

Biological Sciences

LEHIGH UNIVERSITY

From the Department Chair



I hope you are all managing well in these hard economic times. With its conservative financial policies, and a bit of "belt-tightening," Lehigh appears to be weathering the downturn. However, rather than simply maintain the status quo, our Department continues to find ways to enhance our curriculum. Examples include:

- Professor Vassie Ware, with some funding from the Howard Hughes Medical Institute, developed a two-semester, experimental lab course (Lehigh in the SEA [Science Education Alliance]) that exposes students to modern genetics/genomics. In collaboration with others colleges around the country, two dozen of our sophomores volunteered to spend a year examining the genetics of bacteriophages collected from the soil by a nearby stream. With great enthusiasm, they spent the rest of the semester characterizing a host of bacteriophages using sophisticated molecular techniques, coupled with our new table-top electron microscope. The second semester of this course is steering

these students to even more independent/research activities by selecting a few of the phages for intensive examination.

- Another new laboratory course is being developed by Professor Michael Burger that will featuring a new state-of-the-art neuroscience laboratory course where students will learn sophisticated electrophysiological recording and analysis techniques. This course will be housed in the brand new STEPS building (see story below). These courses, and others, are giving our students an early introduction to modern bioscience technology in order to examine both foundational principles as well as relatively new ideas.

It is not surprising that after taking several of these courses, our students quickly gravitate to our research labs where they work closely with the faculty and the graduate students - a topic I mentioned in last year's newsletter. The College of Arts and Sciences considers our undergraduate research program to be of great importance to undergraduate education and has made it a high priority for securing alumni endowment funding.

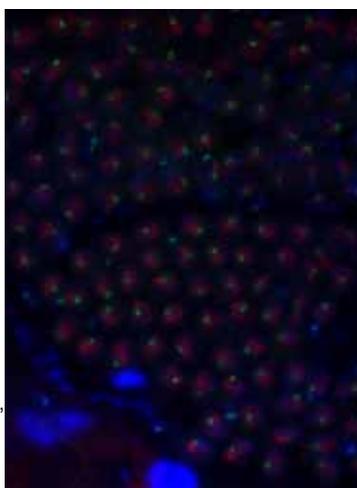
In this issue, we present an interview with another alumnus, Kelly (Buller) Close '91, who remembers working in Professor Barry Bean's laboratory and how Lehigh shaped her succeeding years. Please let us know how your Lehigh biological sciences experience has influenced your career. We so much enjoy hearing from you.

Murray Itzkowitz, Ph.D.
Professor and Chair

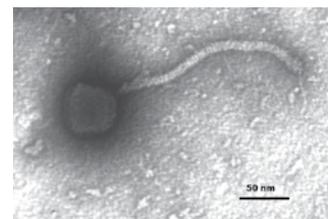
Occupancy in STEPS set for fall

The STEPS (Science, Technology, Environment, Policy & Society) building is on schedule to be ready to house classes in the fall of 2010. This new building is designed to facilitate collaborative learning and eliminate boundaries between the classroom and the lab. The department's three core lab classes, Core I: Cell & Molecular Biology, Core II: Genetics, and Core III: Integrated and Comparative, as well as Comparative Vertebrate Anatomy will be moved to the new building.

When asked how the move from Williams Hall to the new building will affect these lab courses, Lab Manager Dr. Margaret Kenna noted, "I can't tell you how excited I am about moving into new lab space that will facilitate meaningful interactions with students, encourage cross discipline interaction, provide a state-of-the-art lab experience and simply puts us in a position where the equipment and infrastructure are new and operational on a day to day basis. I think the students will have an enhanced learning experience."



Immunohistochemistry of *D. melanogaster* testis shows ribosomal protein L22 (red) localization is restricted to the nucleoplasm in meiotic germ cells. Co-staining for the nucleolar marker fibrillar (green) shows L22 does not colocalize with the nucleolus (site of ribosome synthesis). DAPI staining for DNA is seen in blue. M. Kearse; Ware Lab



Phage, "Yahalom," identified and named by Rachel Fieman, student in Lehigh in the SEA course led by Drs. Ware, Kenna and Marzillier. EM image captured by lab technician, Lee Graham

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Are you a member of the Class of '75 - the first graduating class that included women as undergraduates? If so, we'd like to hear from you. Please click here to complete a survey. We hope to do a feature article in next year's newsletter!

Two promoted to associate professor

Two of our faculty members were promoted to associate professor with tenure by the university's board of trustees in 2009.



