

# Biological Sciences

LEHIGH UNIVERSITY

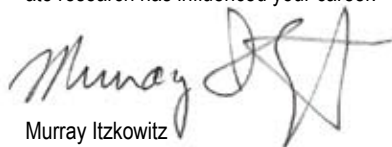
## From the Department Chair

Greetings and best wishes to all alumni and friends.

Since becoming chair in July, I've spent considerable time examining our undergraduate teaching programs. One of our most successful efforts is providing students with a research experience in a faculty member's lab. Even a casual tour of our Department reveals many undergraduate students working elbow-to-elbow with faculty members and graduate students. While our students focus on different specializations, they all leave with a much greater appreciation for how science works. This mentoring also provides students the opportunity to ask, and perhaps answer, interesting biological questions.

From my perspective, I certainly enjoy teaching in ways that are different and sometimes more satisfying than in the typical lecture-style class. My belief in the value of this undergraduate program has been reinforced by my daughter, Debra. When she was an undergraduate here, she quickly became associated with Dr. Mike Kuchka's laboratory and now, years later, she still touts this educational experience as one of the most important aspects of her undergraduate career. In this newsletter, the Buckheit family was asked to share their experiences in this Department and I am especially delighted that they too remember their undergraduate research experiences as being of exceptional value.

Won't you take a moment to think about your undergraduate experiences in the department? We always enjoy hearing from our alumni and hope that you will let us know what you are doing and how undergraduate research has influenced your career.



Murray Itzkowitz  
Professor and Chair



Murray Itzkowitz, Professor and Chair

## Construction begins on new science building

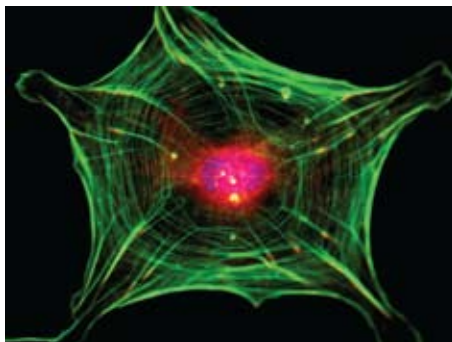
Construction has begun on a new 135,000-square-foot building at the corner of Packer Avenue and Vine Street on Lehigh's Asa Packer campus. The new building will be designed to facilitate collaborative learning and eliminate boundaries between the classroom and the lab and will feature state-of-the-art teaching and research areas mingled with seminar rooms, study lounges and faculty offices. The \$62.1 million facility will be a "green" building with the goal of LEED certification (Leadership in Energy and Environmental Design), the gold standard for sustainable architecture in the U.S.

The STEPS (Science, Technology, Environment, Policy & Society) building is slated to be ready for classes in the fall of 2010. Instruction for 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.

## Did you know?

The course "Bioscience in the 21st Century" is considered "Cool Science" by the Howard Hughes Medical Institute and deemed a national resource. Each lecture of this course, which is overseen by Professor Vassie Ware, is videotaped and made available to the public. Check it out at <http://www.lehigh.edu/bioscience21>

Mouse MC3T3 pre-osteoblast cell with stained actin filaments (Alexa488-phalloidin, green), focal adhesions (vinculin, red) and nucleus (DAPI, blue).  
Image: Michael Burgart, BioS368 Fall '08;  
Instructor: Prof. M. Falk.



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## A learning adventure across the globe

Pool Scholar Elana Nack is a Behavioral Neuroscience major, completing her junior year. Elana's research supervisor is Professor Jennifer Swann. Thanks to support from the Pool Scholar program, Elana spent the summer of 2008 working in Israel. Her story below explains how the Pool Scholar program helped change her life.



Elana Nack (second from right) shares a celebratory moment with her fellow EMT students in Israel

*In trying to formulate my plans for the summer of 2008, I was torn between participating in some form of medical internship, where I would gain valuable hands-on experience, and spending time traveling the world, something I wanted to take advantage of while still young. My worries soon subsided as I stumbled on the Magen David Adom (MDA) Ambulatory Program in Israel. It encompassed the perfect combination of medical experience and travel opportunities, while at the same allowing me to use my time and skills for the benefit of others.*

*When I arrived in Israel in May of 2008, I was quickly thrown into an intensive ten-day training program, which consisted of basic life saving strategies incorporating common Hebrew vocabulary. At the end of the training, I became certified as a First-Aid Responder and was finally ready to start my volunteer work in Jerusalem where I would be stationed. This is when my life-changing experience truly began. For the next six weeks, I spent most of my time running shifts on ambulances, where I worked alongside emergency medical technicians and paramedics. This left my weekends free for travel time, which allowed me to experience the history and culture of Israel first hand, while making friends that I know will last a lifetime.*

*Once arriving home, I quickly enrolled in an Emergency Medical Technician-Basic course, became certified, and currently run with Lehigh University Emergency Medical Services. Looking back on my experience, it scares me to consider the thought that without the monetary help from the Pool Scholars Premedical Education Program, I may not have been able to participate. I will always be grateful for this opportunity that has shaped me in countless ways and will continue to affect the person I will become. As I prepare to enter medical school upon completion of my undergraduate degree, I am certain that my experiences with MDA provided me with a solid foundation for success.*

