from youthful robust learning ability (we term "plasticity"), to the mature, stable adult form. Using genetic engineering to remove the *lynx1* gene, she found that these mice learn better, and with colleagues found they have youthful plasticity beyond the normal time-frame. Her work now focuses on understanding how the *lynx1* gene suppresses learning potential on a cellular level, and seeks to control the activity of the *lynx1* gene. This ability could be valuable in cases when calling forth such youthful plasticity could be beneficial, such as when we lose brain activity (e.g. stroke, traumatic brain injury), in cases of memory problems (e.g. Alzheimer's disease and other dementias), and neurodevelopmental disorders when correct circuit development in the brain was disrupted. Her work encompasses molecular biology and genetics, electron, light, and fluorescence microscopy, slice electrophysiology, and behavioral research. She focuses particularly on nicotine receptors of the cholinergic system and *lynx* modulators which govern their activity.

Dr. Miwa is interested in teaching neuroscience, molecular genetics in the brain and behavioral plasticity.

Faculty promoted by trustees



R. Michael Burger, Ph.D.
Associate Professor

R. Michael Burger, Ph.D. promoted to associate professor with tenure

Burger received his bachelor's degree from Ithaca College and his Ph.D. from the University of Texas at Austin. He was then appointed as a postdoctoral fellow at the University of Washington. Prior to his arrival at Lehigh, Burger was named a Von Humboldt Fellow, a prestigious award which supported a year's study in Germany. Burger's research centers on the question of how cellular, synaptic, and systems level properties are integrated to allow sensory neurons to extract and represent features of the acoustic environment. His work has been

funded by the Deafness Research Foundation and the National Institute on Deafness and other Communication Disorders (NIH).

Robert Skibbens, Ph.D. promoted to full professor



Robert Skibbens, Ph.D.
Professor

Skibbens earned his bachelor's degree from Ohio State University and his doctorate degree from the University of North Carolina at Chapel Hill. He then did his postdoctoral research at Johns Hopkins School of Medicine and the Carnegie Institute of Washington, Baltimore. Professor Skibbens arrived at Lehigh in 1999 and his research focuses on Ctf7p/Eco1p, an essential component of the sister chromatid pairing pathway found in both humans and yeast. Skibbens' research has been funded by the National Science Foundation, the Susan G. Koman Race for the Cure Foundation, and the NIH.

2012 Publications

Phopin, K, Nimlamool, W, Bartlett, MJ and Bean, BS. 2012. Distribution, crypticity, stability, and localization of alpha-L-fucosidase of mouse cauda epididymal sperm. *Molecular Reproduction & Development* 79: 208-217.

Fischl, M.J., Combs, T.D., Klug, A.K., Grothe, B., and Burger, R.M. (2012) Modulation of synaptic input by GABAB receptors improves coincidence detection for computation of sound location. *Journal of Physiology: London*, 590(13):3047-66

Bruce K. Carney, V. Caruso Silva and L. Cassimeris. 2012. The microtubule cytoskeleton is required for a G2 cell cycle delay in cancer cells lacking stathmin and p53. *Cytoskeleton*. 69: 278-289.

Cundall, D., E. L. Brainerd, J. A. Constantino, A. Deufel, D. Grapski, and N. Kley. 2012. Drinking in snakes: resolving a biomechanical puzzle. *J. Exp. Zool.* 317, 152-172.

Fong, J.T., Kells, R.M., Gumpert, A.M., Marzillier, J.Y., Davidson, M.W. and Falk, M.M. 2012. Internalized gap junctions are degraded by autophagy. *Autophagy* 8:794-811.

Ton, Q.T. and Iovine, M.K. Semaphorin3d mediates Cx43-dependent phenotypes during fin regeneration. *Dev. Biol.* 366: 195-203. 2012.

Bold = Faculty
Bold+Italics=Graduate Student
Italics = Undergraduate Student
Underline=Former Student

Sie, C. G., S. Hesler, S. Maas, and **M. Kuchka** (2012) IGFBP7's susceptibility to proteolysis is altered by A-to-I RNA editing of its transcript. *FEBS Letters*, 586: 2313-2317.