Matthias Falk came to Lehigh from the Scripps Research Institute in La Jolla, California, where he served as an assistant professor in the department of biology. He earned his doctorate in molecular biology from the University of Heidelberg (Germany) and his master's and bachelor's degrees from the University of Giessen

(Germany). Funded by the National Institutes of Health, Falk's research interests include the biosynthesis, structure, and function of gap junction membrane channels and of other membrane proteins. He is interested in understanding how such complex signaling structures are biosynthesized, how they are structured, and how their function is regulated. Dr. Falk has taught Introduction to Cell & Molecular Biology and Cell Biology.

Kathy Iovine earned her doctorate in biomedical sciences from Washington University in St. Louis, where she then served as a post-doctoral fellow in the department of genetics. She was awarded an NRSA post-doctoral fellowship at the NICHD, and the Spencer T. and Ann W. Olin Fellowship at Washington University. Her research is focused on determining the molecular pathways that guide bone growth and joint development, using regeneration of the zebrafish fin as a model system. The Iovine Lab has published numerous reports on their progress showing that defects in direct cell-cell communication directly affect levels of cell proliferation. Dr. Iovine's current focus is to determine if the same cell-cell communication pathway regulates the location and development of joints. Iovine received an early career award from the National Institute of Dental and Craniofacial Research and is currently funded by the National Institute of Child Health and Development. She earned her bachelor's degree from Carnegie Mellon University.



NIH awards \$1.8 million for sound research



Michael Burger, assistant professor of neuroscience in the biological sciences department, has been awarded a \$1.8 million grant from the National Institutes of Health's (NIH) National Institute on Deafness and Other Communication Disorders for his research entitled "Efferent Inhibitory Mechanisms in Binaural Processing." The five-year grant will allow Burger to build upon the preliminary

data he first collected under a grant he received from the Deafness Research Foundation for his work on "Efferent Function in Sound Localization Processing."

Burger is interested in how the auditory system processes sound information. The ear and the brain work in tandem to determine the location of sound, relying on a specialized

neural circuit in the brain devoted to the process. The brain is able to compute where sound comes from by determining when a sound wave strikes each ear. Auditory neurons can detect the tiny microsecond differences in arrival time of a sound between the two ears. This system also has to function over a wide range of sound intensities, making this computation particularly challenging.

The 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. The grant will enable Burger to further explore how the inhibitory components of the circuit influence processing in each brain area involved in computing sound source location.

Burger first began studying hearing at a bat auditory neuroscience lab while a Ph.D. student at the University of Texas at Austin and later started working with birds as a senior postdoctoral fellow at the Department of Otolaryngology-Head and Neck Surgery at the University of Washington. In 2005, he was awarded a prestigious Alexander von Humboldt Research Fellowship at the University of Munich. Burger joined the Lehigh faculty in 2006.

--Tricia Long, Office of Communications

Doctoral Degrees awarded in 2009

Doctor of Philosophy Integrative Biology

Jennifer Gumm

*Sexual Selection and Alternative Reproductive Tactics in *Cyprinodon elegans**

Laura Szymanski

Food and Fertility: Neuroendocrine and Metabolic Events that Integrate Energy with Reproduction

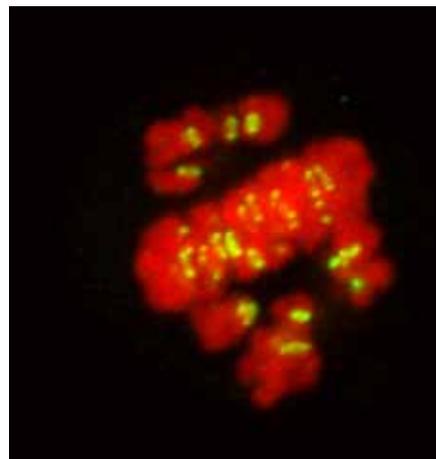
Molecular Biology

Yulia Akbergenova

*Cross-Talk Between Recycling and Reserve Vesicle Pools in *Drosophila* Presynaptic Boutons*

William Coleman

Synapsin II and Rab3a Are Dynamic Regulators of Vesicle Cycling in Mouse Motor Endplates



Mitotic chromosomes are shown in red. Green label shows regions where the chromosomes connect to the mitotic spindle during division.
L. Cassimeris

Cundall receives Hillman Award

In May, 2009, Professor David Cundall was presented the Hillman Award for Undergraduate Advising for his demonstrated excellence in teaching and mentoring. This annual award is given for exemplary student advising, defined as either guiding students through their exploration and pursuit of an academic course of study or assisting students in the development and/or completion of research related to their degree program. Traditionally, the university reserves this award for those who have distinguished themselves through long-term excellence or service to the institution.

Prof. Cundall's student nominator wrote, "I always expected an advisor to provide insight on general life choices and Dr. Cundall definitely met that standard. Dr. Cundall has a reputation of being tough, and I love that he pushes his students, especially his advisees, to be the best they can be."



