Biological Sciences

www.biol.vt.edu

Vol. 8, No. 2 --Summer 2010

VirginiaTech
Invent the Future®

A Reflection and a Look Forward

After eight years of serving Biological Sciences as Department Head, I am moving to a new challenge as Dean of the Eberly College of Arts and Sciences at West Virginia University. My experiences at VT have been exceptionally satisfying, and I am very proud of the Department of Biological Sciences. Thanks to the efforts of a wonderful and fully engaged faculty, staff and student body, the department has reached many milestones in the past eight years including:

- *Recognition as an Exemplary Department (best at VT) for academic advising in undergraduate and graduate studies.*
- *Leadership in developing three new multi-departmental graduate student recruitment and training programs.*
- *Four new buildings to support research and teaching for nearly half of the department's programs.*
- *Initiation of an Annual Research Day attended by virtually all faculty and grad students to celebrate graduate education, recruit new graduate students, and engage our Alumni. This year marked our 7th annual event.*
- *Successful recruitment of many students and faculty from underrepresented groups, and formal programs to establish an inclusive and welcoming environment for all.*
- *Initiation of an Alumni Advisory board and a retired faculty group (the OWLS), both becoming vibrant and active parts of the department.*
- *Initiation of a new multi-dimensional faculty mentoring system, a new ePortfolio system for graduate students, new learning outcome assessment approaches to drive our curricula, and this newsletter.*
- *The delivery of over 300,000 student credit hours of teaching, outreach to over 1000 teachers and over 20,000 students in regional 1° and 2° schools, and the conferring of 2220 B.S., 151 M.S., and 52 Ph.D. degrees.*
- *Progress in several key measures of program quality:*
    - *Endowed student scholarships and academic excellence funds increased from 6 to 15*
    - *Annual new research funds increased from $3.7 to $6.5 million*
    - *Annual research expenditures increased from $3.8 to about $5 million*
    - *Total graduate enrollment (all majors advised by our faculty) increased from 67 to >90, PhD students increased from 33 to >70*
    - *Postdocs and other research faculty increased from < 10 to between 15 and 20.*
- *We achieved these milestones while meeting the challenges of an increase in Biological Sciences majors from 1100 to 1600, and budget reductions in four of the past eight years.*

What lies ahead? I predict that neuroscience, ecosystem ecology, and other highly integrative or interdisciplinary sciences will emerge as cross-campus initiatives, with Biological Sciences playing a significant role. There will be increasing use of technology and pedagogical tools to modernize and enhance undergraduate learning and additional outreach. New heights in research productivity will be reached, leading to increasing national attention and continued strength in graduate education. And there will be much more to be proud of too.

I wish my colleagues and the friends of the department all the best. And, in case you were wondering, I will always be a loyal Hokie.

Robert H Jones

Robert H. Jones

This newsletter was created by Valerie Sutherland, Program Support Technician for the Department of Biological Sciences. We welcome comments and items of interest for future newsletters. Please contact Valerie Sutherland (vsutherl@vt.edu) via e-mail, or write to us at the Department of Biological Sciences, Mail Code 0406, Virginia Tech, Blacksburg, VA 24061.

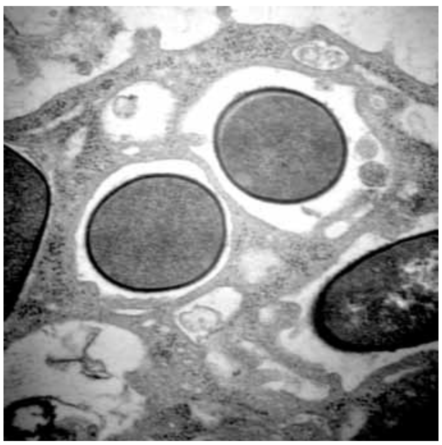
RESEARCH HIGHLIGHTS

Understanding Strategies Anaerobic Bacteria Use to Cause Deadly Infections in Humans and Animals

By Dr. Stephen Melville, Associate Professor of Biological Sciences

Bacteria are well known as the cause of many diseases in people, including such deadly infections as tuberculosis and plague. What is not as well known is that many bacterial pathogens are actually obligate anaerobes, which means they cannot grow or even die in the presence of the oxygen that is found in the air. Despite this limitation, anaerobes are actually one of the most common causes of bacterial infections in humans and animals.

