

Biological Sciences

Lehigh University

From the Department Chair



Neal Simon, Ph.D.

“There is a vibrancy and energy in Biological Sciences that makes the department a great place to study and work.”

Welcome to the first edition of our newsletter. Biological Sciences is now ten years old, there will soon be over 1,000 alums of the department, and there have been dramatic investments and changes over the past five years. It's a time where the life sciences has an increasingly broad influence on society and it seemed appropriate to let you know what we are doing and about our ambitions. You can expect to receive the newsletter twice a year, by e-mail if we have an

address. This will not only save trees and time, we also hope you'll provide comments and let us know what you're doing.

What's the department like? We are now 22 faculty, 15 staff, 34 graduate students, and 220 undergraduate majors. Six faculty have been added in the past four years and this spring we're searching for a seventh new hire. Profiles of these individuals are inside; they're remarkable people who have already added greatly to the opportunities available for students and to the intellectual energy of the department. We have the largest number of majors in the College of Arts and Sciences, the highest number of students engaged in independent study and research, and we are actively participating in new interdisciplinary programs in Applied Life Science, Bioengineering, and a partnership approach to premedical education, the Lehigh Pool Scholars Program, in addition to our other majors. There are new labs, new core facilities for genomics and proteomics, and a recently purchased confocal microscope that is a powerful research tool and also bridges science and art. You can see some of these spectacular images in this issue.

We are at the center of the Bioscience and Biotechnology Initiative, a Lehigh University 2020 investment with a singular objective: to bring national distinction to Lehigh for the quality and distinctiveness of its efforts in life sciences. The Initiative has brought an infusion of millions of dollars to the department and related fields to jump start these efforts through investments in new faculty, new programs, and new facilities. The programs in Applied Life Science and Bioengineering have won national awards for curricular innovation and leadership, faculty scholarship and undergraduate engagement in research are rapidly growing, and the caliber of students coming to Biological Sciences, which was always outstanding, is stronger every year. New and broader opportunities abound. There is a vibrancy and energy in Biological Sciences that makes the department a great place to study and work.

You can learn more about us from our recently launched web site (www.lehigh.edu/~inbios). We welcome the opportunity to keep you informed and look forward to hearing from you. The newsletter is for all of us – you've been part of our past and we hope you'll now be part of our future.

On behalf of the Department,

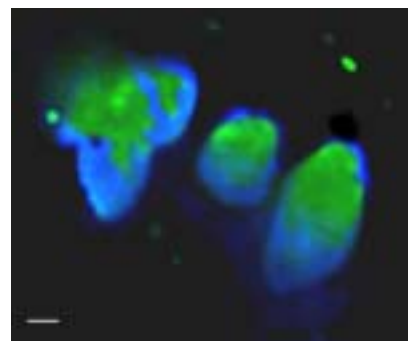
Neal G. Simon, Ph.D.
Professor and Chair

In this issue.....

- 2 In Partnership for Success
- 4 Meet the New Faculty
- 5 A Sampling of Publications
- 6 Student Spotlight
 - Graduate Student News
 - Alumni News
- 7 Recent Graduates
 - Genomics Facility



Department of
Biological Sciences
111 Research Dr.
Bethlehem, PA 18015
Tel: 610.758.3680
Fax: 610.758.4004
www.lehigh.edu/~inbios



Three gap junction channel plaques imaged in living human cells build from subunit proteins that were tagged with cyan or yellow fluorescent protein, respectively. Note that these two subunit isoforms (connexin26 and connexin43) segregate into subdomains (blue and green). Each plaque consists of thousands of individual channels that measure only about 8 nm in diameter that can not be resolved on this fluorescence light microscopic image. The white bar corresponds to 1 μ m of the image. M. Falk

Volume 1, 2005

In partnership for success

Partnership: “.....close cooperation between parties having specified and joint rights and responsibilities”

Webster's Third International Dictionary

The nature of the academic advising process is one that creates a partnership between the academic advisor and the student. According to Professor Steven Krawiec, veteran academic advisor for the College of Arts and Sciences, “An advisor should be sincere, earnest, sensitive, well-meaning. An advisee should be attentive, reflective, responsive. Both should be thoughtful, honest, and forthcoming. A mutually beneficial relationship emerges from trust.” Through a variety of means,

both the advisor and the advisee need to work together in setting goals and working towards those goals, with the ultimate objective of the student's successful completion of sufficient academic credits for graduation.