A letter from a former student.....

Hi Dr Cundall,

I just wanted to write and thank you after all these years for being a great teacher and inspiration. I am sure you will not remember me or my name, out of the thousands that took your courses at Lehigh, but I am a '84 Lehigh Biology graduate. I loved your class on comparative anatomy. I remember it well and still have my dissection kit from that class. I had an insatiable appetite for animal anatomy and your class at Lehigh was the closest thing I did there that came close to what I wanted to do as a career. I went on to veterinary school after Lehigh. I am currently a veterinarian in NJ. After vet school, I spent a lot of time specializing in cardiology, so now I practice diagnosing and treating heart disease in dogs, cats and many other small mammals and reptiles (I have even done echocardiograms on snakes!).

Anyway, I am writing to you because I will always remember your video of your research on snakes and especially the stuff on head muscles and the work you did on how snakes eat. I downloaded a copy of "Activity of Head Muscles During Feeding by Snakes: A Comparative Study" Amer. Zool. 1983; 23: 383-396. It is great paper and it is a fantastic reminder to me of that class and you sharing your research. Thank you for your time and effort as a teacher.

Carl Sammarco

2009 Publications

Bold = Faculty
Bold+Italics=Graduate Student
Underline=Former/Current Student

Venditti, J.J., Mendelson, T.C. & **Bean, B.S.**, 2009. Fucosidases of sperm and milt in Darters (Percidae: Etheostomatini). The Open Reproductive Science Journal 2: 1-7.

Ringhoff, D and **Cassimeris, L.**, 2009. Gene expression profiles in mouse embryo fibroblasts lacking stathmin, a microtubule regulatory protein, reveal changes in the expression of genes contributing to cell motility. BMC Genomics. 10: 343.

Cundall, D., 2009. Viper fangs: Functional limitations of extreme teeth. Physiol. Biochem. Zool. 82: 63-79.

Falk, M.M., **Baker, S.**, **Gumpert, A.M.**, Segretain, D., and Buckheit III, R.W., 2009. Gap junction turnover is achieved by the internalization of small endocytic double-membrane vesicles. Mol. Biol. Cell, 20: 3342-3352.

Sims, K, Eble, D.M., and **Iovine, M.K.**, 2009. Connexin43 regulates joint location in zebrafish fins. Dev Biol. 327: 410-418.

Leese, J., **Snekser, J.**, Ganim, A. & **Itzkowitz, M.**, 2009. Assessment and decision making in a Caribbean damselfish: nest site quality influences prioritization of courtship and brood defense. Biology Letters Royal Society. 5: 188-192

Vassallo, JD, Janovitz, E, Wescott, D, Chadwick, C, **Lowe-Krentz, L.**, Lehman-McKeeman, L., 2009. Biomarkers of Drug-Induced Skeletal Muscle Injury in the Rat: Troponin I and Myoglobin. Toxicological Sciences 111(2), 402-412.

Maas, S. and Gommans, W.M., 2009: Identification of a selective nuclear import signal in adenosine deaminases acting on RNA. Nucleic Acids Res., 37(17): 5822-9, Epub July 17, 2009.

Savage, W.K. and **Mullen, S.P.**, 2009. A single origin of Batesian mimicry among hybridizing populations of admiral butterflies (*Limenitis arthemis*) rejects an evolutionary reversion to the ancestral phenotype. Proc. Roy. Soc. B. 276 (1667): 2557-65

Nyby, J., 2009. Adult House Mouse (*Mus musculus*) Ultrasonic Calls: Hormonal and Pheromonal Regulation. In Handbook of Mammalian Vocalization. An Integrative Neuroscience Approach, Editor: Stephen Brudzynski, Oxford: Academic Press, 303-310.

Saldanha, C.J., Duncan, KA. & **Walters, B.J.**, 2009. Neuroprotective actions of brain aromatase. Frontiers in Neuroendocrinology. 30(2): 106-118.

Maradeo, M.E. and **Skibbens, R.V.**, 2009. The Elg1-RFC clamp-loading complex performs a role in sister chromatid cohesion. PLoS ONE 4(3): e4707.

Swann, J.M., Fabre-Nys, C and Barton, R., 2009 Hormonal and pheromonal modulation of the extended amygdala: implications for social behaviour. Hormones, Brain and Behavior, D.W. Pfaff (ed.), 2nd edition, Academic Press.

Delivering medicine to the public

Hundreds of students pass through the halls of Biological Sciences each year and many leave an indelible impression in our minds as a result of their academic achievements. Kelly (Buller) Close '91 formed such a lasting impression. Prof. Barry Bean served as Kelly's research advisor and remembered not only her academic promise, but also her social activism. No one can tell Kelly's story better than Kelly herself.