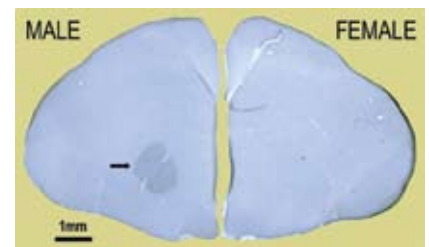
## Graduate Student Spotlight



Ph.D. Candidate  
Bradley Walters

Brad Walters is a graduate student in the laboratory of Dr. Colin Saldanha, where he studies the actions of local estrogen provision in the brain. Specifically, Brad's work focuses on the potential neuroprotective and regenerative roles played by glial aromatase after injury. In the ovary, and in neurons of certain parts of the brain, estrogens are synthesized by the enzyme aromatase. However, after a stroke, or traumatic brain injury, non-neuronal cells known as astroglia rapidly upregulate aromatase expression, and thus provide a mechanism for localized estrogen provision at the injury site. This local provision of estrogen has been shown to prevent cell death secondary to the initial injury, thereby minimizing the extent of brain damage. Additionally, circulating estrogen and exogenous estrogen administration have been correlated with increased proliferation of neural cells. In order for these new cells to have any potential for repairing damaged areas, however, they must not only proliferate, they must also migrate to the site of injury and differentiate into the appropriate types of cells. Currently, evidence suggests that local aromatization after injury can increase the number of newly divided cells in the brain, however, whether or not local aromatization also affects migration and/or differentiation remains an open question.

In a recent publication, Brad and Dr. Saldanha described an effect of glial aromatase on the expression of bone morphogenetic protein-2, a factor that is important in neuronal and astroglial differentiation during vertebrate nervous system development. Brad's current work is focusing on understanding where this BMP2 is expressed after injury and whether or not it may be mediating some of the effects of glial aromatase in the injured brain. Understanding the factors involved in neural cell survival, proliferation, and differentiation could provide the means to manipulate endogenous neural stem cells toward repair of brain damage caused by stroke, trauma, or neurodegenerative diseases such as Alzheimer's and Parkinson's.



Expression of Bone Morphogenetic Protein-2 is strikingly dimorphic in the adult zebra finch brain. Walters and Saldanha, in preparation

## Swann promoted to Professor

Jennifer Swann, Ph.D. was promoted to full Professor by the Board of Trustees at their May, 2008 meeting. Swann came to Lehigh in September, 1995 as a Visiting Associate Professor and was appointed Associate Professor in September, 1996. Prior to her time at Lehigh, Swann was on the faculty at Rutgers University. Dr. Swann was awarded her Ph.D. in Reproductive Neuroendocrinology from Northwestern University.

The research in the Swann Lab is focusing on how sex differences in the structure and physiology of neurons result in sex differences in behavior. Swann is currently funded by the National Science Foundation. Professor Swann's teaching has included: Behavioral Neuroscience Lab, General Physiology, Advanced Neuroanatomy. Dr. Swann serves as Department Graduate Program Coordinator.



Jennifer Swann, Ph.D.



# Students to participate in science education program

## Lehigh will join HHMI's Science Education Alliance's first project, the National Genomics Research Initiative.

Introducing students early on in their education to hands-on, collaborative science research is a goal of Lehigh's Department of Biological Sciences, and thanks to the Howard Hughes Medical Institute (HHMI), a new cohort of Lehigh students will soon be making discoveries of their own.

Lehigh University has been selected to participate in the HHMI's Science Education Alliance (SEA), which will expose students to scientific discovery on a national scale. The initiative began in 2007 at an initial 12 colleges and universities to allow faculty to work together to deliver innovative science education programs. As one of 12 new schools selected for the SEA in 2009, Lehigh will join and help expand the alliance's first project, the National Genomics Research Initiative.

"When you visit these schools, you can see that institutional transformation is occurring," says Tuajuanda Jordan, director of the SEA program at HHMI. "We have given these educators ammunition to show their colleagues that research courses are a viable way to engage students and possibly retain them in the sciences."

Faculty will identify a small group of first-year students with a demonstrated interest in genetics and molecular biology who are both academically strong and primed for research. Students will be offered the chance to join a two-part, year-long course that will be implemented through their sophomore year genetics lab beginning in fall 2009. Vassie Ware will instruct the course along with Margaret Kenna, Ph.D., manager of the instructional labs.

Ware believes Lehigh will expand upon the research started by the initial participants. During that time students made real discoveries by researching bacterial viruses known as phage. After isolating colonies of bacterial phages from soil samples they collected locally, students purified and characterized their phage and then extracted its DNA for sequencing. Isolated phages were



also visualized by electron microscopy. Students used bioinformatics tools to analyze and annotate the genes from the phages.

Participants will be given project-based lab work and contribute to actual research where the answers are yet to be found. The prospect that new phages and new genes will be discovered is very likely. Students will also be able to communicate with students and faculty at other participating schools to compare findings. "One of the goals of biological sciences is to bring other disciplines in to give a broader education to students," says Ware. "This opportunity from HHMI fits beautifully with what we've been trying to do all along. It will get our students thinking outside their own limitations and boundaries within our discipline."

Ware also says that while students will take on biological problems, the solutions will come only when they see the connection between disciplines and contributions from fellow scientists, physicists, chemists, computer informaticists, or engineers. The program is a boon to faculty as well, who see opportunities for long-standing connections with faculty across the SEA's participating schools—ranging from small private colleges to large research universities.