Vassie Ware, Associate Professor of Biological Sciences, and Tricia Serio ('91) formed such a successful partnership in the late 1980s. Read on for their individual reflections on the relationship that was forged between them over a decade ago.

A student's perspective

by Tricia Serio (B.S.'91), Ph.D.



Tricia Serio, Ph.D.

Educational background:

- Lehigh University; B.S. Molecular Biology with Departmental and High Honors, 1991
- Yale University, Dept. of Molecular Biophysics and Biochemistry; M. Phil 1995, Ph.D., 1997; Fellow of the Howard Hughes Medical Institute. Thesis title: Regulation of Late Gene Expression in Epstein Barr Virus. Thesis advisor: George Miller, M.D.

I believe the first time I met Dr. Ware was during my first year at Lehigh. I had been admitted to the pre-dental program with the University of Pennsylvania Dental School. The program was set up for three years of study at Lehigh followed by four years of dental school. A bachelor's degree would be awarded in “pre-dental science” after the first year of dental school. In comparing the requirements for the pre-dental science major with other biology majors, I realized that I would prefer to major in molecular biology.

Dr. Ware was the academic advisor for molecular biology majors, and I made an appointment to see her to determine if this was possible in the confines of the program. I believe that this meeting occurred not long after Dr. Kuchka came to Lehigh because Dr. Ware asked if it was OK for him to sit in on the meeting. It was quickly established that the only way that I could major in molecular biology and remain in the program would be to complete the requirements within three years.

The thing I remember most about that meeting was that Dr. Ware was determined to make it work. She actually laid out each semester for me for what would be my entire stay at Lehigh, making sure that I would meet all requirements and that I took classes in the proper sequence so that I would have all of the necessary prerequisites. This was not an easy task, and she was absolutely amazing. We had just met, and she had enough confidence in me to take the time to do this. I really appreciated this support, especially since there were some pretty hairy semesters as a recall - a spring with 21 credits, two classes over the summer, followed by a fall with 21 credits.

Over my years at Lehigh, Dr. Ware met with me each semester to double check the plan that had been laid out and to fill out various petitions for overloading and to get into certain classes that I wanted to take that were not the normal route. I only remember one thing that she could not fix. I had wanted to take quantum mechanics in the spring semester of my final year (I can't remember why!), but only had room for a non-science elective. I wound up taking pottery at Moravian College, and actually think that it was a much better option for me at the time.

Another important interaction with Dr. Ware that I recall was just before the fall semester of my senior year. I had returned to campus a week early for Gryphon training and stopped by the

Mountaintop Campus to make an appointment with her. I told her that I had been thinking over the summer and that I wanted to go to graduate school. She jumped up from behind her desk and gave me a hug, saying “I've been waiting for you to say this.”

Many years later when I was a post-doc in Chicago, she invited me to Lehigh to give a seminar. When she introduced me, she told this same story, and I was initially surprised that she had remembered it so many years later. But in retrospect, it's really not a surprise at all. She's been an unwavering supporter and enthusiastic cheerleader for me since my first year at Lehigh. I even called her for advice before accepting a faculty position. As always she gave me terrific advice, which I of course followed. She said “You have to go to Brown.” I'm glad that I did. She's really had a major impact on my career since before I even had one, and it continues to today.

Perhaps the most amazing part of this whole interaction is that I didn't take a class with Dr. Ware until my last semester at Lehigh. I only hope that I can pass this spirit along to my students here at Brown.

An advisor's perspective

by Professor Vassie Ware

I thought that it would be a typical type of introductory undergraduate advisee-advisor session. I would welcome the student into my office, and offer congratulations on the choice of Molecular Biology as a major. I would then explore how the student's interest in the discipline developed, inquire about the student's post-Lehigh ambitions, explore other options (usually this would lead to a bottleneck in the discussion!), and then get to the practical issues at hand of how to organize the Lehigh portion of the short or long term plan. With most students having a year of Lehigh under their belts by the time the Molecular Biology major was declared, there was usually 2 1/2 to 3 years' worth of time to complete the degree, accounting for any kinks along the way.