Tell us about your time at Lehigh.

I was incredibly busy and involved, which is what made my Lehigh experience so great. I played soccer (goalie). I was a Gryphon as a sophomore and then an assistant hall director as a junior and senior. I was a member of Gamma Phi Beta sorority and was a Rho counselor (rush counselor). My biggest commitment was to community service. Dr. Carol Brown was my English professor my second semester of my freshman year and Dr. Keith Schray, a chemistry professor, was my advisor. Dr. Brown had us do a paper in which I was required to volunteer at the local homeless shelter (who knew we even had a homeless shelter 500 feet from campus?). It was eye opening. So much so that during the summer I came up with a grand scheme of how I was going to get Lehigh students involved on a local, state and national basis helping the poor and homeless.

Once I returned to school, I presented my plan to Dr. Schray and the Vice Provost of Student Affairs and, to my surprise, they were incredibly supportive (although I think they thought I was unrealistic). We started by creating a "Benefit for the Homeless" Week in which we sold t-shirts, hosted a talent show, recruited volunteers to work at the shelter and provided educational sessions at living units. We raised several thousand dollars for the local shelter. Over the next 3 years, we continued these activities and expanded to providing the dinner and staffing (with volunteer students) for the homeless shelter, created and hosted a state-wide college conference on the homeless, organized the east-coast arm of the national march on Washington for affordable housing, created a yearly day of giving back to the community and created a Lehigh class for credit on "Society and the Homeless." I use to say that "community service is the rent we pay for a good life," but the payment was really to me as I gained more than anyone I ever helped.

What was your research focus in the Bean Lab?

The cause of cystic fibrosis was not known in the late 80s, although we now know that it is due to a defective Chloride channel. Dr. Bean thought that through analysis of the semen of men with cystic fibrosis and carriers that we might be able to identify a potential cause for cystic fibrosis. The reason for this is that men with cystic fibrosis have no sperm and carriers have some subtle abnormalities. I also organized the lab and assisted with the coordination of services for a local hospital's fertility clinics on the analysis of male semen and the ova hamster penetration test to assess male fertility.

What role did your Lehigh experience have in your future career path?

Lehigh actually changed my direction significantly because of my involvement in the community. I entered Lehigh knowing that I wanted to be a physician because of my life-long battle with asthma. However,

Dr. JoClare Hartsig, who was the minister who ran the homeless shelter and co-taught the class on "Society and the Homeless" with me, said that she thought I should instead get my Master's in Public Health (MPH). I had never heard of this and when I investigated it, I realize that it was a perfect fit for me. This is how I ended-up going to Yale University for a full two year MPH and then to medical school. It was a great decision and has allowed me to combine my expertise in medicine and public health as a career. I am a board certified emergency physician and also the director of a public health program.

Tell us about your work with the American Red Cross.

My role as the National Coordinator of Disaster Volunteers and a medical advisor to the President of the Red Cross on Weapons of Mass Destruction and Terrorism entailed oversight of the human resource issues related to the more than 200,000 local disaster volunteers and almost 20,000 disaster services human resource volunteers that travel to major disasters outside of their local Red Cross chapter. I was 100% volunteer, as are the overwhelming majority of Red Cross staff. I hesitate to say that because people often think that this means that I took it less seriously, worked part-time or had little authority. On top of the 20 hours that I worked in the Emergency Department of a trauma center, I worked 40-60 hours a week at the Red Cross Headquarters in Washington, DC.

I began working for the Red Cross in October of 2000. I spent the next 9 months creating task forces and identifying significant changes that needed to be made to disaster services in order to make it more focused on meeting the needs and expectations of disaster victims. I also worked with Dr. Bernadette Healy, the President of the Red Cross, to develop the "Mercy Battalion" concept in which the Red Cross provides medical teams to respond to domestic disasters, similar to what Clara Barton did prior to founding the American Red Cross. A major barrier to the Mercy Battalions was the medical-legal risk and the media risk if an error was made by a Red Cross medical volunteer. In the spring of 2001, Dr. Healy testified before Congress that the Red Cross would fill this unmet need, but the Red Cross needed some protection against the medical-legal risks because during the first 24 hours of a major disaster, the medical care would be done in the field by specially trained volunteer nurses, doctors and EMS providers under less than ideal conditions. Over the summer, we had planned that I would attend the next major disaster, likely a hurricane, to identify all of the opportunities and barriers to implementing the Mercy Battalions. I did not know that the next disaster would be the largest terrorist attack in our country's history.