The department of biological sciences has also been working on unique programs, thanks to a 2006 HHMI grant under the direction of professors of Biological Sciences, Neal Simon and Ware. Through that grant, the department has been offering a multidisciplinary introductory course entitled "Bioscience in the 21st Century," which was available online to members of the Lehigh community and the general public. Other multidisciplinary bioscience-related courses will also be offered. The grant also supports the 10-week Biosystems Dynamics Summer Institute which allows students to work on interdisciplinary research teams of faculty and students to address bioscience-related problems defined by the research interests of participating faculty.

--Tricia Long, Office of Communications

## Darwin party earns national recognition

### The award-winning event marked Charles Darwin's 199th birthday with a celebration of his lasting influence on science and society.

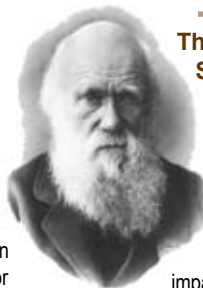
The Lehigh University chapter of Sigma Xi's 199th birthday celebration for Charles Darwin has earned a Sigma Xi Chapter Program Award for distinguished performance for 2007-2008.

The chapter was recognized for organizing a multidisciplinary mini-symposium "Darwin's Birthday Party." The event, held February 20, 2008, marked Charles Darwin's 199th birthday with a celebration of his lasting influence on science and society.

Lehigh faculty speakers each explained Darwin's impact on their respective fields, including assistant professor of Biological Sciences Sean Mullen; Ed Evenson, professor of Earth and Environmental Sciences; Mark Bickhard, professor of Philosophy; James Dearden, professor of Economics; and University Chaplain and professor of Religion Studies Lloyd Steffen. The event culminated in a birthday-cake, candle-lighting ceremony and follow-up discussion by attendees.

"The prestigious award that our chapter received was given to only five chapters out of the approximately 500 that exist," said John Nyby, professor of Biological Sciences, president of the Lehigh chapter, and organizer/master of ceremonies for the event.

--Tricia Long, Office of Communications



## Happy Birthday, Charles!

### The following was a letter written by Assistant Professor Sean Mullen on the occasion of the 200th birthday of Charles Darwin.

Dear Friends and Colleagues,

200 years ago today witnessed the birth of one of the most influential scientists of all time. Charles Darwin's unique insight into the evolutionary mechanisms that produce the incredible diversity of life has since impacted every field of biology and had profound effects on how we think about our origins and role in the universe. For me the implications of Darwinian evolution only serve to increase my sense of wonder that humans arose from a long lineage of organisms that began their evolutionary voyage from simple triploblast chordates to bipedal primates more than 540 million years ago.

Regardless of your personal religious or scientific opinions about evolution, natural selection, or Darwin as a man, it is clear that Charles Darwin achieved that rarest of accomplishments: he saw the universe, for even just a moment, more clearly than anyone had before. In this regard, he joins other great scientific minds (e.g. Einstein, Galileo, Cuvier, Aristotle, Archimedes, etc) in contributing something of lasting value to our understanding of the world and forms an unbreakable link in the pursuit of human knowledge that is as old as our earliest ancestors.

Therefore, today, this day, I am asking you to celebrate your life. For as Stephen Jay Gould was fond of saying, and Darwin certainly appreciated, "if there had been even the smallest of changes in the history of life you would not be here to do so." If that is not a sufficient reason, then at least celebrate the fact that we all get to participate in this great human experience of science as a way of knowing.

Sean Patrick Mullen, Ph.D., Assistant Professor

# A Story of Scientific Footsteps

*This is a story of footsteps, some mighty and others on their way to becoming just as mighty. This is a story of how a Lehigh man began his journey toward a career in microbiology research and a Lehigh woman joined him in his journey. The man and woman then raised three children. Two of the children have attended Lehigh and are well on their way to becoming scientists like their father.*

Bob Buckheit ('82, B.S. Biology) and Elizabeth (Kendrick) Buckheit ('84, B.S., Finance) began working many years ago to create a path of Scientific Footsteps. We have asked them to share their story.

Bob Buckheit worked with Professor Steven Krawiec in his microbiology laboratory. "I primarily helped with microbiology laboratory functions but spent some time on a biochemical project measuring the quantity of certain macromolecules in the cell wall of bacteria using an iodine titration technique. I credit Dr. Krawiec and Dr. Malsberger for stimulating my interest in microbiology and virology at Lehigh and providing me with the initial tools necessary to succeed in the laboratory."

Elizabeth Buckheit had a work study job working for Professor Barry Bean in the Biology Department, which at that time was in Williams Hall. "Since I was a business major I worked as an office helper in the Biology Department, not working on biology, but it gave me my tie to Biology in my biology driven family!"

Bob spent many hours working in the lab of Professor Krawiec, learning all he could about Microbiology, and with Professor Malsberger, learning about Virology. When Bob wasn't at the bench, he was busy playing soccer and participating in Theta Delta Chi fraternity. Elizabeth played club soccer, loved intramurals and was in Gamma Phi Beta sorority.