Tricia Serio (I call her “Trish”) would enter my life in 1988 as a pre-dental candidate in the seven year dental program between Lehigh and the University of Pennsylvania. Students in the pre-dental program were scheduled to spend three years at Lehigh, fulfilling their pre-dental school requirements, and then go on to the University of Pennsylvania for their dental training. Many students in the program at that time rarely declared a major, as they were required to satisfy certain course requirements,

maintaining a high academic average in the process. Trish's decision to declare a major immediately made her unique in that regard.

My next questions would naturally relate to how she developed an interest in dentistry and molecular biology. But how could I ask the question of why she wanted to be a dentist without revealing my own longstanding fear of those that practice dentistry and of the tools they employ? I kept thinking, "She wants to be a dentist...she wants to be a dentist." How would she combine her interest in dentistry with the training that she was eager to receive in molecular biology? I wondered.

We would re-visit this question several times over the course of Trish's career at Lehigh, before she revealed that "final" answer. Some may think that advisors have a lot of influence, but I am sure that my tone on the first attempt at this question was no different than the tone on the "nth" query when Trish's answer was different. I must admit, however, that I could not stop smiling as a reaction to "her final answer". Trish had made the discovery over the course of a year or so at Lehigh that she enjoyed experimental science and was eager to engage her talents in pursuit of a research career in molecular biology. Dentistry would ultimately take a backseat to what she had discovered about her interests in three years at Lehigh.

Before the change in plans, Trish knew that she needed to complete the B.S. degree in molecular biology within three years in order to stay on target for her dentistry plans! As the first of my molecular biology undergraduate advisees to attempt this feat, there was no recommended plan for accomplishing this, but with careful planning and overloading of credits, a strategy was devised. Trish managed a rigorous schedule of classes, managing her time effectively, and earning top grades in her courses.

About half way through Trish's Lehigh stint, she decided to pursue an independent research project. In this same period of time, Trish made a monumental decision, revealed to me one afternoon. She had decided to apply to graduate programs in molecular biology, and she wanted to discuss the strengths of some of the programs and to hear my recommendations about what programs might be of interest to her. I could not have been happier for her, a sentiment that I expressed with a great shriek! The planning began.

Trish had joined the laboratory of now retired Professor John Abel and had embarked on a research project studying the influence of hormones on lipid metabolism. As her major advisor

and as one of her committee members for her undergraduate thesis, I watched as Trish re-worked her original goals for a dentistry career, occasionally pointing out that she appeared to gain great pleasure in working through a research problem. Trish's research efforts earned her an Honors' distinction in molecular biology upon her graduation in 1991 with a B.S. degree. Well over a decade later, her undergraduate thesis is still a fixture in my office.

Trish chose the graduate program in Molecular Biophysics and Biochemistry at Yale University for her graduate work, and earned her Ph.D. in 1997. Trish and I were able to maintain some contact during her graduate years through a number of Lehigh contacts who had migrated to Yale as well. It was during her postdoctoral years at Chicago that we would have another opportunity to discuss career options.

In 2002 Trish came back to Lehigh as one of the Department of Biological Sciences Colloquium speakers. As our department had grown substantially in faculty number since Trish's time at Lehigh, many of the faculty could only relate to her initially as a "former Lehigh undergraduate". Her presentation about yeast prions enthralled the audience, but more importantly, faculty who had never had the pleasure of seeing her grow into a scientific gem from her undergraduate days, readily adopted her as "one of their own", and as a colleague. We were all so proud of her.

A year or so after that visit, we would have another opportunity to discuss her options for faculty positions. My former undergraduate institution, Brown University, was among the choices that she was considering. As objectively as I could, we discussed the merits of the two institutions vying for her commitment. As one of the most highly recruited molecular biologists in the country that year, Trish would be hired at Brown University into the Department of Molecular Biology, Cell Biology, and Biochemistry by my former undergraduate professor and postdoctoral mentor, Professor Susan Gerbi.

My reflections on Trish's days at Lehigh are a source of great joy. It has been such an enriching experience to see Trish's career unfold with such success.

So, we have one less dentist! There are many of us, including Brown students who are now in her care, who are delighted that her talents have been focused as an academic in the field of molecular biology.

Vassie Ware, Ph.D.