On September 11th, I was getting dressed in my red business suit to give a presentation on the future changes to the disaster system to the Board of the

Kelly (Buller) Close

Education:

Lehigh University, 1991
Bachelor of Arts, Biology

Yale University, 1994
Master of Public Health (MPH)

Univ of Pittsburgh, 1998
Medical Doctorate (M.D.)
Board Certified in Emergency Medicine

Personal:

Married to Eric Close '91
Daughters Ashley (4) and Kirsten (3)

1) Kelly Buller with Rev. JoClare Hartsig, former director of Bethlehem Center City Ministries emergency shelter (1989, The Brown & White); 2) Kelly Buller (1990, The Brown & White); 3) Kelly Buller with former Bethlehem mayor Ken Smith, (1990, The Morning Call); 4) The Close Family: (l-r) Ashley, Eric, Kelly, Kirsten



Milford, Connecticut Red Cross Chapter where my family lived. I was in Connecticut because I had been married 9 days before in Disney World to my husband, Eric (Lehigh '91), and that weekend we had a second reception for my family who could not come to Florida. Eric called me downstairs where the news was showing the first tower that was hit in New York City.

I did not know that it was a terrorist attack yet or that another tower, the Pentagon or Somerset, PA were also going to be attacked. However, I knew that this was a major disaster and I needed to respond to assess the healthcare response and use my authority to aid this response. After notifying the Milford Chapter that I was not coming, my new husband and I drove the hour into New York City, all the way to ground zero. As part of the federal response plan, my Red Cross ID got us into ground zero. The smoke was billowing in the distance and everyone was going in the opposite direction by foot or car- we were the only car on the road into NYC. Eric came with me because I was concerned that there would be rioting, looters and a dangerous environment. But instead everyone was evacuating and terrified due to the threat of another attack. When we got to ground zero, it looked like a volcanic eruption and pictures of Pompeii that I had seen. The soot was like snow until you realized that it was buildings and human remains raining down on you. There were very few masks and the few that I brought, I gave to New Yorkers.

During the next 48 hours with little sleep, I visited the two make-shift triage sites, the medical supply site, St. Vincent's Hospital and high-rise apartments, in addition to being the liaison at the incident command center next to ground zero between the Red Cross headquarters and other federal response agencies. I discovered that thousands of people were stranded in their rent-controlled and subsidized high-rises due to lack of elevator function, transportation, food, water or healthcare. Many of these people had special medical, physical or mental health needs that prohibited them from walking the fourteen blocks outside of the FBI- contained zone to food, water, medical care and landline phones.

Over the next 5 weeks I created and coordinated multi-disciplinary outreach teams, consisting of physicians, nurses, social workers and family service workers from the Red Cross and NYU medical center to go door-to-door to either evacuate these mostly seniors and immigrants or bring services, food and water to them and contact their loved ones to tell them they were alive. This door-to-door outreach had never been done at the Red Cross, nor had they used physicians. For efficiency, the Red Cross usually sets up a service center and shelters and waits for people to come to them. This works great in areas such as Florida where the people are aware of the services that the Red Cross provides, but not in areas where disasters rarely happen. For instance, when New Yorkers heard that we wanted to send them to a "shelter" temporarily, they thought we were talking about a NYC homeless shelter. It took a lot of time and convincing to convince them that Red Cross shelters were newly set up at local schools and it was clean and safe with all new beds, food and services brought in just for this disaster. I have 100 inspiring and devastating stories from my time in New York City at ground zero and working with the resilient New Yorkers and the over 18,000 volunteers who helped just in New York alone.

When I got back to national headquarters, 6 weeks later, the President of the Red Cross had "resigned" for requesting blood and money when we already had enough and the Red Cross was under incredible scrutiny. A few leaders made mistakes at the Red Cross but thousands of Red Cross volunteers across the country served Americans well—not only at the Pentagon and NYC but also the unsung heroes of every Red Cross Chapter that fed and sheltered stranded passengers at airports across the country when air flights were sus-

pending for days. However, a benefit to this scrutiny was that the report I had created about the changes that needed to occur at the Red Cross prior to 9/11 suddenly became a priority. I spent the next two years working with the chairman of the Board and the Interim President to restructure disasters services.

I have never, not even during my emergency medicine internship, worked as hard as I did those two years. We were on a mission because any day a new terrorist attack could occur. Unfortunately, even though my investigation of the 9/11 medical response showed that the Mercy Battalions were needed, Congress decided not to give the Red Cross the medical-legal coverage for these teams due to the negative press about the Red Cross. I had to make a final recommendation to the Board as to whether to proceed and create these Mercy Battalions, and it was "no" because the risk in terms of money and reputation were too great.

