

BIOLOGY

VOLUME 7

LAFAYETTE

WINTER 2011-12

SCOTT MELLON '12 AWARDED NATIONAL RESEARCH FELLOWSHIP

For Scott Mellon '12 choosing to major in biology was an easy decision. "Biology has always interested me. Living organisms contain such complex systems that have ingenious methods of obtaining what they need, but also have certain glaring defects. Biology also has so many practical applications, and new discoveries have the potential to greatly improve the quality of life of many people," says Mellon.

Mellon's interest and work in the field paid off as he was awarded an Undergraduate Research Fellowship by the American Society for Microbiology.



Biology major Scott Mellon '12 received a national research fellowship for his work with Laurie Caslake, associate professor and head of biology.

The grant covered costs for his research on campus this summer and travel expenses to the 2012 annual ASM conference, where he will present his work.

His ongoing research with Laurie Caslake associate professor and head of biology, focuses on the ability of desert crust bacteria to repair their DNA after being damaged by various treatments.

(RESEARCH continued on page 2...)

PROFESSOR MEGAN ROTHENBERGER '02 HELPS STUDENTS MAKE 'COOL' DISCOVERIES

Some professors might be alarmed if they saw college students running toward them with a dripping net filled with slimy creatures, but not assistant professor Megan Rothenberger '02.

"It's really rewarding for me to see students get excited about discoveries they make in the lab or out in the field," she says. "When they realize that something that looks like elephant snot in a stream actually looks like miniature green and gold gems under the microscope, or when they run at me with a dip net filled with crayfish or tadpoles to show me what they found, I love it!"

While Rothenberger knew she wanted to be a biology major when she attended Lafayette, she quickly realized that a life of lab coats and test tubes wasn't for her.

"I was attracted to conservation biology because it is an interdisciplinary and applied field. I like the fact that the work being done in my lab can be understood by most people," she says.

Rothenberger stresses the need for quality communication in her classes. Three of the four courses she teaches — Conservation Biology, Environmental Issues in Aquatic Ecosystems, and Agriculture, Ethics, and the Environment — are writing courses.

"In my opinion, there is no point in conducting scientific investigations if you can't effectively communicate the results of your work to the people who will benefit from it or who can use it to make some positive change," she explains.

Remembering how much her research benefited her once she got to graduate school, Rothenberger strives to be a mentor for her students, involving them in research that they can present and publish.

"I love the fact that each semester brings a new batch of students with new ideas and



Professor Megan Rothenberger '02, right, works with Alyssa Calomeni '11 at Raritan Bay, N.J.

perspectives and a new class dynamic," she says.

Rothenberger has three ongoing projects involving student researchers. Alyssa Calomeni '11 completed honors thesis research and Danielle Sobol '12, Carolyn Cabrey '12, Andrew Chun '12, and Alex Pong '13 are conducting independent study research to investigate different aspects of water quality in Raritan Bay, N.J. Carly Feiro '12 is collecting and analyzing macroinvertebrates from five dam sites along the Bushkill Creek to study the effects of dam removal. Shane Foye '12 is continuing work begun by Jeff Hollander '11 by studying the impact of two biocontrol beetles on purple loosestrife plants within Jacobsburg State Park.

"Even if they remember nothing else, I hope they remember our lab motto, which is 'Experience is what you get when you don't get what you want,'" Rothenberger says. "Research projects — and life — rarely happen the way we envision them, but problems and setbacks can be opportunities. I believe it's really important to be adaptable and perseverant, keep an open mind, and continue searching for creative solutions in the face of those problems." ■

BIOLOGY

Note: all email addresses are @lafayette.edu

FACULTY

Laurie F. Caslake

Associate Professor and
Department Head
(610) 330-5462, caslakel

James R. Dearworth

Associate Professor and
Chair of Neuroscience Program
(610) 330-5466, dearworj

Anna Edlund

Assistant Professor
(610) 330-5465, edlunda

Charles W. Holliday

Professor
(610) 330-5461, hollidac

Wayne S. Leibel

Gideon R., Jr., and Alice L.
Kreider Professor
(610) 330-5460, leibelw

Robert Kurt

Associate Professor and Peter
C.S. d'Aubermont Director of the
Health and Life Sciences Program
(610) 330-5681, kurtr

Manuel Ospina-Giraldo

Assistant Professor
(610) 330-5655, ospinam

Elaine R. Reynolds

Associate Professor
(610) 330-5654, reynolde

Megan Rothenberger '02

Assistant Professor
(610) 330-5459, rothenbm

Nancy McCreary Waters

Associate Professor
(610) 330-5467, watersn

STAFF

L. Philip Auerbach

Department Technician
(610) 330-5468, auerbacl

John Drummond

Laboratory Coordinator
(610) 330-5912, drummonj

Paulette McKenna

Department Secretary
(610) 330-5456, mckennap

Biology is published annually by the Department of Biology, Lafayette College, Easton, PA 18042 for current biology majors, prospective students, and biology alumni with the assistance of the Division of Communications.