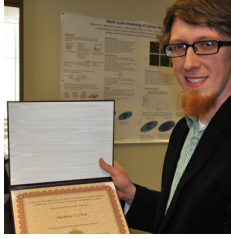
Slee, J.B. and **Lowe-Krentz, L.J.** 2012. Actin realignment and cofilin regulation are essential for barrier integrity during shear stress. *J. Cellular Biochemistry*. Oct 11. doi: 10.1002/jcb.24416.

Vallin, N., **Rice, A. M.**, Bailey, R. I., Husby, A., Qvarnström, A. 2012. Positive feedback between ecological and reproductive character displacement in a young avian hybrid zone. *Evolution* 66: 1167-1169.

Schneider, J. E., Klingerman, C. M., and Abdulhay, A. Sense and nonsense in metabolic control of reproduction. *Frontiers in Endocrinology*, 3:26. doi: 10.3389/fendo.2012.00026, 2012

Rudgra, S., Skibbens, R.V. 2012 Sister chromatid cohesion establishment occurs in concert with lagging strand synthesis. *Cell Cycle* 11:11, 2114-2121.

Special recognitions



Graduate student award

During the university's annual graduate student appreciation week, biological sciences graduate student Matthew Close (Ph.D., 2012) was awarded the Teaching Assistantship award. Matt was nominated for the award by students in the Comparative Vertebrae Anatomy class.

Close was awarded his Ph.D. in August and is currently a teaching associate at Coastal Carolina University in South Carolina. In August of 2013 he will begin a tenure track position at Radford University in Virginia. Matt's research adviser while a Lehigh graduate student was David Cundall, Ph.D.

Celldance entry nets researcher recognition

The American Society for Cell Biology holds an annual Celldance competition where members submit videos of cell-related microscopy. The purpose of the competition is to promote cell biology in the scientific community and the public. It is also a way to highlight the value of video microscopy which has become a significant part of cell biology research.

Our very own Lynne Cassimeris, professor of cell biology, submitted an entry which was awarded second prize. Cassimeris' video, entitled "Cell Wars," was a Star Wars parody featuring a light saber-wielding epithelial cell struggling to free itself from an incubator. If you would like to see the video, please visit <http://www.ascb.org/files/Past-AM-Meetings/2012-Celldance/Cell-Wars-2012.swf>



Ware leads SEA Class to first place at HHMI Symposium

Each year the Howard Hughes Medical Institute holds its SEA Symposium where students present their research on bacteriophages (viruses that infect bacteria). In June, 2012 two Lehigh in the SEA students, Aislinn Rowan and James Bowen, traveled with Professor Vassie Ware to Maryland where they attended seminars and presentations at the institute's Janelia Farm research campus. The highlight of the weekend was a poster session. Rowan and Bowen had the opportunity to share the work of their Lehigh class and received 1st Place for their presentation.



To learn more about the Lehigh in the SEA class, please visit www.lehigh.edu/~insea

Microscopic art highlighted in 2012 calendar



Microscopic art work by Lehigh undergraduate and graduates was published by BMC Cell Biology in a 2012 desk calendar. Under the leadership of Associate Professor Matthias Falk, and images captured by students in BioS 368 Cell Biology Lab were featured in various months of the calendar. Members of the Falk Lab, including current and former graduate students, John Fong and Susan Baker also had images included in the calendar.

BMC Cell Biology is an open access, peer-reviewed journal that considers articles on all aspects of the biology of cells, including organelles and cellular compartments, trafficking and turnover, signaling, motility, adhesion, cell division, differentiation and programmed cell death. Prof. Falk serves as a reviewer.

New funding awarded

Members of our faculty are always striving to increase the research presence of the department. Many innovative proposals are submitted each year to federal and state agencies and private foundations with the hope of receiving a coveted grant. There was significant success in 2012!

Department awarded GAANN Grant

The Department of Biological Sciences was recently awarded a GAANN (Graduate Assistance in Areas of National Need) grant from the U.S. Department of Education. The purpose of this grant is to increase the number of under-represented minorities in professional fields in Biology. The grant will support at least 6 graduate student fellowships over the next three years.

Associate Professor and Graduate Program Director, M. Kathryn Iovine and Professor Jennifer Swann will oversee the GAANN fellowship program. The specific components of the fellowship include a full tuition waiver, fellowship stipend for two years, funds to attend a scientific conference, a supervised teaching experience. After year 2 of the fellowship, students will be supported as either a teaching assistant or a research assistant in the department.