The laboratory of **Stephen Melville**, Associate Professor of Biological Sciences, has been studying one type of anaerobic pathogen since his arrival at Virginia Tech in 2001. This bacterium, *Clostridium perfringens*, is one of the top 2-3 sources of bacterial food poisoning in the U. S. *C. perfringens* is also the major cause of gas gangrene, one of the most infamous and lethal bacterial infections known in human history. A gangrene infection, once it starts, is 100% fatal if it is not treated, a rare level of mortality for a bacterial disease.



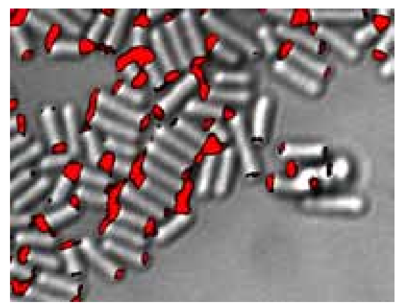
Clostridium perfringens

Dr. Melville's group has investigated the underlying principles behind both major types of disease caused by *C. perfringens*, food poisoning and gas gangrene. Food poisoning occurs when food is eaten that is heavily contaminated with *C. perfringens* bacteria. Once they reach the intestines, the ingested bacteria, begins to make an intracellular spore, which is a highly heat and radiation resistant cell type. At the same time, they also begin to make a toxin, called *C. perfringens* enterotoxin or CPE, inside the sporulating cells. When the cells making the spores reach the end of the small intestine (the ileum), they break open, releasing the fully formed spore but also the CPE toxin. CPE then binds to proteins on the membrane surface of the cells lining the intestine and proceeds to punch holes in the membranes, thereby killing the cells. The dead cells can no longer control the flow of water into and out of the intestine and the patient develops an intense diarrhea, which is not usually life threatening unless the patient is elderly or an infant. A graduate student in Dr. Melville's group, **Katie Harry**, studied the linkage between sporulation and making the CPE toxin and found that the same regulatory proteins that caused the cell to sporulate also turned on synthesis of the gene coding for the CPE toxin, thereby providing the mechanism for linking sporulation and food poisoning.

One characteristic that allows *C. perfringens* to contaminate food even when it its cooked is the production of the heat resistant spores. The spores can survive boiling temperatures for several minutes and then the spores can germinate and grow in the food when it cools down. Dr. Melville's lab, in collaboration with **David Popham** (Professor of Biological Sciences) and his graduate student **Benjamin Orsburn**, investigated the heat resistance mechanisms of *C. perfringens* spores. These studies showed that spores were extremely heat resistant because they had very low levels of water inside the spore. They also found that one of the major protections to heat damage in spores, a chemical called dipicolinic acid, is synthesized by a completely novel pathway in *C. perfringens* and several other *Clostridium* species, including the notorious toxin producers *C. botulinum* (botulism) and *C. tetani* (tetanus).

It has been known for several years that one of the reasons gas gangrene is such a deadly disease is because *C. perfringens* produces many powerful toxins that can kill mammalian cells. The two that are most important in gas gangrene are PLC, which is an enzyme that breaks down the lipids in cell membranes and PFO, which produces large pores in the membrane of the cell, leading to cell death. It was discovered that mutants of *C. perfringens* that lacked PLC could not cause gas gangrene in animal studies, while mutants that lacked PFO could still do so but the infected tissue looked quite different.

A graduate student in Dr. Melville's lab, **David O'Brien**, with the aid of a talented undergrad research student **Michael Woodman**, showed that *C. perfringens* actually used PFO for an unexpected but important function: Preventing it from being killed by phagocytic white blood cells called macrophages. They demonstrated that macrophages would ingest the bacteria, but with the help of PFO toxin, the bacteria would escape the killing chamber (phagosome) inside the cell and eventually kill the macrophage itself. This explained how *C. perfringens* could resist being killed by host phagocytes when it first entered the body and began to cause gas gangrene.