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**The Buckheit Family: (l-r),  
Christa, Elizabeth, Megan,  
Bobby, Bob**



.....  
**Bob Buckheit in the lab at  
ImQuest Biosciences.**

Bob noted that a "Lehigh education was clearly as demanding as it remains today, but the Biology Department was much smaller and focused on botany and ecology, along with the traditional microbiology. The Biology Department was housed in Williams. My life in those days revolved around my studies, and playing for the Lehigh soccer team, which I captained in my junior and senior years. The campus was much different in those days, with most of the buildings being a dark brown color from years of steel operations; the campus walkways were actually roads.

Bob and Elizabeth have similar memories of their time at Lehigh. Elizabeth recalled that, "for a female student, the ratio was 3 guys to one girl! There was no Mountaintop Campus, that was Bethlehem Steel. Taylor Stadium was on campus, right next to Lower Cents so it was real easy to go to the Football games. Drown Hall was the "Business School". I played girls' soccer and it was a club sport then. I fought for it to get varsity status all four of my years and it did right after I left!"

After leaving Lehigh, Bob went on to earn his Ph.D. (1986) from Duke University. "My degree was in microbiology and immunology, with a focus on virology and retrovirus-induced cancer. I then did a postdoctoral fellowship at The Lineberger Cancer Research Center at The University of North Carolina at Chapel Hill in HIV molecular pathogenesis. Following my postdoc, I spent 12 years with a contract research provider (Southern Research Institute) at their infectious disease facilities in Birmingham, AL and then Frederick, MD (1989-2002) where I learned the business of science. I started with Southern as a Research Virologist and ended my tenure with them as Director of Infectious Disease Research in Frederick, managing a \$10 million dollar per year program with over 60 employees. My next professional position thrust me into the world of commercial drug development as Director of Infectious Disease, Cancer and Immunology of TherImmune Research Corporation (2002-2004). I left TherImmune when the company was sold and made that fateful decision to start my own company."

"I founded ImQuest BioSciences in 2004. ImQuest originally started as a contract research provider for pharmaceutical, biotechnology, academic and government laboratories needing to outsource specialized needs in the development of anti-infective and anti-cancer agents. In 2005 I founded ImQuest Pharmaceuticals in order to explore my own interests in developing proprietary drugs for infectious disease and cancer. Additionally, in 2008 I helped found Arisyn Therapeutics to develop drugs for HIV, HCV and cancer based on a portfolio of compounds that had been evaluated by ImQuest."

Bob and Elizabeth Buckheit went on to have three children: Christa, Bobby, and Megan. Megan is a freshman at Shippensburg University. Having broken high school state records in Maryland, Megan was recruited to run track. Megan aspires to be a teacher and is majoring in Elementary Education with a focus on Special Education. Christa and Bobby decided to follow their parents' footsteps and attend Lehigh University.

Christa Buckheit ('08, B.A. Molecular Biology and B.S. Finance) is currently a graduate student at The University of North Carolina, Chapel Hill pursuing a PhD in Microbiology and Immunology. After spending four years at Lehigh, Christa has had the privilege of learning from professors who were at Lehigh when her parents were students. "My favorite course at Lehigh was Virology taught by Dr. Sands. It was this class which really fueled my desire to pursue science, specifically virology, at a higher level. I loved the class from the start because I have always been interested in viruses, largely, I am sure, due to the fact that I grew up in a home where talking about HIV research was a common conversation topic! But the class was unlike any class I had taken before because it was structured around reading the most current publications on the topics we covered. I loved diving into the journals and learning about what was going on currently in



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**Christa Buckheit in her lab at UNC, still  
wearing Lehigh Brown!**



the field of virology. I can remember calling my Dad all the time after class telling him what I had learned about virology, and thinking to myself that this is something I could do every day. All in all, the course was fantastic!"

Christa also spent two years working with Associate Professor Vassie Ware in the Ware Lab. "My research in Dr. Ware's lab was focused on understanding the molecular biology of ribosome biogenesis in eukaryotes, concentrating on differential rRNA processing among species and its role in ribosomal maturation. Dr. Ware is the best mentor I could have asked for. She taught me so much and was always pushing me to think critically and really understand the importance of what I was doing. Not only that, but she was always so welcoming. Her door was always open and I loved being able to stop by at any time and say 'hello' and have a conversation."

While at Lehigh, Christa needed to decide the direction of her future. Science was in her blood! "My undergraduate research was essentially composed of two parts: my work in Dr. Ware's lab and also my summer internships at my dad's company. Both experiences helped shape my choice of graduate studies. My work in my Dad's lab is what focused my research interests in the area of drug and vaccine development and my undergraduate research at Lehigh helped reinforce my interest in pursuing a PhD. But more than that, my time at Lehigh provided me with wonderful mentors, especially Dr. Ware, Dr. Kuchka, and Dr. Sands, who invested so much time and effort in me and were constantly encouraging and challenging me to give my best effort always and shoot for the stars. I owe so much of what I have accomplished to their encouragement and support. After my graduate studies, I hope to become involved in virology research with an emphasis on drug and vaccine development. I guess you could say I hope to follow in my father's footsteps! I have also considered eventually becoming a professor and teaching at a university." Continuing their connections, Christa recently joined the laboratory of Dr. Ronald Swanstrom at UNC where she will perform her Ph.D. thesis project, the same laboratory in which her father did a postdoctoral fellowship.