Serio Employment history

- Post-doctoral research: Univ. of Chicago, Dept. of Molecular Genetics and Cell Biology. 1997-2001
- Associate research scientist: Yale University, Dept. of Molecular Biophysics and Biochemistry 2001-2003
- Assistant Professor of Medical Sciences: Brown University, Dept. of Molecular Biology, Cell Biology and Biochemistry. Pew Scholar in the Biomedical Sciences; 2003 to present

Tricia Serio's research focus at Lehigh

(under Professor Jack Abel, retired)

"I actually still have my honors thesis! Title: "Relationships Between Fluctuations in Estradiol, Progesterone and Cortisol and Changes in Lipid Metabolism" We collected blood from healthy volunteers (including me) twice a week over a nine week period and examined lipid and hormonal profiles for each. We found changes in lipid carrying particles over the course of the menstrual cycle in women."

"This was my first experience with research outside of a classroom, and I couldn't believe how different it was. Techniques, of course, are the same, but the whole way of thinking is really what drew me in. During class, you follow a protocol that's been laid out for you - usually guaranteed to work. In the lab, you have figure out how to experimentally address a question that you are interested in knowing the answer to. Sometimes they work; most of the time they don't, but you just make adjustments and move on. Eventually, you find a way to get the answer. To this day, it is the puzzle of science that keeps me wrapped up in it."

Current research focus of the Serio Lab

In a variety of systems, proteins have recently been linked to processes historically limited to nucleic acids such as infectivity and inheritance. These atypical proteins, known as prions, lack sequence homology but are collectively defined by their capacity to adopt multiple conformational and therefore functional states in vivo. Remarkably, at least one of these forms, the prion state, self-replicates by somehow influencing protein in the non-prion state to change forms. This unusual process has been exploited as a novel mechanism for regulating protein function in many biological contexts. In *S. cerevisiae*, for example, translation termination efficiency is dictated by the conformation of the Sup35 protein, a component of the eukaryotic release complex. In the non-prion state, Sup35 facilitates efficient termination, but in the prion form, Sup35's activity is compromised leading to stop codon read-through. The traits associated with Sup35 conformers are largely stable but can interconvert spontaneously at a low frequency (1 cell/million), invoking a heritable change in phenotype without an underlying change in nucleic acid content. How does the cell constrain Sup35's conformational flexibility to allow stable propagation of distinct phenotypes yet retain enough plasticity to allow transitions? Our long-term goal is to answer this question by linking the dynamics of Sup35 biogenesis to the establishment, maintenance and switching of prion-associated phenotypes.

Meet the New Faculty



Maria Bykhovskaia, Ph.D. (Assistant Professor) earned her Masters Degree in Physics in 1987 from the Leningrad Technical University and her Ph.D. in Biophysics from the Russian Academy of Sciences, both in St. Petersburg, Russia. Professor Bykhovskaia did post-doctoral research at the Society of Mathematics and Information in St. Augustin, Germany and at the University of Virginia. She joined the faculty at Lehigh in 2002. Dr. Bykhovskaia's research focuses on the transfer of information between neurons. These cells of the brain involved in learning and memory increase or decrease their information transfer in response to the information they receive. Bykhovskaia uses electron microscopy, electrophysiology and mathematical modeling to probe the mechanisms involved in brain function.



Matthias Falk, Ph.D. (Assistant Professor) attended the University of Giessen in Germany where he earned his Masters Degree in 1987. Falk then studied at the University of Heidelberg and earned his Ph.D. in 1991, with his research focusing on the structure and function of foot-and-mouth disease virus (Picornaviridae) proteins. After earning his doctorate, Falk spent four years as a postdoctoral fellow at The Scripps Research Institute in LaJolla, California. Prior to his arrival at Lehigh in 2003, Falk served as an assistant professor in the Department of Cell Biology at Scripps. His research focuses on gap junctions, the clusters of channels that join neighboring cells at their membranes and allow cells to communicate by exchanging proteins, electric currents, and ions. The malfunctioning of gap junctions can cause hearing loss, skin diseases and cataracts. Falk uses fluorescent light microscopy and derivatives of proteins to reveal the micro-world of live human cells and the wispy, infinitesimal channels through which cells communicate with each other. Falk's images appeared in the 2004 calendars of Chroma Technology Corp. and Applied Precision Inc. Two of Falk's microscopic photographs, or micrographs, were on display in a unique art exhibit in San Francisco in 2003.