Bacteria with pili

Another characteristic of gas gangrene infections is the speed with which they move through human tissue, up to a rate of several inches per hour. To understand how they move so fast and virtually destroy all of the muscles they encounter, a graduate student in Dr. Melville's lab, **John Varga**, looked for ways the bacteria could move so fast and remain attached to muscle cells. He identified a mechanism for motility that had not previously been described in *C. perfringens*, a type of gliding motility that allows the bacteria to move along surfaces. The motility depends upon extension and retraction of filaments called type IV pili. These pili allow the bacteria to line up end to end in long filaments and move along surfaces. Another grad student in Dr. Melville's lab, **Katie Rodgers**, found that when she expressed one of the proteins that make up the type IV pili fiber in another bacterial pathogen, *Neisseria gonorrhoeae*, it caused *N. gonorrhoeae* to adhere to muscle cells from mice and rats, where previously it would only attach to cells in the urinary tract of humans. This provided an explanation for how the bacteria could both move along and remain attached to muscle cells while causing a gas gangrene infection. Another grad student, **Andrea Hartman**, is investigating how the bacteria actually make the pili only on the ends of the cells and how they use this localization mechanism to form the long filaments of cells that characterize the gliding motility seen in the microscope. The long term goal of this project is to develop strategies to prevent the spread of gangrene infections and save the life or limb of patients unfortunate enough to contract the disease.

Dr. Melville's lab is located in the new Life Sciences I Building.

RESEARCH HIGHLIGHTS

Can online courses met the standards of a lecture course?

By Dr. Art Buikema, Professor of Biological Sciences

There has always been a great demand for introductory biology courses. Not only do we have difficulty meeting this demand, but student requests are compounded by scheduling conflicts that may affect progress toward their degree. With assistance from Virginia Tech's Institute for Distance and Distributed Learning, Drs. **Arthur Buikema** and **Mike Rosenzweig** developed a two-semester online introductory biology course that met the same standards as a traditional lecture class with the expectation that students could easily progress to sophomore level biology classes. A textbook was recommended, but other textbooks could also be used. For motivated and discerning students, online resources could work as well.

The development of this online course emphasized Bloom's taxonomy. For each biological concept, students sequentially engaged in these learning components for each chapter: 1) list of biological terms to emphasize while reading the text plus PDFs of key graphics and summaries of key points; 2) a mind map that helped students understand how biological terms are interconnected; 3) a multiple choice (MC) quiz that tested basic knowledge; and 4) a critical-thinking short essay question that required integration and application. Four online MC exams were taken with a proctor at on- and off-campus facilities. Students could progress as rapidly as possible, but they had to meet deadlines to ensure that they completed the course on time. Instructors were available to assist students during regular campus office hours, online office hours, by email or telephone.

Research was conducted to determine if students enrolled in online classes learned the course material with the same proficiency as the students in a classroom. During summer and fall 2009, Dr. Buikema taught both the online and a regular lecture courses covering the same material, and both classes took the same examinations.

There were no differences in average grades for each of the exams (Figure 1), mind maps and final course grades between online and in- class students. The highest exam grades were from students taking the regular lecture class. However, the lowest grades for the online students were higher than the lowest grade for the in-class students. As for final course grades, approximately the same proportion of students received an A, however, a greater percentage of online students received a B whereas the regular students had more C grades. In conclusion, we interpret these data to indicate that an online class can meet the same standards as a regular lecture class.

One major problem with the online course was a high attrition rate. Approximately 35-50% of the online students dropped the class after beginning it. Many said that they did not want to work that hard. In interviews, some students admitted that they did not know how to manage their time. Several admitted that during a regular lecture class, it was easier to cram just before examinations. Other students placed great value on in-class student-professor interactions, something that was difficult to have in an online class.

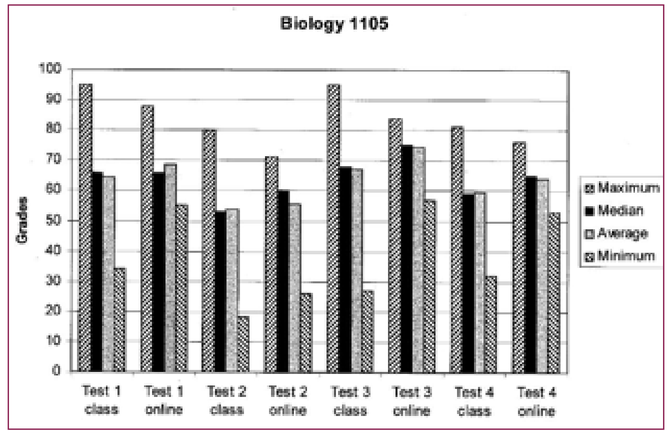
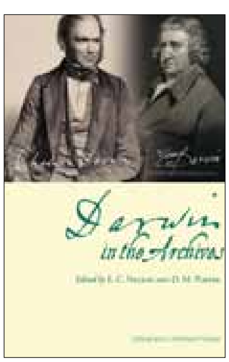


Figure 1. Comparison of grades for students taking Biol 1105. Both the online and lecture classes took the same examinations. (N = 18 online students; N = 123 in class students.)