Faculty awarded research support

Lynne Cassimeris received funding for three different projects:

- PA CURE - Computer automated image analysis methods provide the large data sets needed for statistical analysis. Cassimeris is adapting several automated algorithms to follow the polymerization dynamics of microtubules in living cells. This new methodology will be applied to understanding how a chemotherapy targeting microtubules is able to disrupt their normal function.
- National Institutes of Health - Cancer cells ignore normal control signals and reproduce excessively. The Cassimeris Lab found evidence for a previously unrecognized pathway that can control when cells divide (reproduce) and whether they live or die. This pathway looks critical for cancer cell survival. Cassimeris is looking to identify the molecular pathway controlling the life and death decision, which could lead to new ways of targeting cancer cells for death.
- Department of Defense - The best treatment option available now for late stage metastatic prostate cancer is a drug that targets the microtubule cytoskeleton of cells (the cell's bones). Cassimeris hypothesizes that the microtubule cytoskeleton regulates intracellular metabolism and that a combination therapy of drugs targeting microtubules with those blocking intracellular metabolism will provide enhanced killing of prostate cancer cell lines.

Kathy Iovine was awarded two grants:

- National Science Foundation - Skeletal growth and patterning are coordinated by direct cell-cell communication mediated by Cx43 gap junctions. The goal of this grant is to reveal the Cx43-dependent changes in gene expression, and in turn to place these genes in a molecular network. Findings from this proposal will provide novel insights into how gap junctional communication can regulate complex developmental processes, such as building a functional skeleton.
- National Institutes of Health - Cx43 coordinates skeletal growth (cell proliferation) with skeletal patterning (joint formation). Prior findings revealed that the secreted signaling factor, Sema3d, mediates Cx43-dependent cell proliferation and joint formation. Sema3d could mediate these effects through regulation of the vasculature, neuronal growth, cell proliferation, or cell differentiation. The goal of this proposal is to reveal which of these cellular processes is regulated by Sema3d function.

Murray Itzkowitz received funding for his conservation ecology research:

- Texas Parks and Wildlife - The aim is to protect the highly endangered Leon Springs pupfish (*Cyprinodon bovinus*) found in the West Texas desert. (see related article on page 5)

Doing business with a degree in biology

Neal Walker walked the halls of Lehigh over twenty years ago. He arrived at Lehigh thinking he would pursue an engineering degree. After all, Lehigh's reputation was always one of offering a quality education in engineering, right?

Well, that's true – but Lehigh has also always offered a quality education in the biological sciences, too!

Neal Walker ended up taking a totally different path. He discovered his love of life sciences! In 1992, Walker earned a bachelor's degree in biology which altered his compass coordinates from the one he expected to follow when he entered Lehigh's portal in 1988.

Dr. Neal Walker, '92

With diploma in hand, Walker left Lehigh and to begin his education at Philadelphia College of Osteopathic Medicine (PCOM), where he earned his degree in medicine in 1997. After graduating from PCOM, Dr. Walker completed an internship at St. Barnabas Hospital in New York. Walker then went on to his residency in dermatology at the Lehigh Valley Hospital (Allentown, PA) and PCOM. The last two years of his residency he served as chief resident. Dr. Walker is a board-certified dermatologist.

But it isn't as simple as that!

Walker decided to also pursue an MBA from The Wharton School, University of Pennsylvania. During his medical residency, Dr. Walker realized his acumen in the business arena.

While in my dermatology residency, I co-founded my first company, Octagon Research Solutions which was a service and software business that helped biopharmaceutical companies develop drugs from Investigational New Drug (IND) status through a New Drug Application (NDA). I enjoyed helping patients as a practicing dermatologist, so I continued to practice one day a week while I began to look for solutions to the treatment gaps that existed in dermatology. I felt that I could make a more positive impact and reach more patients if I began to push for more innovation in dermatologic drug development. This led me to start searching for interesting compounds to develop which ultimately resulted in starting a number of companies with the help of venture capital financing.

Dr. Walker's first job in the pharmaceutical industry was at Johnson & Johnson. He then went on to BioMed Sciences, Inc. (an incubator at Ben Franklin Techventures on Lehigh's Mountaintop Campus), and then served as a medical consultant at Astra-Merck. He co-founded Octagon Research Solutions in 1999. The company was sold to Accenture in 2012. He also co-founded Trigenesis Therapeutics in 2003, which later sold to Dr. Reddy's Labs. In 2009, Walker went on to co-found and served as President and CEO of Vicept Therapeutics, Inc., which was then sold to Allergan in 2011. Dr. Walker is currently the President and CEO of Aclaris Therapeutics, Inc.