Editors: Wayne Leibel and Bob Kurt

Photographer: Chuck Zovko

LAFAYETTE
COLLEGE

12/11 • 3K

FROM THE DEPARTMENT HEAD

I write this as Thanksgiving break approaches. Students, faculty, and staff are looking forward to our short break and the two weeks following Thanksgiving are always a whirlwind of activity. The halls of Kunkel have been pretty busy this year; here is an overview of our activities — you can read more specifics about your favorite faculty member inside.

First, we bid goodbye to Professor **Chuck Holliday** as he retires at the end of this academic year. After nearly 30 years, and an untold number of blue books, Doc Holliday will be taking up residence in Pardee Hall to continue his research program on cicada killer wasps. To celebrate and honor Doc Holliday, **Robert Morris '86** (Wheaton College), **Christopher Gillen '89** (Kenyon College), **Winston Thompson '86** (Morehouse College of Medicine), and **Susan (Law) Pignolo '88** (freelance writer for biomedical industry) returned to College Hill to give a seminar on their science careers and life lessons learned at Lafayette. We all enjoyed the perspectives they provided on our little corner of the world.

As you can probably guess, we are searching for a new faculty member. Our goal is to recruit a broadly trained biologist who can teach physiology to biology and neuroscience majors. If the search is



successful, the 2012 newsletter will introduce you to our newest faculty member.

In keeping with our accreditation requirements, we are being much more intentional in our outcomes for student learning in our courses and honors program. Evidence-based assessment is a worthy intellectual inquiry

and one that will allow us to review and refine our program requirements with the goal of improving student success. We remain committed to providing inquiry-based research experiences for our students through vigorous and rigorous independent research, honors research, and EXCEL and Nalven Summer Scholars programs. These research experiences routinely culminate in student-faculty presentations at regional, national, and international professional meetings and coauthored publications. We are, justifiably, proud of our students and their accomplishments.

This is my final year as department head. I thank my colleagues for their patience and hard work over the past three years. I hope you enjoy the newsletter. As always, we love to hear how you're doing.

(...**RESEARCH** continued from page 1)

The standard organism for these kinds of experiments is *Deinococcus radiodurans*, bacteria that can survive high levels of desiccation, UV radiation, and ionizing radiation.

"Desert crust bacteria are important because they provide a source of nutrition in an environment where nutrients are very scarce, and they solidify the soil and prevent erosion," explains Mellon.

"From a scientific standpoint, the research is important because it explores previously unknown ways that DNA can be repaired, and we may discover that many kinds of bacteria can live in places that were previously believed to be uninhabitable."

Mellon spent last school year exposing

the bacteria to UV radiation and measuring survival. For the summer, Mellon and Caslake exposed the bacteria to bleomycin, an antibiotic that causes DNA damage by causing double strand breaks. They also observed the bacteria by putting the fragments back together.

After graduating, Mellon plans to go to graduate school for microbiology or molecular biology and get a job in the biotech industry.

"I was always leaning in this direction, but I was not positive that it was what I wanted to do until I started doing this research," he says. "I love the feeling of making new discoveries that no one has made before and the process of trying to figure out why one particular result occurred as opposed to another." ■

STUDENTS LEARN BIOLOGY AND PROBLEM-SOLVING IN NEW INTERDISCIPLINARY COURSE

This spring, a new course combining biology and computer science will provide students with ways to build connections between disciplines and new techniques to approach difficult biological problems.

The course, A Modeling Based Approach to Biology, can be taken as an alternative to General Biology 102. It will be team-taught by **Robert Kurt**, associate professor of biology, and **Chun Wai Liew**, associate professor and head of computer science. It was developed as a result of a Mellon Course Development grant from the College.

The new course will require that students learn about the same amount of content as General Biology 102, but through the process of problem-solving.