Thanks to the technology used, online courses yield detailed records of the students' access to materials, providing a tool for faculty members to give advice to students on how to be more effective learners. In our opinion, if students remain in the class, they can expect a course grade comparable to their peers who are taking the lecture course and they will be well-prepared to enter follow-up courses delivered in a regular lecture format. Dr. Rosenzweig is exploring the possibility of using these online materials for offering a hybrid course where students will assume greater responsibility for their own learning.

Two faculty are currently creating online sophomore level classes. Dr. **Rich Walker** is developing a Cell and Molecular Biology course online while Dr. Buikema is developing an online Ecology class. Both courses will be taught during second summer session. Both professors will compare online student performance with that of students in a regular classroom. The department is committed to offering online courses that meet departmental standards so our graduates will be prepared for the rigors of upper level courses and their chosen profession.



Duncan M. Porter, Profesor Emeritus of Biological Sciences, is the co-editor of a new book titled *Darwin in the Archives*. The book was released to mark the bicentenary of the birth of Charles Darwin, and the 150th anniversary of *On the Origin of the Species*. Issued by the Society for the History of Natural History, the publication reproduces facsimiles of papers on Erasmus Darwin and Charles Darwin published before 2005 (from the *Journal of the Society for the Bibliography of Natural History* and *Archives of Natural History*) and a reprint of the Sherborn Fund Facsimile No. 3 (1968) of *Charles Darwin's Questions About the Breeding of Animals* (1840) with the original introduction by Sir Gavin de Beer. The book opens with a specially commissioned essay by Dr. Porter recounting the Society's particular contribution to Darwin scholarship.

Additionally, Dr. Porter appeared on the WVTF Public Radio show "With Good Reason" this past November to discuss the 150th anniversary of the publication of *On the Origin of the Species*.

Breakthroughs in Biomedical Research

Jianhua Xing, Assistant Professor of Biological Sciences, and Yan Fu, Ph.D. Student

The effectiveness of antibiotics is routinely thwarted by the evolution of resistant strains. Resistance arises in part because some cells, knowns as "persisters", within a population are in a non-susceptible phenotypic state when the antibiotic is applied. One approach to slow evolution of resistance and enhance the overall effectiveness of antibiotics, is to trick all the cells in the population to switch into a susceptible state at the same time, but the theoretical possibilities for cell synchronized of this sort have been difficult to examine, until now.

In a ground breaking paper written by **Jianhua Xing**, Assistant Professor of Biological Sciences, the potential has been demonstrated to align metabolic processes within cells and across populations of cells in a phenomenon akin to "resonance activation", a well known concept in physics. Along with Ph.D. student **Yan Fu** and Meng Zhu, a student at Clemson University, Xing used a theoretical framework and simulations to demonstrate synchronized and accelerated bacterial cell phenotypic transitions. This concept might be applicable to a broad range of biomedical problems, including the susceptibility of cancer cells to treatment.

Their paper is appeared in *Physical Biology (Vol. 7, No. 1),* one of the leading journals focused on the use of physics to investigate biological frontiers. It was also selected as an IOP SELECT article, which is a special collection of journal articles chosen based on having made substantial advances or significant breakthroughs, a high degree of novelty, or of having a significant impact on future research.

If you've ever been stuck next to a coughing seatmate on an airplane, you are intimately familiar with the urge to avoid individuals showling signs of contagious disease. Shouldn't birds do the same, provided they can recognize cues of infection? **Dana Hawley**, Assistant Professor of Biological Sciences, and **Karen Bouwman**, a postdoc in the Hawley Lab, tested this idea in house finches (*Carpodacus mexicanus*) using a naturally-occurring disease, Mycoplasmal conjunctivitis, that causes hard-to-miss changes in infected individuals: physical symptoms such as swollen eyes and behavioural changes such as lethargy.