Neal Walker has worked as a serial entrepreneur – he has started 5 companies to date...all in the biopharmaceutical space.



Dr. Walker has also worked with a number of universities and their tech transfer offices to identify and commercialize promising technologies based on faculty research. His many years of business development experience spans from working with large biopharmaceutical companies, start-ups, and universities in the identification, acquisition/licensing, and financing of novel development stage assets and in-market brands. Walker also served on the advisory committee safety team for the prescription to over-the-counter switch of Prilosec®.

While at Lehigh, Neal Walker learned the basics of research methods which laid the foundation for his future.



Dr. Neal Walker ('92)
Entrepreneur

I did research while an undergrad with Prof. Murray Itzkowitz. We were looking at animal behavior with Texas Cichlids. It was a great experience learning how to do research at the bench level and really understand how a study was designed and what steps needed to be incorporated. This practical application of the coursework was invaluable in prepping me for the research environment of medical school, as well as the industry research with which I am now involved.

The department of biological sciences continues to stress the importance of research in the educational curriculum. But Walker also has some practical advice for Lehigh's students.

All things being equal, it is the relationships and networks (both personal and professional) that you build over time that will be the biggest contributors to your success in business and in life. You also need to be persistently introspective about who you are and what you really want to do. I started out in materials engineering at Lehigh. Since then I went to medical school and business school, trained as

a dermatologist, and ultimately became a biotech entrepreneur and have now started my fifth company. Quite a different road than I could have ever envisioned as an undergrad.

Neal Walker recently came back to visit Lehigh's campus after having been gone for many years. He was impressed!

The campus seems a lot bigger than it did back in 1992. Although I always liked the character of the older buildings and architecture, I couldn't help but notice a more vibrant, contemporary feel to the campus which seemed to reflect the more diverse, well-rounded nature of the university. When I attended Lehigh, it was mainly known as an engineering school. It feels a lot different than that today.

Dr. Walker lives in Valley Forge, Pennsylvania, with his wife, Christy, and 7 year old son, Jake.

We sincerely thank Dr. Walker for taking time out of his busy schedule to allow us to highlight his career for this publication.

Conservation and desert fish

Across America's southwest deserts are small isolated springs (like oases) that sometimes support unique species of fish called pupfishes. Essentially an entire species of pupfish may be found in a spring that may be as small as a bathtub, to as large as a swimming pool. The extremely limited distributions and small population sizes place each species under the Federal Endangered Species Act. This means that the Federal Government does what it can to protect these really interesting species. Department chair Murray Itzkowitz has spent the last ten years re-claiming the habitat of the pupfish in the West Texas desert.



Spawning *Cyprinodon bovinus* in the West Texas desert. Note the Pecos gambusia waiting to attack the female's released eggs.



When it is cold, we first cut the bulrush weeds before the digging begins.



We then remove the roots and the mud, an extremely difficult and tedious operation.

I began studying one of these endangered species, Leon Springs pupfish (*Cyprinodon bovinus*), near Ft. Stockton, Texas. At the time, my aim was to use them to test general hypotheses about social behavior. However, in 2003, I noticed a decline in the population. I immediately called the Texas Nature Conservancy (they owned the property) and the Federal Fish and Wildlife Service. They took notice in 2005 when I pointed out that the once robust population was now down to maybe 10 individuals. They suggested that I apply for funding from the Texas Parks and Wildlife Department (TPWD) and do what I could to halt the likely extinction.

I thought the demise of the pupfish was caused by two

interrelated factors. First, the shoreline that the pupfish used for reproduction was being encroached by bulrush weeds. I really don't know why this was happening but it was clear that these weeds were converting shallow breeding habitat into land! Second, the reduction in shallow areas also caused increased predation of pupfish eggs by another endangered fish, the Pecos gambusia (*Gambusia Nobilis*). I speculated that the loss of habitat modified the micro distribution of the Pecos gambusia making them more likely to eat the pupfish's eggs. While habitat loss has been linked to the decline in many species, this appears to be the first record of one endangered species threatening the extinction of another one. Clearly I could never get permission to eliminate one endangered species to protect another one.