“One driving force is that there is too much content to cover in a general bio course

and so an alternative approach may be warranted,” says Kurt. “By having students learn content by working in teams to solve complex interdisciplinary problems the hope is that they will get more out of this type of class than the traditional intro course.”

Liew and Kurt will lead classroom discussions, showing the class how two different disciplines would view problems and how individuals can incorporate multidisciplinary approaches to problem-solving.

“The class will be taught using ‘problem based learning,’ where students form teams to propose solutions to problems given to them by the instructors,” says Liew.

The laboratory projects in the course are also built around current events. One project will have students model

the immune response to cancer, and the other project will have students isolate their own DNA and model the expansion of transposons in the human genome.

“Our hope is that students will retain the content better with the approach we are using in the new course since they will have to learn material for the purpose of addressing specific problems,” says Kurt. “In addition, if students learn the process of solving interdisciplinary problems then they will be in a better position to take charge of their own learning.”

Liew is excited to provide students with a new learning opportunity.

“I am interested in guiding the students to learn how to approach solving interdisciplinary problems — which is what most interesting problems are,” he says. “They will learn a lot and enjoy the challenge.” ■

PROFESSOR ELAINE REYNOLDS SHOWS STUDENTS THE MARVELS OF THE BRAIN

Associate professor **Elaine Reynolds** is known as the Flywoman on campus, a reference that applies to her winged subjects of choice for student research experiments.

But it could just as well pertain to the appearance of perpetual motion she exudes both in and out of the classroom.

Reynolds is a passionate neuroscientist who has the distinction of working with more than 70 Lafayette students over the past 14 years on projects ranging from the genetics of alcoholism and epilepsy, to computer modeling of neurocomplexity, and how decisions are made at the cellular level — research that has applications in artificial intelligence and cancer prevention.

“I could teach at a lot of other places, but there are very few where I can interact with students as much as I do here,” says Reynolds, currently president-elect of the organization, Faculty for Undergraduate Neuroscience or “FUN.”

Because of similarities in the genes and the cells that make up the nervous system in humans and fruit flies, these insects are used regularly by Reynolds and her students in their quest for new knowledge.

Currently, she has eight students conducting research. One group is

looking at genetic factors that could cause alcoholism by conducting experiments that compare how long it takes for normal flies and flies with mutations to pass out when exposed to alcohol.

“Alcoholism is genetic and passed from generation to generation,” she says. “They’re looking for changes in the genome that would predispose someone to the disease.”

One of her other students is studying why some cells become a neuron and others a skin cell during development, while another is using epileptic flies to try and understand why a high-fat diet reduces the incidence of seizures in some people. Pinpointing the responsible compound or mechanism could help people whose epilepsy doesn’t respond to existing medication.

“There’s potential for development of a new drug,” Reynolds says. How’s that for real world?

Outside the fly lab and as a professor in an interdisciplinary field, Reynolds frequently collaborates with other faculty to teach courses that mix in art, religion, and philosophy with neuroscience.

“It allows me to think about my field in a different way,” she says, as results of those interdisciplinary pairings are



Professor Elaine Reynolds teaches a lab in Oechsle Hall.

always interesting and often revelatory.

In a First-Year Seminar, she tackled fear not only in a biological sense, but how it’s portrayed in horror flicks as a cultural reflection, and used to influence public opinion by politicians and the media. For example, the class discusses Michael Moore’s *Bowling for Columbine* to examine how he manipulates the viewer’s opinion on gun control.

“Once you understand how primal the emotion of fear is, it is easier to understand how difficult anxiety or phobia can be to treat or how fear can be used to sway your ideas.” ■

FACULTY AND STAFF UPDATE



Whether for courses, field work, teaching, or research laboratories **PHIL AUERBACH**, technician III, continues to be the “go to” guy for the biology department. Indeed no job is too complex, too

big, or even too small for Phil. Anything we seem to need to do our job, Phil is able to get it done. He is truly an outstanding and skilled individual who continues to perform the many complex and technical jobs in the department in an exceedingly competent fashion. Our research and teaching program would not be the same without him.



Laurie Caslake, associate professor and head, taught Molecular Genetics in the fall and Microbiology in the spring. Caslake supervised six independent research students including travel and living

expenses for one student doing research in the department of civil engineering at U.C. Davis. One manuscript was published with a Lafayette student as coauthor and two students presented their research results at the general meeting of American Society for Microbiology (ASM) in New Orleans, La. **Scott Mellon '12** was awarded an Undergraduate Research Fellowship from ASM. Caslake served as the academic adviser for 21 students and on the Honors Thesis Committee for Lafayette and a student at Moravian College. She served on three college committees and presented “Polio Eradication: Is it Possible?” at Experience Lafayette. She volunteered her time at Third Street Alliance during their science week entitled “Icky, Sticky, Ooey, Goey.”