M. Kathryn Iovine, Ph.D. (Assistant Professor) earned her bachelor's degree from Carnegie Mellon University in 1993 and went on to study at Washington University, earning her Ph.D. in 1998. Iovine continued doing research at Washington University and joined the faculty at Lehigh in 2002. Her research interests involve how limbs and organs grow to the proper size with respect to the overall size of the individual. Zebrafish fins are normally proportional to their body length, making them good models to study growth control. Iovine has identified mutant zebrafish that have fins shorter or longer than normal. By identifying the mutations that affect fin length, she will begin to understand the mechanisms that regulate fin growth. To date, Iovine has identified a gap junction protein as one of mutant genes suggesting that direct cell-cell communication plays a role in this process.

Stefan Maas, Ph.D. (Assistant Professor) attended the Free University of Berlin, studying Biochemistry, where he earned the U.S. equivalent of his Masters Degree. His doctoral studies were carried out at Heidelberg University. Dr. Maas then spent six years doing post-doctoral research at the Massachusetts Institute of Technology (MIT) and came to Lehigh in 2003. Maas' research focuses on understanding the molecular basis for the tremendous diversity and complexity of higher organisms,

specifically through the recently discovered process of RNA editing. He uses molecular biological, biochemical and cell biological approaches to study how prevalent RNA editing is and how it is regulated. Furthermore, Maas investigates the consequences of misregulation or deficiency in RNA editing and how it can contribute to human disease processes. One of the targets for Maas's study is the Glioblastoma multiform (GBM), one of the most common and most aggressive of brain tumors. The overall goal of Dr. Maas's research is to establish novel molecular targets for clinical intervention. For more specific information concerning Dr. Maas' research please visit http://www3.lehigh.edu/News/news_story.asp?iNewsID=1019



Jutta Marzillier, Ph.D. (Professor of Practice) oversees the new Genomics Facility in the department. She is responsible for instrumental and computer set-up, establishing and developing protocols and methods, assisting and teaching students who want to use the new methods, interdepartmental networking to integrate methods used in biological sciences, biochemical engineering, computer science and other disciplines. Marzillier received her B.S. in Biology, M.S. in Biology and M.S. in Chemistry from the University of Giessen, German. She then earned her Ph.D. from the University of Heidelberg, Germany. Prior to her arrival at Lehigh in the fall of 2004, Dr. Marzillier was employed at CyThera, Inc. in California, where she was a senior scientist and manager of laboratory operations, responsible for human embryonic stem cell culture and cell banking.



Tamra Mendelson, Ph.D. (Assistant Professor) is one of the newest members of the department, joining the faculty in the fall of 2004. Mendelson earned her bachelor's degree in 1991 at the University of Wisconsin (Madison), and went on to earn her Ph.D. from Duke University in 2001. She then spent three years as a postdoctoral research associate at the University of Maryland. Her research addresses the question: How do evolutionary changes in mating behavior contribute to the formation of new animal species? Mendelson uses darters (a variety of small fish found locally) to ask questions about behavior that separates species and whether the behavior differences precede other genetic differences. Mendelson employs behavioral studies in the wild and using a laboratory streambed along with genetic studies.



Colin Saldanha, Ph.D. (Assistant Professor) earned his Bachelor's degree from Gustavus Adolphus College in Minnesota, and his Masters and Doctoral degrees from Columbia University in New York City. Following postdoctoral work at the Brain Research Institute at the University of California Los

Angeles, Professor Saldanha joined the faculty at Lehigh in 2001. His research examines how the brain rewires itself under natural and pathological conditions. A specific focus within this work is the role of the endocrine system in seasonal cycles of neuron turnover and local hormone provision in the recovery from injury. Songbirds are used as the model system because of the inherent neural plasticity demonstrated by species of this order. Saldanha uses molecular techniques as well as electron and confocal microscopy to study the remodeling process. His research group has identified evidence of cell-specific estrogen synthesis in the limitation of neural damage. Overall goals of this work are to better understand the roles of the endocrine system in brain development, damage and repair.