Carpodacus mexicanus

What they found was surprising: male finches strongly preferred to feed near sick flockmates. What explains this apparent maladaptive behavior? The extent of preference for a contagious dinner-mate was directly related to the sick male's reduction in aggression; in other words, healthy finches just want to eat in peace. Their results suggest that house finches are more interested in minimizing their need to aggressively compete for food, a costly activity during winter feeding, then they are in avoiding sickness with a potentially deadly disease. This behavior may inadvertently contribute to the annual debilitating disease epidemics observed in free-living house finches. Is there hope for this bird species given this apparent maladaptive behavior? The disease of interest, Mycoplasmal conjunctivitis, emerged only recently in house finch evolutionary time (~15 years ago). Perhaps with continued exposure to this deadly disease, finches will catch on to the contagious dangers their peaceful dinner-mates are carrying.

Their paper appeared in *Biology Letters* (Published online before print February 17, 2010), and was also featured in *Nature* and on *Scientific American's 60-Second Science Podcast*.

Kevin Kim, Ph.D. Student

To Virginia Tech Ph.D. candidate **Kevin Kim**, cancer is a scientific puzzle with which to grapple. But it's also a terrifying disease his father and grandmother are lucky to have survived. So when Kim spends long hours working with test tubes on cellular research to improve our understanding of breast cancer, he realizes the stakes of his job all too well. "It's really gratifying to know that the work that I'm doing may help ... solve one little piece of the puzzle," he says. Kim is one of several students working with **Carla Finkielstein**, Assistant Professor of Biological Sciences, whose study of the cellular processes that affect tumors has received private funding from the Susan G. Komen and Avon foundations. Finkielstein, whose lab is also supported by a National Science Foundation CAREER Award, thought it would be valuable for all the students who are involved in her research to understand its importance in the way that Kim can. So she recently invited members of the Virginia Breast Cancer Foundation (VBCF) to come to her laboratory and talk about their own experiences with the disease. "Bringing the advocates here today is the perfect way to humanize our science," Finkielstein said. "I want our students to understand that what we do is not in a test tube, but is going to impact someone else's life."

Carla Finkielstein, Assistant Professor

Finkielstein and her team of researchers are focusing on the relationship between circadian rhythms — the body's natural clock that synchronizes physiology and behavior to a 24-hour cycle — and the natural processes of cell growth, division, and death. Those processes are altered in most cancers. "Epidemiological studies have shown a higher rate of breast cancer in women working in night shifts or other odd-hour jobs that disrupt one's normal circadian rhythm," Finkielstein said. "A better understanding of the relationship between disrupted circadian rhythms and cancer at the cellular level will provide information that could be factored into work schedules to reduce cancer risk for people in certain professions," she added. Down the road, her research also may help doctors treat tumors more effectively by providing clues as to when is the best time to administer medicines.

(From an Article by Albert Raboteau)

Professor Brenda Winkel

Theralase Technologies (located in Toronto), an international manufacturer of laser medical devices, reports that its patented photodynamic compounds (PDCs) developed at the Virginia Tech, when used with its lasers, destroy breast cancer cells in pre-clinical trials.

The PDCs were developed by Karen Brewer, professor of chemistry in the College of Science at Virginia Tech, and a team in biological sciences led by Professor of Biological Sciences **Brenda Winkel**, and they are the subject of a newly issued patent. Theralase says they plan to submit its study results to the U.S. Food and Drug Administration (FDA) and Health Canada, as part of its collaborative work with Virginia Tech.

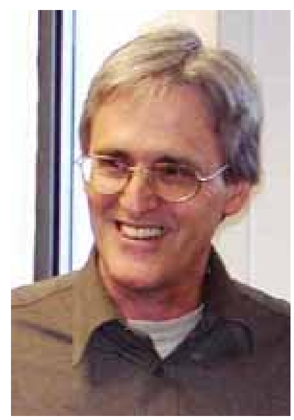
Roger Dumoulin-White, president and CEO of Theralase, said in a news release issued Jan. 5, 2010, "This new research brings the potential for tremendous impact on a most devastating disease, and we are excited to be working with a world-class group of researchers to further develop this technology." "We wanted to come up with some molecular systems that didn't require oxygen, but would still be light-activated," Brewer said. "We have been able to make these oxygen independent agents and they should hold promise in treatment of cancer tissue that is often oxygen deficient."

The therapy the research group developed utilizes a wavelength of light called the therapeutic window that is neither absorbed nor reflected away by tissue. This is the same wavelength that one sees as red light shining through a hand that is covering a flashlight. By using light at this wavelength, the researchers believed they could signal their manmade molecules to release cancer-fighting agents at the disease site. "The challenge up until now has been that tissue blocks light, so we can't signal molecules deep within the body to deliver drug therapy," Brewer said.