Being the National Coordinator of Disaster Volunteers was the hardest and most rewarding job that I have ever had and will continue to be a hallmark of my life.

You received the President of the United States Service Award in 1996. Would you describe the work you did that received this recognition?

I created a program where medical students were matched with teenage pregnant women from six Los Angeles prenatal clinics. The medical students served as health coaches during the prenatal period, labor, delivery and well-child visits for the first year of the baby's life. I created a health coaching booklet that the medical students and their patients utilized. These teenagers were high risk due to their age and typically do not attend their prenatal care physician visits so our students, who attended all medical visits, served to remind them, ensure transportation and ease fears. The students also served as liaisons between the physicians and teenagers to translate the medical jargon and work with the physician to answer questions. Over 100 students and pregnant teenagers participated each year.

Tell us about your current position.

I am one of the directors of the Center for Emergency Medicine of Western Pennsylvania where I did my emergency medicine residency. I am the executive and medical director of a division called Emed Health, which is a unique nonprofit entrepreneurial venture begun 7 years ago. Emed Health is one of the first organizations in the world to use paramedics and EMTs to provide health coaching and home healthcare services that complement but do not replace home healthcare social workers and nurses.

Emed Health delivers these prevention and disease management services for insurers, hospitals, large employers, departments of health and retirement communities through subcontracts with Emergency Medical Service (EMS) agencies. The need for these new services is great across the country due to an aging population with increasing health concerns, home healthcare nursing shortages, primary physicians with dwindling availability, and costs that are escalating. Due to the lower costs of EMS provider wages (half to a third the cost of nurses), subcontracting so you only pay for them when they are needed, and the use of existing EMS infrastructure (malpractice insurance, workman's compensation insurance and vehicles), all patient services are provided in a cost-effective manner to patients in their homes, workplace or communities – "bringing healthcare to the people."

From Bethlehem, to New Haven, to Los Angeles, to Pittsburgh, to New York City, to Pittsburgh— Kelly (Buller) Close has touched the lives of countless people. The Department of Biological Sciences is proud to have played a role in the life of this transformational woman.

Pictures of the aftermath of the terrorist attack on the World Trade Center (NYC) taken by Eric and Kelly (Buller) Close. (2001)



Autism researcher visits Lehigh

Geraldine Dawson, Chief Science Officer (CSO) of Autism Speaks, visited Lehigh in March 2009 for a series of events and lectures.

Dawson, whose visit was made possible by the Howard Hughes Medical Institute (HHMI) for Undergraduate Bioscience Education, spoke with various groups on campus to present the highlights and new directions of work in autism. While at Lehigh she presented a technical seminar, met with small groups, including Lehigh researchers, parents and caregivers, mental health professionals and teachers. Her visit to Lehigh concluded with her public lecture entitled "New Directions in Research on the Causes, Detection, and Treatment of Autism Spectrum Disorders."

AHA fellowship awarded



Doctoral candidate Bradley Walters was been awarded a pre-doctoral fellowship in 2009 from the American Heart Association. The award's stipend has allowed Walters to focus exclusively on his research in the integrative biology and neuroscience program. The fellowship is the first pre-doctoral award earned by a biological sciences graduate student.

Walters, who is in his fifth year at Lehigh, works closely with associate professor Colin Saldanha studying topics centered on the synthesis of estrogens in the brain. Following graduation, Brad will be continuing his work as a postdoctoral research scientist at St. Jude Hospital in Memphis, Tennessee.

Prestigious Goldwater Scholarship awarded

Behavioral Neuroscience major Amanda Dilger was awarded a 2009-2010 Goldwater Scholarship for her Lehigh studies. Dilger, who will be graduating in May, 2010, is an undergraduate researcher in the Lowe-Krentz lab, studying the effects of heparin on single pathway JNK on the vascular smooth muscle cells.

The Goldwater Scholarship is awarded to approximately 300 engineering, natural science, or math students across the nation each year. Consideration is based on academic merit and research experience. The \$7,500 scholarship award may be used for tuition and related expenses.

Following graduation, Ms. Dilger will be entering Harvard Medical School where, in addition to her medical studies, she hopes to continue to be engaged in research.



Please visit the department's website (www.lehigh.edu/~inbios) to see a video highlighting Amanda Dilger and Dr. Lowe-Krentz!

Alumni Updates

Edward Feinberg (BA, Biology, 1966) graduated from Mount Sinai School of Medicine in 1971, and served internship, ophthalmology residency and retina surgery fellowship at University of Michigan and then spent 19 years in private practice and on the faculty of University of Tennessee. In 1998 he joined the faculty of Harvard Medical School and in 1999 the faculty of Boston University School of Medicine. "I have been Professor and Chair of Ophthalmology at BUSM the last 7 years, until becoming chair emeritus in 2009. I continue to see patients, do surgery, teach, and do research in health outcomes."