Bobby Buckheit is in his final year at Lehigh. He earned his B.A. in History in January and is planning to graduate with his B.S. in Molecular Biology in May. Bobby is heavily involved in Greek life on campus as the Interfraternity Council President as well as being involved as an Orientation Coordinator for the Class of 2012.

In addition to his extra-curricular activities, Bobby has spent many hours in the classroom and in Dr. Matthias Falk's research lab. "My favorite Biological Sciences class was Cell Biology with Dr. Cassimeris. It was my first upper-level biology class, as well as being extremely interesting subject matter. I had always had an interest in cell biology, and this course fit well with my interests as well as expanding my knowledge base. Dr. Cassimeris did an amazing job teaching the course and I think her love of biology, as well as her personable teaching style helped make the subject matter even more interesting and the class more engaging. The course also blended well into my research in Dr. Falk's lab that same semester."

Over the past few months, Bobby has been busy applying to graduate schools and going on interviews. At the time of this writing, Bobby has been accepted into the graduate programs at The University of North Carolina, University of Pennsylvania, Washington University, Yale and Johns Hopkins. Bobby has decided to attend Johns Hopkins to pursue his graduate studies.

When speaking about his experiences in the Department of Biological Sciences, Bobby says, "The entire faculty that I have had the opportunity to interact with have been just incredibly warm and receptive to any ideas or thoughts that I might have. I also remember distinctly coming up to mountaintop for the first time to declare my Major in the fall of my freshman year. I got outrageously lost and ended up in the Bioengineering floor and had to be directed more than once. When I finally made it to the department office, I was filling out my Major declaration form, Dr. Ware (I had no clue who she was at the time) stopped and asked if I was going to declare Biology or Molecular Biology. When I answered with the latter, to my amusement, Dr. Ware exclaimed 'Yessss, we got another one!' I couldn't have imagined a warmer or more genuine welcome to the Biology Department. I enjoyed walking into Dr. Kuchka's office to a warm 'Hello, Dr. Buckheit' and having conversations with both Dr. Kuchka and Dr. Ware while standing halfway between both of their offices, as they yell to each other and add to both of the conversations."

***Undergraduate research has been the hallmark of the Department of Biological Sciences for many years. Each faculty member takes great pride in working with the next generation of researchers and helping to mold their skills. In the Buckheit family, the passing of this mantle has now spanned two generations. We can only imagine what the next generation of Buckheit children will do!***

In the Spring of 2008, Robert Buckheit ('82) was invited to present his research to the faculty and graduate students of the Department of Biological Sciences. His presentation was on "Development of Novel Dual-Acting Pyrimidinediones as HIV Therapeutics and Microbicides." Also in the audience were Dr. Buckheit's two children, Christa and Bobby. As you can see from their reflections below, each understands the importance of footsteps.

**Bob:**

A day that will be forever etched in my mind was the day that I was invited to give a lecture as a part of the Lehigh colloquium series, with many of my old professors and my two children in the audience. I can't say that I have ever had a prouder moment than to be able to stand there and give thanks to those that had such a great impact on my life while standing in a place that had meant so much to myself and Bobby and Christa. That moment was one of those where it becomes so clear just how much of a connection there is between the Buckheit Family of Biologists and the Lehigh Biology Department. Every father should have such an opportunity but I doubt it happens very often with so many connections in the same room with shared school and shared professors and shared love of biology. I now can dream of the day when both Bobby and Christa are invited back to Lehigh to give seminars and I will be in the audience with all of the professors that had shaped all of our careers. Wouldn't that be special!!!!

**Christa:**

I think one of the proudest moments of my time in the Biological Sciences Department was when my Dad was asked to come and speak at the Department seminar. I remember sitting in the seminar room with all of my mentors and peers, next to my brother Bobby, listening to my Dad recount his experiences at Lehigh, give thanks to the professors who had impacted his career, and talk about his life's work. I was so proud of my Dad and all that he had accomplished and I was so honored that the department had taken such an interest in bringing my Dad back to Lehigh while my brother and I were there together. It meant so much to me, so thank you.

**Bobby:**

It was incredible to have my Dad come and present at the Biological Seminar Series. Sitting in the audience with many of my professors, listening to my own Dad talk about his research that started right here at Lehigh was incredible. I can only hope that one day I will have the opportunity to come back to Lehigh and share my own research.



Bobby Buckheit getting some advice from Assistant Professor Matthias Falk

## 2008 Publications

**Venditti, J., Bean, B.**, 2008. Stabilization of membrane-associated  $\alpha$ -L-fucosidase by the human sperm equatorial segment. *International Journal of Andrology*.

**Cundall, D.** and F. Irish. 2008. The snake skull, pp. 349-692. In: *Biology of the Reptilia*, Vol. 20, Morphology H, C. Gans, A. S. Gaunt, and K. Adler (eds.). Society for the Study of Amphibians and Reptiles, Ithaca, NY.

**Angela D. Hoptak-Solga, Sarah Nielsen, Isha Jain**, Ryan Thummel, David R. Hyde, **M. Kathryn Iovine** 2008. Connexin43 (GJA1) is required in the population of dividing cells during fin regeneration. *Dev. Biol.* 317:541-548.