But the research team designed supramolecular complexes that can hold and, when signaled by light (photoinitiated), will generate pharmaceutical compounds that can cleave DNA, such as in a tumor cell. Lothar Lilge, widely published expert on photodynamic therapy and principal investigator of the study reaffirmed, "We are extremely pleased with the in-vitro results of the Theralase photodynamic compounds in the destruction of cancer cells. Results indicate that these PDCs can destroy cancer cells when light-activated, even in low-oxygen environments. Low-oxygen environments prove challenging for most other cancer therapies, which is why these PDCs are very attractive for solid tumors such as cancers of the lung, breast, prostate, and brain."

(From an Article by Catherine Doss)

Math-based computer models are a powerful tool for discovering the details of complex living systems. **John Tyson**, Professor of Biology at Virginia Tech, is creating such models to discover how cells process information and make decisions.



Professor John Tyson

"Cells receive information in the form of chemical signals, physical attachments to other cells, or radiation damage, for instance," Tyson said. "On the basis of this information, the cells must make the correct response, such as to grow and divide, or to stop growing and repair damage, or to commit suicide." The question for a molecular biologist is: What are the underlying molecular mechanisms that implement these information processing systems? "Just as computer is an information processing system, with silicon chips, wires, mother board, clock, and power source, a cell is a an information processing system made of genes, messenger RNAs, proteins, and enzymes," Tyson said. "Somehow these molecules interact with each other to detect signals, make decisions, and implement the proper response."

Tyson and other biologists want to know how molecules within cells can figure out how a cell should respond to its environment in order to survive, grow, and reproduce, and how mistakes in these responses lead to diseases such as cancer. "So we do what any good engineer would do. We create a mathematical model of the components and their interactions, and let the computer work out the details," Tyson said.

During the course of his research, Tyson and colleagues have used computer simulations to test their math models. "If the math model behaves in the computer the way cells behave in the lab, we gain confidence that we understand the molecular interactions correctly. If not, we can be sure that our models are missing something important." Tyson also talked about the control of cell division in yeast and in mammalian cells. "Yeast cells are easy to work with in the lab, and their molecular control systems are very similar to the control systems in mammalian cells," he said. As a result of the success that Tyson and his colleagues have had in modeling yeast cell growth and division, they are now making the transition to mammalian cells and cancer.

"We do not yet have an engineer's understanding of normal mammalian cell proliferation and of what goes wrong in cancer cells," Tyson said. "Cancer treatment is still a matter of cutting out, blasting, or poisoning cancer cells — and any normal cells that get in the way. We could be more subtle and perhaps more effective in treating cancers if we had a systematic insider's understanding of the molecular networks that control cell growth, division and death, and an ability to manipulate this control system with a new array of drugs and procedures."

(From an Article by Susan Trulove)

Jacob Waller Wins 2010 President's Award for Exellence

Jacob Waller, a laboratory instrument maker in the Department of Biological Sciences in the College of Science at Virginia Tech, received the university's 2010 President's Award for Excellence.

The President's Award for Excellence is presented annually to up to five Virginia Tech staff employees who have made extraordinary contributions by consistent excellence in the performance of their job or a single incident, contribution, or heroic act. Each recipient is awarded a $2,000 cash prize.

A member of the Department of Biological Sciences since 1985, Waller is responsible for servicing all the equipment, spread among seven buildings, in one of the largest departments at the university. He also serves as the liaison between his department and the Department of Environmental Health and Safety Services; chairs the department's safety committee; and teaches faculty, students, and staff about safety issues. His technical expertise saves the department thousands of dollars each year by repairing, rather than replacing, equipment.

In addition to his responsibilities in the College of Science, he is the advisor and instructor for the Virginia Tech SCUBA Club. He also volunteers with the Virginia Tech Rescue Squad and was among the first responders who provided support on April 16, 2007.

"Mr. Waller's work has been exceptional from the beginning and he has become irreplaceable," said **Ignacio Moore**, associate professor of biological sciences. "He performs beyond expectations at every facet of his job and is always willing to help people with a problem. There are too few people that are willing to drop everything to help others, and Mr. Waller is one of those people."

"Jake has been an excellent facilities manager, an effective leader in assuring safety and security, and a frequent volunteer for community service," added **Robert H. Jones**, professor and head of the Department of Biological Sciences. "He has developed a well-earned reputation for excellence in supporting all the research and teaching lab operations in the department."