Robert Skibbens, Ph.D. (Assistant Professor) earned his bachelor's degree from Ohio State University and moved into the commercial sector to work for a biotech company, T Cell Sciences, Inc. in Boston. Dr. Skibbens went on to earn his Ph.D. from the University of North Carolina at Chapel Hill and receive post-doctoral training at both Johns Hopkins School of Medicine and the Carnegie Institute of Washington, Baltimore. Professor Skibbens arrived at Lehigh in 1999 to continue his research on chromosome replication and segregation. During replication, each parental chromosome is exactly duplicated and the resulting products (called sister chromatids) are tightly paired along their length. Upon cell division, the pairing mechanism is inactivated and the sisters segregate away from each other into the newly forming daughter cells. The Skibbens' lab focuses on Ctf7p/Eco1p, an essential component of the sister chromatid pairing pathway found in both humans and yeast. (See *Student Spotlight*, page 6)



A Sampling of Publications

Venditti, J., K. Donigan, & **B. Bean**, 2005. Subcellular localization of alpha-L-fucosidase in human sperm cells. *J. Andrology* 26, [abstract] accepted for publication.

Behe MJ, Snoko DW. 2004. Simulating evolution by gene duplication of protein features that require multiple amino acid residues. *Protein Sci* 13:2651-2664.

M. Bykhovskaia and E. Polagaeva. 2004. Increase in the releasable pool of vesicles underlies facilitation. *Neurocomputing* 58-60:469-476.

Cassimeris, L. 2004. Cell Division: Eg'ing on Microtubule Flux. *Curr. Biol.* 14: R1000-R1002.

Cundall, D. and F. J. Irish. (in press) The snake skull. In: *Biology of the Reptilia, Morphology H*, Vol. 20:, C. Gans and A.S. Gaunt (eds.) SSAR

Segretain, D. and **M.M. Falk**. 2004. Regulation of connexin biosynthesis, assembly, gap junction formation, and removal. *Biochem. Biophys. Acta.* 1662:3-21.

Iovine, M.K., Higgins, E.P., Hinds, A., Coblitz, B., and Johnson, S.L. Mutations in connexin43 (GJA1) perturb bone growth in zebrafish fins. In press. *Dev. Biol.*

Haley, M., Smith, J. & **Itzkowitz, M.** 2004 Female choice and male courtship in the beaugregory damselfish. *Behaviour.* 141, p. 391-405

Athanasiadis, A., Rich, A., and **Maas, S.** 2004: Widespread A-to-I RNA editing of Alu-containing mRNAs in the human transcriptome. *PLoS Biology*, in press

Mendelson, T.C., B.D. Inouye, and M.D. Rausher. 2004. Patterns in the evolution of reproductive isolation and the genetics of speciation. *Evolution* 58:1424-1433.

Saldanha, CJ, Schlinger, BA, Miceyvich, PE & Horvath, TL. (2004). Presynaptic NMDA-receptor expression is increased by estrogen in an aromatase-rich area of the songbird hippocampus. *Journal of Comparative Neurology.* 429: 522-534.

Schneider, J. E. Energy balance and reproduction. *Physiology and Behavior* 81:289-317, 2004.

Simon, N.G., Kaplan, J.R., Hu, S., Register, T.C., and Adams, M.R. (2004) Increased aggressive behavior and decreased affiliative behavior in adult male monkeys after long-term consumption of diets rich in soy protein and isoflavones. *Horm. Behav.* 45, 278-284

Skibbens, R.V. 2004. Chl1p, a DNA helicase-like protein in budding yeast, functions in sister chromatid cohesion. *Genetics* 166: 33-42.

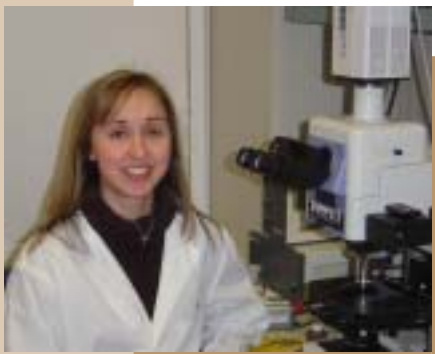
For a more in-depth listing of publications please visit our website (www.lehigh.edu/~inbios) and explore individual faculty members' information.