**Baker, S.**, Kim, N., Gumpert, A., Segretain, D., **Falk, M.** 2008 Acute internalization of gap junctions in vascular endothelial cells in response to inflammatory mediator-induced g-protein coupled receptor activation. *FEBS Lett.*, 582: 4039-4046. (Cover image, left)

**Gumm, J., Sneker, J. & Itzkowitz, M.** 2008 Conservation and onflit between endangered desert fishes. *Biology Letters Royal Society* 4:655-658.

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

Gommans, W.M., Tatalias, N.E., **Sie, C., Dupuis, D.E., Vendetti, N.J.**, Smith, L., Kaushal, R., and **Maas, S.** 2008: Screening of human SNP database identifies recoding sites of A-to-I RNA editing. *RNA*, 14 (10), 2074-85.

**Mullen, S. P.**, Dopman, E. B., & R. G. Harrison. 2008. Hybrid zone origins, species boundaries, and the evolution of wing-pattern diversity in a polytypic species complex of North American admiral butterflies (Nymphalidae: Limenitis). *Evolution* 62:1400-1417.

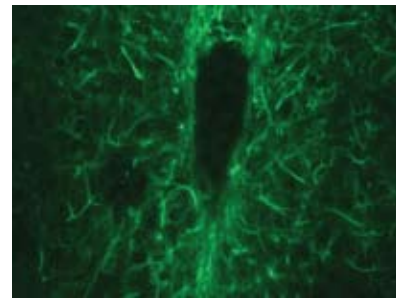
**Nyby, J.** 2008. Reflexive testosterone release: A model system for studying the nongenomic effects of testosterone upon male behavior. *Frontiers of Neuroendocrinology*, 29, 199-210.

**Wynne, RD, Walters, BJ**, Bailey, DJ, & **Saldanha, CJ.** 2008. Inhibition of injury-induced glial aromatase reveals a wave of secondary degeneration in the songbird brain. *GLIA*. 56(1): 97-105.

Ferris, C.F., Stolberg-Messenger, T., Kulkarni, P., Murugavel, M., Blanchard, R., Blanchard, D.C., Febo, M., Brevard, M., **Simon, NG** 2008. Imaging the neural circuitry and chemical control of aggressive motivation. *BMC Neuroscience*, 9: 1471-2202.

**R.V. Skibbens, D.N. Ringhoff, J. Marzillier, L. Cassimeris**, and L. Eastman. 2008. Positional analysis of BRCA1-dependent expression in *Saccharomyces cerevisiae*. *Cell Cycle*. 7: 3928 – 3934.

**Ware, V.C.**, and **Kearse, M.** 2008. Analysis of yeast chimeric rRNAs harboring *Drosophila* D7a expansion segment substitutions within the binding site for ribosomal protein L25. *Mol. Biol. Cell Suppl.* **19**, 599.



**Expression of Glial Fibrillary Acidic Protein (GFAP) in the periaqueductal gray of an adult female Syrian hamster brain. Magnification at 20x. Richendrefer, H. Swann Lab**

## Our recent graduates

Congratulations to those who received their degrees in 2008. Please keep in touch!

### Doctor of Philosophy

#### Biochemistry

Ryan Douglas Wynne - *The Role and Transcriptional Regulation of Glial Aromatase in the Injured Zebra Finch Brain*

#### Integrative Biology

Abigail Mary Pattishall - *The Ecology of Synurbic Watersnakes*

Laura Szymanski - *Integrating Neuroendocrine and metabolic events with reproduction*

Natalie April van Breukelen - *The Role of Androgens in the Expression of Male Pre-Spawning Behavior*

#### Molecular Biology

Yulia Akbergenova - *Cross talk between recycling and reserve vesicle pools in Drosophila presynaptic boutons*

Donna Marie Cartledge -  *$\gamma$ -Synuclein as a Therapeutic Target for Breast and Ovarian Cancers*

Angela Daria Hoptak-Solga - *The Role of Connexin43 (cx43) During Zebrafish Fin Regeneration*

Meron Mengistu - *The Effects of Fluid Shear Stress on Micro-Mechanical Properties and Mechanotransduction Events in Endothelial Cells*

Jennifer Jo Venditti - *Localization, Stability, and Functional Role of Sperm Associated with  $\alpha$ -L-fucosidase*