James Dearworth, associate professor, taught Comparative Vertebrate Anatomy, his First-Year Seminar “This is Your Brain on Drugs,” and supervised four independent research students and one

honors student during the fall semester. In spring semester, he taught Neuroanatomy, and supervised six independent research and one honors student. Six students were coauthors on four abstracts presented at the 87th annual meeting of the Pennsylvania Academy of Science and the 2nd annual Lehigh Valley Society for Neuroscience Undergraduate Research Conference. Thirteen students were coauthors on three papers: two published in

Vision Research and a third in the *Journal of the Pennsylvania Academy Science*. Dearworth also received the 2011 Delta Upsilon Distinguished Mentoring and Teaching Award, was appointed as the neuroscience program chair, and organized the Lafayette Alumni Research Network (LEARN) Program.



In fall 2010, **John Drummond**, biology laboratory coordinator, taught eight laboratory sections, and in spring 2011, he taught seven laboratory sections while

also supervising 16 teaching assistants who helped facilitate the labs. He served on two honors thesis committees. In September 2010, he conducted a monarch butterfly tagging program for second grade students at Blue Mountain Elementary East in Schuylkill County, Pa., as well as an all day monarch event at Hawk Mountain Sanctuary, Kempton, Pa. He attended the Association for Biology Laboratory Education conference in June 2010 in Las Cruces, N.M.



In the fall semester, **Anna Edlund**, assistant professor, taught General Biology and mentored four research students. During the spring semester she taught Developmental Biology, Special Topics in Developmental

Biology: Biological Pattern Formation, and mentored one research student. Edlund was on the steering committees for two National Science Foundation (NSF) Research Coordination Networks, traveling during the summers to meet with other committee members. She also was primary investigator on an NSF grant titled RUI Collaborative Research: Genetic and Cell Behavioral Characterization of Nonrandom Mating in *Arabidopsis thaliana*, and presented a poster at the 21st International Congress on Sexual Plant Reproduction, in Bristol, England.



Bernie Fried, Kreider Professor Emeritus, continues to be an asset to the biology department with his collegiality, productivity, and willingness to still

mentor students despite his retirement. His list of publications and mentoring activities for the academic year is as impressive as ever. Last year, Fried published 10 articles and had another 9

articles in press; 12 of these include Lafayette students as coauthors. In addition, Fried supervised three EXCEL summer research students, as well as four independent and/or EXCEL students during the academic year.



In the fall, **Charles Holliday**, professor, taught Human Physiology and Marine Biology. In the spring, he taught Invertebrates and World Health, and Comparative

Animal Physiology. During the summer, Holliday performed field research on cicada-killer wasps in Florida, using his travel trailer as a field lab. Holliday and his colleagues, Joseph Coelho (Quincy University) and Jon Hastings (Northern Kentucky University) published a scientific paper on the relationship between the size of cicada killers and the size of their cicada prey. A second paper on the distributions of the five New World cicada killer species has just been published. Also at the 2010 annual meeting of the Entomological Society of America, he presented a research poster on theft of prey cicadas by rival female cicada killers.



Robert Kurt, associate professor, taught Immunology during the fall semester, and A Modeling Based Approach to Biology, and Infectious Diseases in the spring

semester. Kurt supervised two independent research students in the fall and one in the spring semester, as well as four honors thesis students. One manuscript was published with Lafayette students as co-authors. Three research students presented their work at the Pennsylvania Academy of Science meeting and one student presented her work at NCUR. Kurt presented student research results at the 14th International Congress of Immunology meeting in Japan, served as an academic advisor to 20 students, is working on the third year of a three-year NIH grant with his research students, and chairs the health and life sciences minor.



In fall semester, **Wayne Leibel**, Kreider Professor of Biology, offered Evolutionary Genetics, and FYS “The Human Animal,” and he taught General Biology II,

and Evolutionary Genetics in the spring semester. In addition, he oversaw the

honors research of **Christina Chen '11** who successfully defended her thesis in May. He attended one professional meeting last summer and published four articles on cichlid fishes. He continued his work as associate editor/technical editor for the *Journal of the American Cichlid Association*, as chair of the Guy D. Jordan Endowment Fund of the American Cichlid Association (which administers small grants for cichlid research for graduate and postdoctoral students), and as the editor of *Cichlid News*. He was honored as a Guy D. Jordan Fellow by the American Cichlid Association at their annual meeting for his lifetime contribution to the science and husbandry of cichlids.