Alumnus Richard Wardrop Returns to Area

Richard M. "Dick" Wardrop is an M.D., Ph.D., FAAP, and FACP Assistant Professor in the Departments of Internal Medicine, Pediatrics, and Basic Sciences at the Virginia Tech Carilion School of Medicine, as well as the Director of Resident Research at the Internal Medicine Carilion Clinic in Roanoke, Virginia.

Wardrop received a B.S. in Biology from Virginia Tech in 1994; his wife, Sarah Morrison, received a B.S. in Biology the previous year. In December 2009, Wardrop visited Blacksburg and stopped by Derring Hall to visit Fred Benfield (Professor) and Robert Benoit (Associate Professor Emeritus). "Both of these gentlemen had an enormous impact on my development as a biologist, scientist, and later as a physician," he says. Upon randomly running into Dr. Benfield while visiting Virginia Tech in highschool, Wardrop says, "...after half an hour with him, I was convinced that #1, I needed to study Biology, and #2, I needed to come to Virginia Tech."

"Dr. Benoit was also a great influence as he administered the mentoring program for undergrads to have physician mentors - I am currently mentoring a Tech undergrad in Roanoke. This was powerful for me and really led to my coming back to the area to practice," says Wardrop.

After leaving Virginia Tech, Wardrop completed an M.D./Ph.D. fellowship at Ohio State (Ph.D. in Immunology), and went on to train in a dual Internal Medicine and Pediatrics Residency at UNC-Chapel Hill. He joined the Carilion Clinic in Roanoke in 2007. Many thanks to Dr. Wardrop for sharing his memories and his gratitude!

Joshua Williams Receives Graduate School Recognition

Joshua Williams was selected by the Virginia Tech Graduate School to receive an Honorable Mention in the Enginering, Mathematics, and Science Category of 2010 Outstanding Dissertations. Williams completed his Ph.D. with research in the laboratory of **Ann Stevens**, Professor of Biological Sciences.

Williams' dissertation, entitled "Multi-tiered Regulation of *lux*R Provides Precise Timing and Maintenance of the Quorum-sensing Response of *Vibrio fischeri*", focuses on "gaining a better understanding of how multiple levels of regulation control the process of bacterial cell-cell communication (quorum sensing) using interdisciplinary approaches". Through Williams' research and additional ongoing research in the Stevens lab, it is hoped that by understanding this mode of bacterial signal transduction and gene regulation that methods to manipulate it in ways beneficial to society may be discovered.

Williams is currently a postdoctoral research associate working with Dr. Kim Lewis at Northeastern University in Boston.

GRANTS, AWARDS, AND OTHER NEWS

Karen Drahos, who just completed her M.S. in **Carla Finkielstein's** lab, received the 2009 William Preston Society Award in Life Sciences. The award is given for the master's thesis that presents the best original research with the potential to benefit all people.

Brittany Gianetti, a sophomore majoring in Biological Sciences and Biochemistry, was recognized as a Goldwater Scholar. The Barry M. Goldwater Scholarships were awarded to 278 outstanding undergraduate sophomores and juniors across the United States; the Goldwater Foundation was designed to foster and encourage outstanding students to purse careers in the fields of mathematics, the natural sciences, and engineering.

Ignacio Moore and **Christopher Lawrence**, both Associate Professors of Biological Sciences, were individually named as "Virginia Tech Scholars of the Week" during the Spring 2010 semester.

The following Biological Sciences faculty members have been granted emeritus status: **Robin Andrews** (Professor Emerita), **Don Cherry** (Professor Emeritus), **Anne McNabb** (Professor and Associate Dean Emerita), and **George Simmons** (Alumni Distinguished Professor Emeritus).

M. Camille Harris, a Ph.D. student in wildlife ecology, was named the Outstanding Doctoral Student for 2009-2010 by the College of Science. Harris is advised by **Dana Hawley**, and her research focuses on how timber harvesting can impact the dynamics of a mosquito-borne virus found in hardwood forests.

Carla Finkielstein, Assistant Professor of Biological Sciences, received a Minority Scholar Award from the American Association for Cancer Research. This award is sponsored by a grant from the National Cancer Institute's Center to Reduce Cancer Health Disparities.

Six freshmen majoring in Biological Sciences were awarded VT Presidential Scholarships for the 2009-2010 academic year. These awards are made to academically talented students and complement all other aid options to make a Virginia Tech education available at no cost. The recipients were: **Jessica Blackwood, Letitian Clay, Mecal Ghebremichael, Tevin Jefferson, Rochelle Layne,** and **Ashley Marcum**.