### Master's Degree

#### M.S. Molecular Biology

Susan Frances Cays Caravello\*

Tara Elyse Cusick\*\*

Laura Ellen Eastman\*\*

Louis Charles Elefante

Christine Louise Flefleh\*\*

Sarah Harris Gurley\*\*

Christopher Ballo Hopson

Xinliang Li\*

Jill Elizabeth McCane\*\*

Michele Alisa Muravsky\*\*

Jennifer Megan Painter\*

Boris Rubin\*

Amanda Marie Ryan

Kara Jean Sykes\*\*

Elizabeth Anne Thoryk-Longenecker\*\*

Jeffrey David Vassallo\*

### Bachelor of Arts

#### Behavioral Neuroscience

Shawn Suchet Amin

Teri Marisa Belkin

Christina Madison Berndt

Christopher Holden Chen

Pamela Margaret Fiorillo

Mark Francis Forwood

Michael Guirguis Ghali

Brittany Nicole Kishel\*

Michael Mazzei

Rachel Anna Moquete\*

Michaela Jane Pawlewicz

Kaela Irene Pearce

Lauren Reynolds Reading\*

Rita Raji Shankar

Matthew James St. John

### Biology

Hannah Marie Brotzman

Amanda Marie Brown

Sarah Rose Crump

Dana Lyn Fish

Jennifer Anne Gammell

Sarah Leann Hopler\*\*

Louis Anthony Magdon III

Colin Michael McLeod

Alanna Sari Nattis

Sarah Marie Nielsen\*

Jeffrey Park

Caitlin Sara Warinsky

### Molecular Biology

Christa Elizabeth Buckheit

### Bachelor of Science

#### Behavioral Neuroscience

Kelly Anne Durbin

Sheena Kathleen Farrell

Niranjan A. Gunasekaran

#### Biochemistry

Elizabeth Anne Brown

Scott Nathan Mlynarski

Stephania Maria Papastephanou

Kumar Manoj Shah

Ernest Young-Min Tchoi

Erica Marie Vaccari

Larry L. Zhang\*

### Biology

Kristin Marie Bierbauer

Kristen Elizabeth Cornell

Brittany Lee Grier\*

Michael Bertram Hall

Julie Montgomery Heidt

Timothy James Hertz

Kimberly Marie Hollywood

Amber Michelle Horner

Justin H. Johannesen

Amy Elizabeth Johnston

Philip Jerome Koehler III\*

John James Koprivsek\*\*

Megan Marie Linaberry

Kerry Elizabeth McLaughlin\*

Alyssa Rae Nielubowicz

Emily Grace O'Koren\*

Kelly Joy Pettijohn\*

Patricia Rekawek

Brian Manuel Rodrigues

Andrew Craig Stein

Christine Ashley Talmage\*

Nicholas Emmanuel Tatalias

Heather Marie Wilson

Pamela Clare Wilson

Jamie Chaterine Wohlhagen

### Molecular Biology

Whitney Marie Alexander

Emily Lauren Cooper

Jessica Lynne Phillips\*

Daniell Lynn Rowles

Alexander Volchonok

\*= January 2008 degree recipient

\*\*=September 2007 degree recipient



# Alumni Updates

**David M Dines** (1970) is now Professor of Orthopedic Surgery at Cornell-Weill Medical School and the Hospital for Special Surgery in NY. "We have developed the Biomodular Shoulder Replacement Systems for Biomet, Inc. and they are 2 of the most widely used shoulder replacement systems in the world. I have recently finished my term as President of the American Shoulder and Elbow Society and have served as the team physician for the NY Mets baseball team. I have also been the Medical Director for the ATP Tennis Tour and US Davis Cup Tennis team."

**Ron Kralik** (BS Biology 1973) entered into the dental supply business after graduation, working his way up through sales to management. He joined Henry Schein, Inc as Director of E-business Marketing to launch the first Windows-based dental supply ordering system. "The biology background provided a strong base for dental materials and procedural expertise."

**Randall Cohen** (BA Biology, 1978) has a private dental practice and is working as a consultant for Kuraray Medical. "I publish articles and deliver lectures to dental study groups around the country, a rewarding second career within my profession."

**Jon Linden** (BS Biology, 1978) is a Civil Mediator helping people stay out of court by resolving their disputes at the mediation table. "I work mainly for the NJ Superior Court and the US Equal Employment Opportunity Commission as a contractor."

**Francis "Chip" Uricchio** (BS Biochemistry, 1979) went on to Tufts University Medical School and did a fellowship in cardiology at the University of Pennsylvania. "I am currently president of a 21 member single specialty cardiology group in Philadelphia."

**David Warnke** (BA Biology, 1984) spent many years doing lab and chemistry applications for Air Products and moved into technical sales and marketing for the chemicals industry. He is back in the Lehigh Valley after years of domestic transfers. "I enjoyed Virology with Prof. Marsberger and Physiological Psychology with Prof. Nyby. Go Dravo B-3!"

**D'nese Sokolowski** (BS Molecular Biology, 1992) received her medical degree from Jefferson Medical College, completed her Obstetrics/Gynecology residency in 2000 and is in solo practice in Allentown. "I am proud to have a degree from Lehigh."

**Ben Del Tito, Jr** (PhD. Molecular Biology, 1995) is currently the Senior Vice-President of Quality and Regulatory Affairs at Auxilium Pharmaceuticals, Inc. in Malvern, PA and is responsible for Quality Control, Quality Affairs and worldwide Regulatory Affairs.

**Michelle Ferretti** (BA Behavioral Neuroscience, 1995) is now a pediatric physical therapist, and has worked at Children's Hospital Boston for the past 7 years. "I received my Masters in PT in 2000, and my doctorate in 2002. Both degrees were from the Massachusetts General Hospital Institute of Health Professions."

**Meghan Leigh Williams** (MS Biology, 1995) went on to earn her degree in Veterinary Medicine from Atlantic Veterinary College in Canada. "I am currently an associate veterinarian at the Hunt Valley Animal Hospital, Maryland."

**Bonnie Howell** (PhD, Molecular Biology, 1999) is currently a Research Fellow at Merck & Co. (West Point, PA) leading a group of 9 scientists in the Department of RNA Therapeutics. "I just celebrated my 5th year anniversary here and I really enjoy my work. Prior to my position at Merck, I spent 4.5 yrs as a post-doc in the Dept. of Biology (Ted Salmon's lab) at UNC-Chapel Hill."