SHYAMAL MAJUMDAR,

Kreider Professor Emeritus, supervised one honors research student, co-authored two book chapters with his research students, co-edited one book, and edited three issues of the *Journal of Pennsylvania Academy of Science*. He was an invited participant and speaker at the sixth Asia Pacific Congress on Cell Biology held in Manila, Philippines, where he served as a member of the International Advisory Committee of the Congress and chaired a scientific session. Majumdar was editor of books and the *Journal of the Pennsylvania Academy of Science*, and served on the editorial board of one national scientific journal (*In Vitro: Cellular and Developmental Biology*), and two international journals (*The Ekologia*, India, and *Advances in Pharmacology and Toxicology*, Jalgaon, India). He also served as the chairman of the International Scientific Committee of the third International Conference on Ecotoxicology and Environmental Sciences.



PAULETTE MCKENNA,

secretary, will have completed 35 years of service on Sept. 14, 2011. Some of the ways in which she has contributed significantly to supporting and sustaining the biology

department include: serving the department head in running the department, assisting other faculty in the department, managing the building, coordinating the purchasing of equipment and supplies for teaching and research, and handling faculty scientific grant expenditures. She also handles invited speaker arrangements, coordinates lunch for faculty brownbags, and compiles the

extensive documentation for our annual report. Moreover, she facilitates department course field trip fees and transportation needs, coordinates interviews for teaching assistants, monitors student hiring, contract submissions, controls student payrolls, and issues key requests for students working in the department. All of her talents and contributions were recognized 2010 when she was presented with the Lafayette College Distinguished Service Award.



MANUEL OSPINA-GIRALDO,

assistant professor, taught Essentials of Plant Disease, and Genomics in the fall semester, and Molecular Genetics in the spring of 2011. Ospina-Giraldo supervised two honors

thesis and two independent research students during the academic year, and he supervised three EXCEL scholars (two of them funded by external grants) in the summer of 2010. Most of the student research conducted this year was presented at the Oomycete Molecular Genetics Network meeting at the Asilomar Conference Grounds in Pacific Grove, Calif., and at the National Conference on Undergraduate Research. These presentations resulted in three published abstracts and two submitted manuscripts. Ospina-Giraldo served on the Biotechnology and Bioengineering Advisory Committee and the Institutional Review Board. Additionally, he advised 25 students.



ELAINE REYNOLDS,

associate professor, taught Neurobiology and she team-taught Art, Neuroscience, and Consciousness with Ed Kerns, Clapp Professor of Art, in the fall. In the spring semester, she

taught Advanced Neuroscience and Intro to Neuroscience. Reynolds supervised one honors thesis student in neuroscience as well as nine other students in various research projects. This summer, she continued working on projects using *Drosophila* as a model system as well as neurocomputational projects with Chun Wai Liew, associate professor and head of computer science, and **Jeff Pfaffman**, associate professor of computer science. Reynolds published a paper on integration of teaching and research with undergraduates with several students, coauthored two poster presentations with students at the Society of Neuroscience meeting in San Diego, Calif., and another presentation at the *Drosophila* Research Conference in San

Diego. She also reviewed grants for the SOMAS program and is president of the organization Faculty for Undergraduate Neuroscience.



In the fall, **MEGAN**

ROTHENBERGER, assistant professor, offered Conservation Biology, and Environmental Issues in Aquatic Ecosystems. In the spring, she taught VaST “Agriculture, Ethics, and the

Environment,” and Plant Form, Function, and Adaptation. During the academic year, Rothenberger supervised two honors thesis students in biology as well as five other students in various independent research projects. Three of these research students presented their work at the Pennsylvania Academy of Sciences meeting in April. She served as a reviewer for an article in the *Journal of the Pennsylvania Academy of Science*, and service to the college included memberships on the Sustainability Committee, the Environmental Science Minor Advisory Committee, and the Environmental Initiative Steering Committee.