With funding from the Texas Parks and Wildlife Department, we expanded the

We then add cement steps to provide the pupfish with suitable spawning surfaces and to stop the bulrush from returning.

Two current graduate students, Andrew Black and Kimberly Little, are observing the pupfish in the renovated shallow area in the summer... when the temperature is about 105° F.

shallow areas and documented the reproduction of the pupfish and their interactions with the gambusia. It was a slow process but over the next several years, the gambusia did interact less with the pupfish and gradually the pupfish population increased. After 7 years, the pupfish population now is sufficiently robust to make extinction unlikely in the absence of any serious environmental perturbation.

Of course, serious environmental disturbances in the southwest are not unusual. With an additional grant from the TPWD, we are now expanding the pupfish habitat to nearby localities where this pupfish has gone extinct. Because there still are not enough fish in the rejuvenated spring to

share with other habitats, we will reintroduce this pupfish from a captive population maintained for nearly 30 years in a federal fish hatchery in New Mexico. Reintroducing highly endangered species into their former habitat has always been controversial because often the habitat has changed, making it unlikely that it will support the species. More recently, conservationists also have come to realize that captivity sometimes causes species to "evolve" in ways that make them unsuitable to survive in appropriate habitat. For this reason we will be examining the genotype and phenotypes of the captive population relative to the current wild population and observe how they adjust and hopefully survive in their new habitat.



A tribute to our colleague and friend



Barry Bean, Ph.D.
Nov. 2, 1942 - June 25, 2012

The following is an abridged version* of a memorial resolution presented at the meeting of the university faculty in September, 2012.

On June 25, 2012, we were saddened to learn that Professor Barry Bean had passed away. Barry joined the Lehigh University Faculty in 1973 and served with dedication and distinction for 39 years. He earned his undergraduate degree in Biology from Tufts University in 1964 and his doctorate in Life Sciences from Rockefeller University in 1970. After a year overseas in the Department of Biochemistry at the Indian Institute for Science in Bangalore, India, he returned to Rockefeller as a Postdoctoral Fellow for an additional two years prior to his appointment as an Assistant Professor in what was then the Department of Biology. Barry served as Chair of the department from 1983-1985, where he recruited some of the faculty that are here today.

Barry Bean loved science and students. As a scholar, he was interested in human male reproductive biology. His group focused on the function of sperm and the processes underlying sperm-egg interactions and fertilization, with a special emphasis on how characterizing these mechanisms might lead to new forms of contraception in males. He published regularly in this area, was a frequent presenter at meetings, and served on the Editorial Board of the Archives of Andrology.

We know that students fortunate enough to pass through his classroom or work in his group came away knowing that he cared deeply about both their professional and personal development. Barry worked with more than 120 undergraduates in his lab over the course of his career. Many have gone on to some of the very best graduate and medical schools. Barry took great pride in their accomplishments.

Barry's work with graduate-level international students was one of the highlights of his career, particularly his mentorship and training of Ph.D. students from Thailand. Barry knew that globalization was critical for our future long before it became fashionable in higher education. His efforts in welcoming international students to Lehigh and in advocating for the value of having diverse cultures represented at the University, like his belief in translational research, was ahead of its time and testimony to his vision as an educator and global citizen.

Professor Barry Bean was a colleague, mentor, friend, husband, and father. We cannot adequately convey his impact on our professional and personal lives with these words. What we can say was that Barry was a good man in the very best sense of the term. He was gracious, kind, encouraging, insightful, and a wonderful colleague. He believed deeply in social responsibility and that our obligation as educators is to make Lehigh, our community, and hopefully the world, a better place. He was unrelenting in this commitment and, for those of us that knew Barry well, we expect he would say he was never able to do enough. But we would say to you today that he did; his life and influence have made all of us better.

**If you would like to read the full version, please visit <http://www.lehigh.edu/~inbios/news/Memorial.html>*

Alumni Updates

Undergraduate

Tom Walker (B.A. Bio, '64) Was a naval officer from 1964-68, earned his MA in 1970 and worked at IBM until his retirement in 2002.

Steven Lisook (B.A., Bio, '71) Became a family practice/ senior FAA medical examiner osteopathic physician in Portland, Oregon for 31 years and is now retired.