Biological Sciences

Neal Simon, Ph.D. Chair
 Barry Bean, Ph.D.
 Michael Behe, Ph.D.
 Maria Bykhovskaia, Ph.D.
 Lynne Cassimeris, Ph.D.
 David Cundall, Ph.D.
 Matthias Falk, Ph.D.
 M. Kathryn Iovine, Ph.D.
 Murray Itzkowitz, Ph.D.
 Steven Krawiec, Ph.D.
 Michael Kuchka, Ph.D.
 Linda Lowe-Krentz, Ph.D.
 Stefan Maas, Ph.D.
 Tamra Mendelson, Ph.D.
 John Nyby, Ph.D.
 Colin Saldanha, Ph.D.
 Jeffrey Sands, Ph.D.
 Jill Schneider, Ph.D.
 Robert Skibbens, Ph.D.
 Jennifer Swann, Ph.D.
 Vassie Ware, Ph.D.

Student Spotlight

A fundamental aspect of cell division is that each daughter cell inherits a full complement of the parental genome, each cell receiving a full set of chromosomes. Mis-segregation of the chromosomes is strongly correlated with cancer progression and birth defects. Central to proper chromosome segregation and cell viability is the mechanisms by which cells recognize and properly segregate their sister chromatids. One of these mechanisms, sister chromatid cohesion, is the main focus in Dr. Robert Skibbens' lab.



Lisa Antoniacci
Skibbens Lab

Lisa Antoniacci is graduate student in the Biochemistry program within the Department of Biological Sciences. She is a three-time recipient of the Nemes Fellowship, a private scholarship offered to senior graduate students nearing the completion of their Ph.D.

Lisa's research focuses on chromosome transmission fidelity, ensuring that each daughter cell obtains the proper number of chromosomes. In order for chromosomes to properly segregate, sister chromatids must be tethered together from DNA replication until anaphase onset. This process termed cohesion, holds the sisters together until they separate into their respective daughter cells. Working in the lab of Dr. Robert Skibbens, Lisa recently published her work regarding a novel mechanism that is critical for tethering sister chromatids together via a nuclear envelope protein. Using a TetR/TetO GFP system in *Saccharomyces cerevisiae*, we are able to visualize chromosome cohesion. Using this assay they identified Mps3p, a nuclear envelope protein, concentrated at the spindle pole body (centrosome), as having a role in sister chromatid cohesion. This research identified the first spindle pole body component functioning in sister chromatid cohesion, and provided the first documentation linking cohesion processes with the nuclear envelope.

Graduate Student News

Meron Mengistu recently attended the American Physical Society Meeting in Montreal, Canada. "I found this experience to be one that broadened my horizon both educationally and culturally," Mengistu reported. "This meeting had a whole section dedicated to cellular biomechanics and biomedical physics, where I was presented with a different approach to solving biological problems." Meron is a second year graduate student and Professor Linda Lowe-Krentz is her advisor.

Ryan Wynne, a third year graduate student, received word that his manuscript, "Glial aromatization decreases neural injury in the zebra finch (*Taeniopygia guttata*): influence on apoptosis." has been accepted by the *Journal of Neuroendocrinology*. Wynne's research work is centered in Dr. Colin Saldanha's lab, where he is focusing on the neuroprotective role of glial aromatization and local estrogen synthesis in the avian brain.

Natalie Van Breukelen and **Jennifer Gagliardi** ventured to Lomas Barbudal Biological Reserve in Guanacaste, Costa Rica for the 2004 spring semester to conduct behavioral ecology field research. They collected parental care behavioral data on a native species of fish, the convict cichlid (*Archocentrus nigrofasciatus*). Gagliardi notes, "The convict cichlid is an interesting study animal for behavioral ecology and evolutionary research because it is one of the few species of fish that is monogamous and biparental." This trip not only allowed them to further their academic career, but it gave them the experience of living in a Third World, Spanish-speaking country. Professor Murray Itzkowitz is their advisor.

Alumni News

Jeremy McGarvey ('04) graduated a semester early and served as an intern at Merck Pharmaceuticals, working for a former graduate student of Lynne Cassimeris (Bonnie Howell ('98)). Jeremy is currently attending the University of Pittsburgh School of Medicine.

Jessica Lohoczky ('98), who graduated with a double major in Molecular Biology and Biology, went on to work at the Whitehead Institute at MIT, one of the major sites responsible for the public sequencing of the human genome. Jessica is included in the list of authors on the publication describing this major achievement (sequencing the genome), featured in a special issue of the journal, *Nature*.

Joe Fetcho ('79), who did undergraduate research in the Cundall lab, has just been hired as a full professor in Neurobiology and Behavior at Cornell University. He will head a new research group in the department focusing on the imaging of neural networks. Joe and his wife Mary (also a graduate of our old Biology Department) and their son Robert are living in Ithaca, New York.