In the fall, **NANCY WATERS,**

associate professor, offered Environmental Biology, as well as Advanced Aquatic Ecology to students who enjoyed working on the McCutcheon

Foundation-funded “floating laboratory” pontoon boat moored at Merrill Creek Reservoir. In the spring, she offered VaST “Pharmaceutical Science and Ethics, and Ecology.” She mentored two research students, one of whom successfully defended their honors thesis in the spring. Results of research work with a total of five student coauthors were presented by two students at the National Conference on Undergraduate Research. A NCUR proceedings paper from the 2010 conference appeared in 2011, and an additional 2011 proceedings paper was accepted for publication next year. In the summer, she supervised a trio of Nalven, Mellon, and Excel students, and she returned to the Lafayette stage in the dramatic reading of *Hear Me Roar* in March 2011. ■

Thanks to those who keep us updated. We would love to know how you are, what you are up to, and ways you have used your biology knowledge in your careers or everyday life.

During her junior year at Lafayette, **BRITTANY DOWNHAM '08** studied abroad at the School for Field Studies in the Turks & Caicos Islands, British West Indies. While learning about tropical marine ecology, she did field research on the Queen Conch and Nassau Grouper species. Her experiences at Lafayette and the School for Field Studies sparked her interest in natural resource management. After graduating, she worked as a Student Conservation Association intern at Olympic National Park in Port Angeles, Wash. She was hired by Olympic National Park as a biological science technician and worked with them for one year before deciding to go back to school for teaching. Downham is now getting her Master of Arts in Teaching degree and aims to build a bridge between the National Park Service and the high school in which she teaches.

BENJAMIN D. GOLDSTEIN '07 graduated from Drexel University College of Medicine. He will be conducting a pediatric residency at the Rainbow Babies and Children's Hospital/Case Western Reserve University in Cleveland, Ohio.

TARA MAYO '10 is working full-time as a researcher for the Dana-Farber Cancer Institute at Harvard Institutes of Medicine, Boston, Mass.

ASHLEY RICHARDS '08 was originally set on working in a laboratory until

Nancy Waters, associate professor, assigned her the task of designing a lesson for elementary students in her special topics: botany course. Richards loved the feeling of students becoming excited about the topics she had been interested in her whole life. She is now starting her second year of teaching biology and environmental science to alternative education students at Tulpehocken High School, and is thankful to Waters for helping her find this career path.

KATIE SCHRACK '03 is the Chief Resident in Ophthalmology at Temple University Hospital.

After graduating from Temple Medical School **ANDREW WEBER '00** underwent a residency in internal medicine at Crozer Chester Medical Center outside Philadelphia, followed by a year as chief resident and hospitalist. He then pursued specialty training at Philadelphia's Hahnemann University Hospital/ Drexel University in hematology and oncology where he was chief fellow in his final year. In July 2011, Weber took a position as an oncologist/hematologist at a practice in Panama City Beach, Fla.

LEE WILLIAMS '03 is currently the Pediatric Chief Resident at the Golisano Children's Hospital at the University of Rochester. ■

BOYD KING '88 MANAGES THE WORLD'S LARGEST ALGAL PRODUCTION FACILITY

When **Boyd King '88** graduated from Lafayette he followed an urge to "play hard" and became a dive instructor in the Caribbean. His curiosity and sense of adventure led to a job as a refrigeration engineer in industrial northern England, then operator of a dive/tourist business in Belize exploring caves, ocean, and jungle, then a plasma cutter in an Australian shipyard.

Some 10 years later, King found the

knowledge and skills that he developed while acquiring a B.S. in biology and A.B. in engineering came into play.

For the past 13 years, King has been manager of Hutt Lagoon for Cognis in Perth, Australia. Cognis, a worldwide supplier of specialty chemicals and nutritional ingredients with a focus on wellness and sustainability, was recently bought by BASF.

(BOYD continued in right column...)

(...BOYD continued from below)

The lagoon is the largest algal production facility in the world and a source for both natural betacarotene and enriched artemia, tiny brine shrimp that live in inland saltwater lakes. Artemia, a critical food for young fish and prawns, are used as a "much-needed natural resource in the aquaculture industry," says King.

Cognis received the 2010 Premier Award for Excellence in Public Sector Management for the Nutremia™ project, managed by King and done in conjunction with the Department of Fisheries Western Australia. They received the award for producing the world's first carotenoid-enriched artemia and helping develop the economy of Western Australia.



Boyd King '88, left, holds the 2010 Premier Award for Excellence.