O. Thomas Mueller (B.A. Bio, '72) is the Director of Biochemical and Molecular Genetics at All Children's Hospital, St. Petersburg, Florida.

Michael Melino (B.A., Bio, '76) "I earned my PhD in Immunology from Rutgers University in 1984. Currently I am a Sr. Director at Daiichi Sankyo Pharma Development in the Cardiovascular Research Department developing and conducting clinical trials for anti-coagulant therapies."

Susan (Bieling) Paolucci (B.A. Bio, German, '78) is a psychiatrist and medical director of Systems Therapeutics at Geisinger Health System, Danville, PA. She has been married to Dr Stephen Paolucci for 33 years and they have two children, Benjamin and Kathryn.

Robert Cortright (B.S. Biochem, '79) is the co-founder of FX Solutions, LLC, named to the List of 500 America's fastest growing private companies. In 2009 Robert was named Ernst & Young Entrepreneur of the Year in Financial Services for the New Jersey Region and a national finalist.

Thomas Ward (B.S. Bio, '80) "After graduating in 1980 I attended the Penn State College of Medicine and received my MD in 1984. I then did an internship at Tripler Army Medical Center, an Ophthalmology Residency and Fellowship in Diseases and Surgery of the Retina and Vitreous at Walter Reed Army Medical Center, and a Fellowship in Ophthalmic Pathology at the Armed Forces Institute of Pathology. I spent 22 years in the U.S. Army where I was the Ophthalmology Resi-

dency Program Director at Walter Reed and the Ophthalmology Consultant to the Army Surgeon General. I retired from the Army in 2006 and joined Consulting Ophthalmologists, PC in Farmington, Connecticut."

Jacqueline (Lachman) Hirsch (B.A., Bio & Psych, '82) earned her MBA Fairleigh Dickinson in 1986 and was in pharmaceutical marketing and sales during the '80s. She went back to school and earned her BSN from Pace University in 1997 and is a Maternal-Child Health, Board-Certified Holistic Nurse Entrepreneur. Jacqueline is also an Arbonne International, independent consultant/district manager selling premium branded Swiss-formulated health, beauty and wellness products.

Guy Eshelman (B.A. Bio, '83) earned his M.D. at the University of Rochester in 1987 and went on to do a residency in family medicine at Lancaster General Hospital. Until 2001, Guy was in private practice in Lititz, PA. He is now teaching and promoting family medicine in the Republic of Albania.

Richard Mansfield (B.A. Bio, '85) is a physician in West Chester, PA.

Katie (Mazarin) Derase (B.A. BNS, '95) is a Doctor of Physical Therapy.

David Warsaw (B.S. MBio, '85) "I am currently the chief of Plastic Surgery at Lancaster General Hospital in Lancaster, PA."

Fotinos Panagakos (B.A. Bio, '86) "I am currently Director, Clinical Research - Oral Care, for the Colgate Palmolive Company. I have been with the company for 7 years. Following completion of a DMD/PhD (biochemistry and molecular biology) program at the University of Medicine and Dentistry of NJ in 1992, I was a full time faculty member for 14 years, while also maintaining a part time dental practice."

Karen Flam (B.A. Pre-Dental, '92) Karen Flam is Executive Director of the Aromatherapy Alliance, a not-for-profit education group that educates clinicians and lay-people about the usage of essential oils and hydrosols.



Barbara Simon (B.A., BNS, '92) "I worked in biomedical research at Jefferson Hospital and the Children's Hospital of Philadelphia. Then I did a Post Baccalaureate Program at the University of Pennsylvania, then attended MCP- Hahnemann University Medical School and received my MD in 2000. I am currently an Assistant Professor of Medicine and the Chief of the Division of Endocrinology at Drexel University College of Medicine. I have started a fellowship training program in Endocrinology and will be the Program Director for our first fellows starting July 2012. I was in the very first class that Jill Schneider taught at Lehigh, she was a great inspiration and also gave me the research skills that I needed to start off with my first job after Lehigh...I wonder if she remembers me? Thank you, Prof. Schneider!"

Amy (Benedict) Leahy (B.S., MBio, '94) "I am a Registered Patent Attorney, providing intellectual property counseling and support to institutions including Massachusetts General Hospital, Memorial Sloan-Kettering Cancer Center, and Brigham and Women's Hospital."