**David Stachura** (BS Molecular Biology, 2000) earned his Ph.D. in Cell & Molecular Biology from the University of Pennsylvania. "Now I am a postdoc in Dr. Traver's lab at UCSD, studying hemaotopic development in the zebrafish."

**Michelle Catherine Siry** (BS Biology, 2001) graduated from Stony Brook School of Dental Medicine in 2007 and completed her general practice residency in Dentistry at Manhattan Veteran's Affairs Medical Center. "I am currently working in private practice as a general dentist in Manhattan."

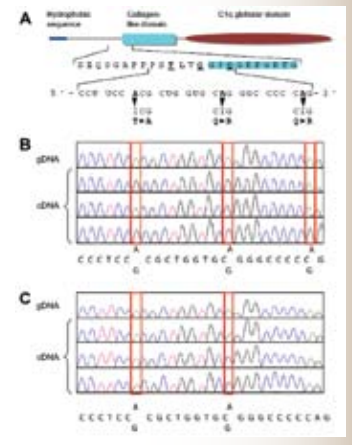
**Daria Blyskal** (BA Pre-Med, 2003) is currently doing her residency in family medicine at the Reading Hospital in Reading, PA. "Thanks for all the educational opportunities you provided me!"

**Laura Herr** (BS Molecular Biology, 2006) will be graduating from Thomas Jefferson University with a masters in microbiology. "I have recently started a new job at The University of Pennsylvania as a biosafety officer in the department of Environmental Health and Radiation Safety."

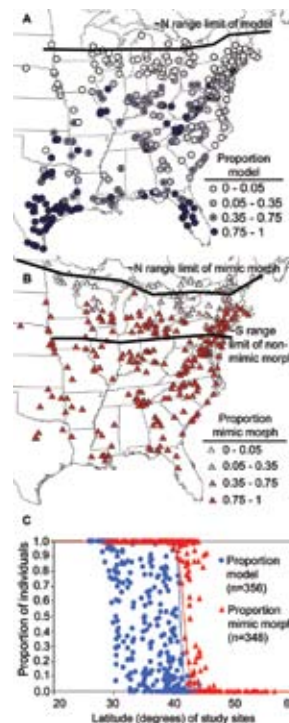
**Marissa Papaccioli** (BS Behavioral Neuroscience, 2007) is currently in a two year masters program at NYU in their Environmental Health Department. "My concentration is on inhalation/systemic toxicology. I am currently doing research on the extra-pulmonary effects of nanoparticles due to oxidative stress."

## RNA Editing in mouse and human C1QL1

(from Sie&Maas, 2009, FEBS A)\* A schematic representation of the C1QL1 protein is shown with the three main functional domains indicated. The amino acid sequence surrounding the editing sites is depicted and recoding events are indicated both at the amino acid and at the RNA sequence levels.\* B)\* Representative sequence tracks from subcloning of mouse cerebellum C1QL1. The genomic sequence is at the top. The positions of the three editing sites are boxed.\* C)\* Representative sequence tracks from subcloning of human C1QL1. The genomic sequence is at the top. The two editing sites are boxed.



A male Caribbean beaugregory damselfish (*Stegastes leucostictus*) looks out of his artificial "condo" and begins to court the presented female. Sneker, J. Itzkowitz Lab



Batesian mimics are predicted to lose their fitness advantage in the absence of an unpalatable model or when the mimic becomes relatively abundant. We used 29 years of observational field data from a continental-scale butterfly monitoring program, the 4th of July Butterfly Counts, to show that (A) the advantage of mimicry does not extend beyond the range of the model, (B) in contrast to expectations, the mimicry complex is maintained even where the model is rare and (C) the sharp phenotypic transition between mimetic and nonmimetic admiral populations occurs over a very narrow spatial scale corresponding to the limit of the model's range. These results suggest that, even at very low densities, there is selection for Batesian mimicry and it maintains the geographic position of this hybrid zone. Mullen, SP

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## And now we'd like to hear from you!

**Please take a moment to update us on your activities.**

### Want to visit?

Would you like to see for yourself how the department has grown? We would love to welcome you back for a visit! Simply call Vicki Waldron (610-758-3680) to make arrangements and we'll make sure someone is available to give you a personal tour!

Name: \_\_\_\_\_ Year(s) of Lehigh degree(s) \_\_\_\_\_

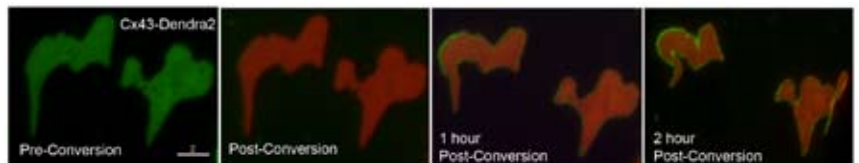
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News about you and your professional work: \_\_\_\_\_  
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Please send to: e-mail: [inbios@lehigh.edu](mailto:inbios@lehigh.edu)

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Bobby Buckheit III using Cx43 tagged with the photoconvertible fluorescent protein Dendra2. He permanently photoconverted 2 Cx43-Dendra2 gap junction (GJ) plaques from green to red and followed the plaques over a period of 2 hours in living cells. Note the green rim of the red plaques indicating accrual of newly synthesized GJ channels along the outside edge of GJs. R. (Buckheit and M. M. Falk, in submission)

*Please be sure to read the article (page 4) about the Buckheit Family!*