"The success of our algal business grew from an unlikely acquisition of a small biotech company by a mining company," explains King. "The strange mixture of process engineers, geologists, mining engineers, chemists, and biologists in a remote area led to some very different approaches to problems. The disciplines have melded into a general biotech approach. Then, you throw in the really out there discipline of 'marketing,' and it mutates again."

King is most enthused by the creative design-side of his work. "The company demands a very quick payback on most projects — 12 to 24 months — but if you can put together an idea, they'll back it. Australians have a 'give it a go' mentality, and our company has always nurtured this in their employees."

"I get to work with teams to engineer production solutions, delve into aquaculture and algal biology, and still go for a dive once in while," King says. ■

GOING GREEN?

Would you like to go green? Let us know and we'll add you to the list of alumni who will receive electronic copies of the newsletters instead of paper copies. ■

BRIAN SELVARAJAH '12 UNRAVELS MYSTERY OF TURTLES' RESPONSE TO LIGHT

Even in elementary school, **Brian Selvarajah '12** saw the living world as an unsolved mystery. Now pursuing a dual major in biology and international affairs, he is part of cutting-edge research to identify the anatomy underlying the turtle's response to light.

Collaborating with **James Dearworth**, associate professor, Selvarajah is analyzing visual pathways in vertebrates using the turtle as a model. He is attempting to isolate the gene for the photopigment melanopsin, which the team believes is responsible for the sluggish response to light in the pupil of the turtle.

Melanopsin has never before been found in the turtle, but has been shown to play a role in controlling slow pupil response in other animals. Melanopsin is a novel photopigment that is not found in the rods and cones of the eye like the traditional photopigment, rhodopsin, but instead is found in the ganglion cells of the retina and the iris, explains Dearworth. In addition to modulating slow pupil response, the photopigment also is thought to play a role in controlling circadian rhythms. The research could have implications in deciphering why some people have seasonal affective disorder in the winter.

"As a prospective student, I knew I wanted to take part in research," explains Selvarajah.

"It was one of the major factors in why I applied to Lafayette. Professor Dearworth takes his role as a research professor seriously and strives to pass on knowledge to his students. It is exciting to be part of a team that was the first to locate this gene in the turtle."

Selvarajah is trying to identify the amount of expression of melanopsin in different tissue types. The peer-reviewed journal *Vision Research* recently accepted one of their manuscripts for publication.

"Brian's participation has been critical. In addition to carrying out the experiments, he has helped me prepare the manuscripts," says Dearworth. "He is carrying out roles that at big universities would normally be done by graduate and postdoctoral students and even professors."

Selvarajah believes his biology research will be a beneficial transition into law school and a career in patent law.

"My research definitely gives me an edge at a time when pharmaceuticals and biotechnology firms are increasing their involvement in the legalities of the life sciences," he says. "Taking part in complex research will help me in the future when deciphering cases filled with scientific jargon. Not many lawyers have knowledge of advanced molecular techniques." ■

SURGEON NANCY SHUMEYKO '80 IS A ROLE MODEL IN THE CLASSROOM AND THE OPERATING TABLE

When gynecologic surgeon **Nancy Keller Shumeyko '80** stands before her med students at SUNY-Binghamton Clinical Campus and delivers 23 years of accumulated medical wisdom, she empowers them to transform the lives of their future patients — and does so gratis. For that reason and for her excellence in training the next generation of doctors, she received the university's President's Award for Outstanding Voluntary Faculty Service.

"I don't get paid to teach," says Shumeyko, assistant professor in the Department of Obstetrics and Gynecology, and surgeon with United Medical Associates, Binghamton, N.Y. "That's not why I do it. I serve as a role model. That's what [SUNY] was looking for: a faculty member who voluntarily gives of her time for the benefit of students."

Being a role model meant blazing the trail as a female surgeon. Unwilling to appear

less capable than her male peers, Shumeyko, almost eight months pregnant, performed a grueling seven-hour surgery without a break when she was chief administrative resident in obstetrics and gynecology at Emory University. Staying true to her domestic side matters, too. Despite a surgeon's schedule, Shumeyko remains committed to cooking dinner for her family (son **Chris '10**, daughter **Allie '14**, and husband Mark, also a doctor).

Shumeyko's love for teaching began at Lafayette, where she earned an A.B. in biology, and continues in the College's externship program.

Extern **Lauren Howland '11** notes: "I've shadowed other physicians, and they forget you are there. Dr. Shumeyko, though, allowed me to stand next to her during a dozen surgeries. I handed her instruments throughout the procedures." ■

STUDENTS PRESENT RESEARCH AT PA. ACADEMY OF SCIENCE

Eight biology majors and a government and law major presented research papers with their faculty advisers at the 87th annual meeting of the Pennsylvania Academy of Science.