Lauretta Bushar (BA, Biology, 1979) is associate professor and chair of the biology department at Arcadia University.

Charles Iselborn (BA, Biology, 1979) graduated from Georgetown Dental School in 1984. "I am enjoying practicing general dentistry in Portland, Maine."

Robert E. Hampson, Ph.D. (MS, Biology, 1982) is an associate professor at Wake Forest University School of Medicine, as well as teaching occasionally at the University of Aberdeen.

Howard Reinert (Ph.D, Biology, 1983) is currently a professor in the biology department of The College of New Jersey.

Carl Sammarco (BA, Biology, 1984) is a veterinarian in Tinton Falls, New Jersey. (Please see Carl's letter on page 3).

Mark Notis (BA, Biology, 1985) is married with five children – his oldest is a sophomore at Cornell; the next child started at Univ. of Pennsylvania in the fall, 2009. "I am a practicing dentist in Allentown and still make it to Lehigh for wrestling matches!"

Charles Crowley (BA, Biology, 1986) has a practice in Ophthalmology in Passaic County, NJ. He graduated from New York Medical College in 1994, after working for four years as a pharmaceutical rep for the Upjohn Company. "I will always be indebted to Dr Pritchard and Mrs Furlong, who really got me into Lehigh and medical school."

Marilyn Gorney-Daley (BA, Biology, 1988) is currently Medical Director for Special Child Health at the New Jersey Department of Health in Trenton, New Jersey. She's responsible for several autism research projects as well the state's newborn screening program.

Adam Levine (BA, Biology, 1988) received his M.D. from the Albany Medical College in 1992 and completed a residency in Obstetrics and Gynecology in 1996 at the Medical University of South Carolina in Charleston. He then completed a fellowship in Reproductive Endocrinology and Infertility at Johns Hopkins University School of Medicine in Baltimore in 1998. "About three years ago, I had a mid-life crisis and left my private practice. I now provide medical care for indigent patients and will graduate from Law School at Stetson University School of Law in December, 2009. It's been a long journey and I will always remember my time at Lehigh and Professor Bean."

Alan Harrison (MS, Biology, 1989) is vice president for administration of the CDC Foundation, an independent, nonprofit organization that helps the Centers for Disease Control and Prevention do more, faster by forging partnerships between CDC and individuals, foundations and corporations to fight threats to health and safety.

more on page 7.....

Alumni Updates continued.....

Daniel Shelly (BS, Biology, 1991) is director of Business Development at Meridian Life Science in Cincinnati, OH.

Kara (Villamil) Gavin (BA, Journalism/Science Writing/Biology, 1992) was recently promoted to director of public relations at the University of Michigan Health System, where she oversees the media relations and internal communications team. "My Lehigh biology training definitely prepared me for my work! I also became a mom for the first time in December 2008. Who knows - maybe baby Moira will be a Lehigh biology major someday!"

Scott Goldman (BS Biology, 1997; BA Psychology 1998) and **Lisa Bernstein Goldman** (BS Biology, 1999) both attended veterinary school at the University of Pennsylvania and graduated in the spring of 2003. Scott is a Major in the U.S. Army Veterinary Corps and is currently completing a Ph.D. in Cellular and Molecular Pharmacology at the Rutgers/UMDNJ Joint Molecular Biosciences Program in Piscataway, NJ where he studies the cellular process of macroautophagy. Lisa is a small animal veterinarian at Somerset Veterinary Associates in Branchburg, NJ. Scott and Lisa were married in 2004 and lived in Annapolis, MD and Olympia, WA before moving to their current residence in Whitehouse Station, NJ with their two children, Josh (4) and Sadie (2). Following completion of his degree, the Goldman family will move yet again so that Scott can begin work as a comparative medicine specialist in one of the many biodefense initiatives supported by the Department of Defense.

Aimee (Concepcion) Cunningham (BA, Biology, 1998) graduated from Tufts University School of Dental Medicine in 2006. She was commissioned as a captain in the US Army in May, 2006 and has been on active duty with the Army since then. "I did a one year Advanced General Dentistry program at Ft. Benning, Georgia. I am now stationed at Ft. Stewart, GA and am a Staff Dentist. Thanks for all the updates, it's always fun to hear what everyone's doing!"