Kaci (Holt) Nowadly (B.S. MBio, B.A. Anthropology, '96) "I am currently in my 10th year teaching 8th grade science and Regents Living Environment in Hamburg New York. I love what I do. This year I also took on the responsibility of Energy Education Specialist. It is my job to watch the district energy use and try to save us money by educating the staff and by walking through the buildings to be sure that our guidelines are being followed."

Dawn (Sharvin) Horst (B.S. Bio, '97) is currently the Manager of Ingersoll Rand's Global EHS Assessment and Compliance Program. She is responsible for leading the development, implementation, and execution of a value-added global EHS compliance audit program at approximately 300 facilities, including manufacturing, sales/service, R&D, and warehouse facilities. Prior to working at Ingersoll Rand, Dawn was employed as a consultant with a major international environmental consulting firm where she specialized in the investigation and remediation of sites impacted with chlorinated solvents. She is a Certified Hazardous Materials Manager.

Sarah Lopas (B.A., MBio, '01) "After spending five years in New York City working as an environmental consultant, I attended graduate school at Columbia University for environmental policy. I am now approaching my sixth year as an environmental project manager at the U.S. Nuclear Regulatory Commission."

Chris Utter (B.S., MBio, '01) "I received my Ph.D. in Microbiology and Molecular Genetics from UMDNJ-New Jersey Medical School. I worked as a post doc for 15 months at UMDNJ-Robert Wood Johnson Medical School, researching the interaction of malaria with human endothelial cells and red blood cell receptors. I am currently working in the Oral Care R&D group at Johnson and Johnson Consumer Products."

Erin (Jobson) Rechler (B.S., Biochem, '02) is a Planning Specialist within the Pharmaceutical Research & Development Project Management for Forest Research Institute, Inc. She was married in May 2011 to Harold Rechler, also Class of '02 and they live in Huntington, NY.

Sami Amin (B.S., BNS, '03) "I have spent the past eight years working in the communications sector for an international Public Relations and Communications Agency, recently rebranded from Hill & Knowlton to Hill+Knowlton Strategies."

Jaime Warmkessel (B.S. MBio, '03) works at Sanofi Pasteur as a Laboratory Manager. Jaime oversees a group of technicians in the development of ELISAs via the use of new technologies to support new vaccines and clinical support for existing vaccines.

Eugene Vovchuck (B.S. Biochem, '04) "After graduating from Lehigh in 2004 I went to medical school at St. George's University in Grenada West Indies, I graduated from medical school in 2010 and I am now a 2nd year Anesthesiology Resident at Wayne State University/Detroit Medical Center. I plan on continuing my education by doing two fellowships one in Cardiothoracic Anesthesia and a second in Critical Care Medicine."

Shruti Gandhi (B.A., Bio, '04) has finished a residency in Internal Medicine in Connecticut and began a fellowship program in Endocrinology at George Washington University in July.

Heather Desh (B.A. Pre-Dental, '07) "Having graduated from University of Penn School of Dental Medicine in 2010, I am now completing my residency in Orthodontics at Temple University and will graduate in August 2012."

Elizabeth Rabold (B.S. Bio, B.A. Eng, '07) earned her MD from the Univ. of North Carolina School of Medicine in 2012.

Andrew Zeiger (B.A. Bio, '07) received his DDS from Univ. at Buffalo School of Dental Medicine in 2011. He is currently practicing dentistry full time and owns two locations in Arizona. "Special thanks to Dr. Iitzkowitz for writing me a recommendation to dental school."

Whitney Alexander (B.S., MBio, '08) graduated in 2012 from Temple University School of Medicine. "I will be starting my Emergency Medicine Residency at the University of Washington in Seattle this June."

Scott Wojciechowski (B.S. Bio, '09) "After finishing my master's in secondary education and teaching science in the Lehigh Valley for a year, I spent two years at the University of Iowa completing another master's in higher education and student affairs. I recently accepted a position at Gettysburg College where I will be a housing administrator overseeing the residential curriculum for sophomores. It may not be directly related to my undergraduate degree, but I do wow my science students with what I learned at Lehigh."

Caroline Miller (B.A. Span, '08; B.S. MBio, '09) is a research assistant at Beth Israel Deaconess Medical Center in Boston, MA. The lab is involved in HIV vaccine research, performing neutralizing antibody assays as well as processing blood for human clinical HIV vaccine trials.