Afua Akuffo '11, **Jason Ewer '13**, **Caroline Vail '13**, and **Robert Kurt**, associate professor, presented research on mouse and human breast cancer.

Kelsey Andersen '11 worked with **Manuel Ospina-Giraldo**, assistant professor, on *Phytophthora infestans*, the organism that caused the Irish Potato Famine.

Alyssa Calomeni '11 and **Megan Rothenberger**, assistant professor, studied the environmental characteristics and plankton dynamics of Raritan Bay.

Andrew Chun '12, a government and law major, worked with Rothenberger to assess the quality and availability of geographic information system data from point and non-point sources of nutrients and pollutants in the Raritan River Basin.

Jason Ewer '13, **Caroline Vail '13**, and Kurt presented an analysis of DAMP expression in mouse and human breast cancer.

Jeffrey Hollander '11 and Rothenberger researched the distribution, decomposition rate, and phosphorus content of two exotic plant species.

Alyssa Leone '12 and **Meghan Schlitt '11** presented research they performed with **James Dearworth**, associate professor, on pupil constriction in the red-ear slider turtle. ■

BIOLOGY STUDENT AWARDS AND SCHOLARS

THE WILLIS ROBERTS HUNT PRIZE

Kurt Yaeger '11
Christina Mingora '11

DR. LORRAINE MINEO TEACHING ASSISTANT AWARD

Levar Davis '11
Farai Gombedza '11

NALVEN SUMMER 2010 RESEARCH FELLOWSHIPS

Carly David '13
Dyana Picache '12

12/11 • 3K

BIOLOGY AT LAFAYETTE: 1878-1897



1878 The third annual meeting of the American Academy of Medicine is held at the College. Of the 83 men in attendance, the largest college contingency is from Lafayette.

1879 A devastating fire in Pardee Hall completely guts the building. Most of Thomas Porter's research and collection of fauna, flora, and minerals are lost. Before Pardee Hall was built, the second story of the west wing of South College housed Porter's natural history museum. Porter continues teaching until 1898, but doesn't stop work on his herbarium until his death in 1901. Most of his specimens are given to the Academy of Natural Sciences in Philadelphia.

1884 Jacob D. Updegrove is appointed director of physical culture with the rank of adjunct professor as the result of a student body petition.

1885 Arbor Day is first celebrated at Lafayette in the spring when the class of 1888 plants a sugar maple sapling at the east end of Pardee Hall. Professor Porter speaks on the importance of trees to society. The class president throws the first shovel of earth on the roots of the tree, followed by the rest of the class. The next morning, the class is shocked to find the tree with its trunk painted green, spruce twigs tied to the branches with green calico and an inscription that said "88's evergreen."

1891 An elective in biology is offered to the members of the senior class who have been enrolled in the classical course track.

1894 The department of biology has its birth at Lafayette. After graduating in medicine from the University of Pennsylvania in 1890, Jacob Updegrove, class of 1884, returns to Easton to practice medicine and to his post as director in physical training and lecturer on hygiene at Lafayette. Wanting to reduce the educational time necessary to prepare for the practice of medicine, Updegrove arranges to secure credit with the University of Pennsylvania Medical School for Lafayette students who have taken courses in chemistry, botany, and biology. Since no course is offered in biology, Updegrove offers to give the biological courses without charge.



1895 Alvin Davison is appointed and sets up the first laboratory of biology. Instead of preparing specimens for cabinet displays, students begin to use scalpels and forceps to prepare slides for microscopic examination.

1896 The Biological Society holds monthly meetings to discuss important biological questions and to enable students to appreciate the value of scientific research. Some of the topics are the use of X-rays in medicine, hypnotism and science, and Pasteur's contribution to biology.

1897 Professor Davison's new laboratory in the west wing of Pardee Hall is in operation for only a few months when a second fire breaks out and destroys all but the external walls. Students

Launch Your Life at Lafayette

All the experiences you need to create your edge are built into your four years. It's a powerful platform from which to launch your life.

- Have *Cur Non* Impact
- Cross-Train Your Brain
- Make Big Use of Big Resources
- Work with Stellar Professor-Mentors

Learn more at www.lafayette.edu.



Launch your Life at Lafayette.



rescue some equipment, which is set up in a small area inside South College. ■