Natasha Schuh (BS, Mol. Biology, 2002) earned her Ph.D in microbiology at the University of Virginia. Her graduate work was on breast cancer cell signaling. She is currently a post-doctoral fellow in the Laboratory of Cell and Developmental Signaling at the National Institutes of Health in the Center for Cancer Research in Frederick, MD. "Lehigh prepared me well for my graduate work, both in the classroom and at the bench, and I'm very thankful for all the advice I received from my professors during my time at Lehigh."

Chris Jewell (BS, Mol Biology, 2003) was appointed as a Ragon Fellow at MIT in the Dept of Materials Science and Engineering. He will be working on engineering new materials for vaccines and immunotherapies aimed at cancer and HIV. "I'm looking forward to being back in the lab and hope to pursue tenure-track faculty positions after my postdoc. Hope to have a chance to stop by Lehigh sometime soon!"

Jill Rafalko (BA, Biology, 2006) earned her master's degree and is working as a prenatal genetic counselor.

Daniell Rowles (BS, Molecular Biology, 2008) – "I have just begun my second year as a Ph.D. student at Princeton University's Department of Molecular Biology. I work with both Jane Flint and Ileana Cristea in studying induction of autophagy in adenovirus infection."

Graduate Student Spotlight

Matthew Close is a Ph.D. candidate in the Integrative Biology program in the lab of Professor David Cundall. Research in the Cundall lab ranges from studies in evolutionary and functional morphology to ecology. Most of the work currently carried out in the lab centers around the form, function and evolution of the feeding apparatus in snakes. Matt's work focuses on the behavior of the snake lower jaw apparatus and the structural basis of its ability to undergo high degrees of extension.



In snakes, the tips of the mandibles do not form a rigid symphysis typical of many other terrestrial vertebrates, and many snakes are thus able to ingest whole prey of relatively large size. Through analysis of swallowing events, Matt is determining the effects of prey size and shape on the lateral migration of the seemingly free mandible tips. He is also currently working with Joe Constantino, an undergraduate in the Department of Biological Sciences, and Richard Vinci, a faculty member in Materials Science and Engineering at Lehigh, to determine the mechanical behavior of the lower jaw when it is stretched. Through mechanical manipulations and both gross anatomical and histological analyses of stretched and unstretched specimens, Matt is examining the relative roles of the arrangement and composition of the lower jaw soft tissues to the extensibility of the lower jaw as a whole. Finally, he is determining whether there are differences in intermandibular extensibility between major snake families and between different age/size classes, and whether these functional differences are related to differences in soft tissue structure. Some pieces of this work have been presented in talks given at national meetings of professional societies.

In addition to his research in the Cundall lab, Matt has spent his graduate career developing the tools he needs to be an effective teacher in the university setting. The department has provided the opportunity for him to serve as a teaching assistant for introductory biology courses such as Introduction to Cellular and Molecular Biology Laboratory, Genetics Laboratory, Integrative and Comparative Biology, and Biology for Non-Majors and he has spent three fall semesters with juniors and seniors as the sole TA of the Comparative Anatomy Laboratory course. He has also previously been the recipient of the Teaching Assistant of the Year award from the College of Arts and Sciences, a student-nominated award given yearly to one graduate student in the college.

We enjoy hearing from you!

Dr. Nyby,

I do not think you will remember me, but I was one of your undergraduate students that graduated in 2006. I was actually a Neuroscience major at Lehigh and took your Neuroscience 1 & 2 courses during my Sophomore year. This May, I will be completing my medical degree and I recently learned that I was accepted into a Neurological Surgery residency back in my hometown of Detroit. I wanted to tell you this because you are the professor that gave me my start in the neurosciences. Before your class, I had never considered spending my life studying the nervous system and it was during your class that I began dreaming of becoming a Neurosurgeon. Since then I have worked extremely hard to achieve my dream and now it seems to be coming true. I wanted to thank you, for that dream began in your class and without your class the dream may have never existed. Obviously your teaching has had a profound affect on my life and I highly doubt that I was the only student of yours in which this is the case. Thank you again, sir, for creating the dream that I have been pursuing, I truly cannot imagine where I would be without it.

Pradeep Setty'06

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

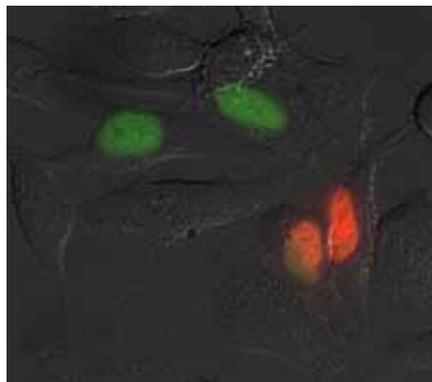
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DIC and fluorescence image of HeLa cells expressing histone H2B-Dendra 2.
Image from BioS 368 class; Matthias Falk, instructor