Do you have any news to share? If so, please e-mail your information (name, year of graduation, degree, and news) to inbios@lehigh.edu

Our recent graduates

Congratulations to those who received their degrees on January 16, 2005. Please keep in touch!

Doctor of Philosophy

Behavioral Neuroscience

Robert M. Blum- *Metabolic signals are more important than Adipocyte, Pancreatic and Adrenal hormones in control of reproduction*
Peter J. James- *Reflexive testosterone release in male mice: roles of genotype and sexual arousal*

Masters Degree

M.S. Molecular Biology

Krista L. Alvin
Tina J. Frey
Krista L. Getty
Steven R. Katchur
Sheri C. Kelly
Sandra Y. Vasey
Feilan Wang

Bachelor of Arts

Behavioral Neuroscience

Tiffany A. Berman
Tiwaun S. Hawkins
Rebecca Sharim

Biology

Erin E. Anthony
Lauren H. Kramer

Bachelor of Science

Behavioral Neuroscience

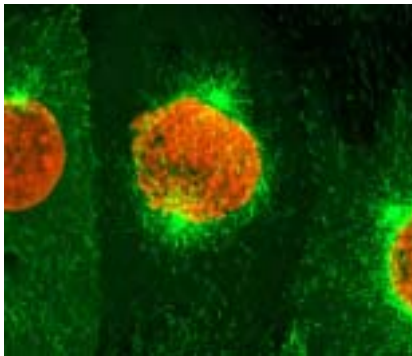
Travis D. Cobb
Kevin N. Rohmann

Biochemistry

David R. Lowery
Tracy L. Vrablik

Biology

Caleb V. Scott



Dividing cells viewed at high resolution using a novel microtubule marker (green). Chromosomes are stained red. (Confocal image)

M. Piehl and L. Cassimeris

Student receives Goldwater scholarship

Kate Donigan ('06) has been recognized with a Goldwater Scholarship for her research on andrology with Professor Barry Bean. Donigan is one of the 310 sophomores and juniors from across the United States to receive the honor. The Goldwater Scholarship, one of the most prestigious awards for undergraduates pursuing careers in science, offers the cost of tuition, fees, books, and room and board up to a maximum of \$7,500 per year for each recipient.

This year's Goldwater Scholars were selected on the basis of academic merit from a field of 1,113 mathematics, science and engineering students who were nominated by the faculties of colleges and universities across the country. Each school was invited to send up to four nominees to the national competition. Donigan is the sole winner from Lehigh.

Genomics Facility Established

With the onset of the "post-genomic era" approximately ten years ago, the demand for high-throughput screening is rapidly growing, thus advancing the microarray technology extensively used in biological research. This technique uses parallel hybridization of thousands of gene sequences to measure levels of gene expression in RNA samples and make comparisons between samples. Thanks to a grant from the Keck Foundation, the department was able to purchase at DNA microarray scanner and other necessary equipment to equip its new Genomics Facility.

The Genomics Core Facility contains the following equipment and resources:

DNA microarray scanner
Rosetta Luminator® Gene Expression Data Analysis System.
Bioanalyzer
Real Time PCR System.
Genetic Analyzer (sequencer)

The Genomics Facility is managed by our Professor of Practice, Jutta Marzillier, Ph.D. If you would like further information about the facility, please contact Dr. Marzillier at 610-758-4902.

Do you have an e-mail address?

Please send us your e-mail address so we can save on production costs and you can receive your newsletter quickly. E-mail addresses can be sent to inbios@lehigh.edu. Be sure to include in the subject line "alumni e-mail, class of ??".

Featured in our next issue:

- New Programs in Biological Sciences
- Undergraduate Research
- Meet the Staff
- Associate Professors
- Imaging: Where Science meets Art
- and more!

Department of
Biological Sciences
111 Research Dr.
Bethlehem, PA 18015
Tel: 610.758.3680
Fax: 610.758.4004
www.lehigh.edu/~inbios



And now we'd like to hear from you!

Please take a moment to update us on your activities.

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

e-mail address: _____

News about you and your professional work: _____

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!

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



While no individual yeast cell can give an answer, the collective voice of millions betray the secrets of CTF7.
A. Brands and R.V. Skibbens