Benjamin Evans (B.A., Bio, '09) After working as a research assistant in a DNA sequencing lab for 2 years, I'm off to graduate school. I just started as a Ph.D. student in Yale's Ecology and Evolutionary Biology Department.

Hannah Brotzman (B.A. Bio and Philosophy, '08) graduated from Georgetown University School of Medicine in 2012 and is pursuing residency training in Obstetrics & Gynecology at Johns Hopkins University.

Kurt Wadsworth (B.A. Pre-Dental, '08) graduated from University of Pennsylvania School of Dental Medicine in 2011, and is currently attending a specialty program in endodontics at Tufts University.

Allison M Porman (B.S., MBio, '09) is a Ph.D. student at Brown University in Molecular Biology, Cell Biology, and Biochemistry. "I am working in the laboratory of Richard Bennett. We recently published an article in PNAS titled 'Discovery of a phenotypic switch regulating sexual mating in the opportunistic fungal pathogen *Candida tropicalis*,' which details my discovery of a mating pathway in the pathogenic yeast species *Candida tropicalis*. The past year has been successful, and I am excited to see what lies ahead in the upcoming year!"

Burton Tabaac (B.S. BNS, '09) completed his second year of medical school and began his clinical rotations in August.

Lauren Eichblatt (B.A. BNS, '10) "I just received my Masters in Public Health from University of Texas School of Public Health in 2012. I will be pursuing a degree in dentistry at Midwestern University in the DMD class of 2016."

Hillary Stires (B.S., BNS, '10) is a second year PhD student in the Endocrinology and Animal Biosciences program at Rutgers University, researching the effects of fetal alcohol on breast cancer growth in rats.

Graduate

Abraham Eastwood (Ph.D., '71) "I don't have much to tell. I'm basically retired, although I still write some science articles for the National Multiple Sclerosis Society. I also continue to follow science through subscriptions to Science and Nature. And I play a lot of tennis!"

Diane Dutt (B.A. Bio, '94; Ph.D. '02) joined the Defense Threat Reduction Agency (DTRA) to support a program involving rapid, targeted drug development. Her task was to identify host-specific molecular targets exploited by bacterial and/or viral pathogens for which drugs could be designed. "My current task is to identify, fund and manage research projects focused on the identification of host-specific pre-symptomatic biomarkers for assay and drug development for diseases caused by Cat. I and II Select Agents."

Qianxing Mo (Ph.D., '06) "It is very nice to hear from Lehigh. I recently moved from New York City to Houston, TX. I joined Baylor College of Medicine in January 2012 as a tenure-track assistant professor in the Dan L. Duncan Cancer Center and Department of Medicine."

Frederick C. Monson (B.A. '65, M.S. '68, Ph.D. '71)

Work history:

1971-1982 - Dept of Biology, St. Joseph's Univ, Philadelphia
1982-1986 - Electron Microscopy, PCOM, Philadelphia
1986-1997 - Div. Urology, UPenn Medical School, Philadelphia
2000-Present - CMIRT, Geology-Astronomy, West Chester Univ, West Chester, PA

High Points:

Best education: Lehigh, 1957 (Tuition: \$900/semester)
Graduate Student - Histology (TA-Prof BB Owen) - was on VA Bill and received stipend
First Contract at St. Joseph's for \$10,000.00 - exactly the same pay made by the newly hired street cleaners in Philadelphia during that year.
One NIH Grant at age 54 while at Penn (1993) - most assuredly one of the last 50% anatomy grants funded by the federal government. (\$888k)

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Research Symposium**

**Thursday, April 11, 2013
4:00 to 6:00 p.m.**

*Poster presentations
by our undergraduate researchers*

Refreshments will be provided!

Iacocca Hall, 111 Research Drive
Mountaintop Campus, Siegel Gallery



And now we'd like to hear from you!

Please take a moment to update us on your activities.

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Name: _____ Year(s) of Lehigh degree(s) _____

e-mail address: _____

News about you and your professional work: _____

Please send to: e-mail: inbios@lehigh.edu

-or- fax: 610-758-4004

-or- Department of Biological Sciences
Alumni News
111 Research Dr., B217
Bethlehem, PA 18015

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Rat smooth muscle cell (A7r5)
cotransfected with GFP-vinculin
(green) and tomato actin (red).
W. Nimlamool (Lowe-Krentz Lab)