Jeb Barrett and **Daniela Cimini**, Assistant Professors, each received a Department of Biological Sciences' Outstanding Research Award.

Ignacio Moore, Associate Professor, and **Jake Waller**, Lab Instrument Maker, each received a Department of Biological Sciences Outstanding Service Award.

Mary Lipscomb, Senior Instructor, and **Jack Webster**, Professor, each received a Department of Biological Sciences Outstanding Teaching Award.

Lisa Belden, Assistant Professor, received the Department of Biological Sciences Outstanding Undergraduate Research Mentor Award.

Ann Stevens, Associate Professor, was named the Department of Biological Sciences Most Influential Professor by the Class of 2010.

Jack Evans, Advanced Instructor, was named Department of Biological Sciences Outstanding Undergraduate Advisor by the Class of 2010.

Ph.D. student **Bonnie Fairbanks** was awarded a Fulbright Scholarship to study tuberculosis in mongoose populations in Botswana. Additionally, she was one of six Virginia Tech students selected for recognition and support by the scientific research society Sigma Xi. Fairbanks works in **Dana Hawley's** laboratory.

Two majors in Biological Sciences, **Alexa Karatsikis** (Falkinham Lab) and **Isaac Nardi** (Cimini Lab), were among eight VT students named 2010 ACC Undergraduate Research Scholars. The scholarship recognizes highly talented undergraduate students who are pursuing ambitious and unique research projects.

Shashank Sharma, who completed a B.S. in Biological Sciences in 2010, received Virginia Tech's Undergraduate Man of the Year award. Sharma spent, and continues to spend, much of his time volunteering in medical clinics and orphanages in Kenya, and his long-term goal is to raise funds to purchase land to further support one orphanage. Sharma graduated summa cum laude, and he intends to pursue a career in medicine.

Sheena Friend, Ph.D. student in **Khidir Hilu's** lab, received the Department Graduate Student Teaching Award.

Justin Beckett and **Amanda Nizam**, of the 2010 graduating class, received Department Outstanding Senior Awards.

Issac Nardi, 2010 graduate in Biological Sciences, received the Department Undergraduate Research Award.

The previous three awards were funded by a new endowment established by **Art Buikema**, Alumni Distinguished Professor.

The following students received awards at the Biological Sciences' Seventh Annual Research Day on February 20, 2010:

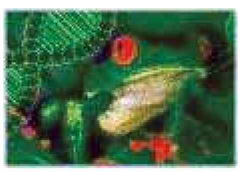
Best Oral Presentation: **Erin Hewett** (Walters Lab)
First Place Poster Awards: **Raymond Danner** (Walters Lab) and **William Silkworth** (Cimini Lab)
Second Place Poster Awards: **Andrea Hartman** (Melville Lab) and **Jonathan Moore** (Walters/Moore Labs)
Third Place Poster Awards: **Victoria Garcia** (Walters Lab) and **Xing Jing** (Schubot Lab)

The following members of the Biological Sciences Department were recognized for their years of service to Virginia Tech:

10 Years: **Bambi Jarrett** (Animal Care Technician)
15 Years: **Bob Jones** (Dept. Head and Professor) and **Jeff Walters** (Harold Bailey Professor)
30 Years: **Katherine Chen** (Research Scientist, Tyson Lab)
35 Years: **Klaus Elgert** (Professor) and **Joe Falkinham** (Professor)

Scholarships:

- "2010" Graduate Assistantships: **Matthew Becker**, **Gaurav Dogra**, **Lu Gan**, and **Kevin Geyer**
- John Cairns, Jr. Assistantship: **Bonnie Fairbanks**
- Ralph E. Carlson Memorial Freshmen Scholarship: **Jason Reese**
- Ralph E. Carlson Memorial Scholarships in Ornithology: **Julie Castner**, **Camille Harris**, **Erin Hewett**, **Michelle Jusino**, **Vicki Garcia**, **Olga Milenkaya**, and **Jonathan Moore**
- Joe and Barbara Cowles Scholarship: **Caitlin Harris**
- George and Gladys Cunningham Ph.D. Scholar: **Jenifer Walke**
- Fralin Assistantship: **Andrew Schneider**
- Rachael Hill Memorial Scholarships: **Andrea Carlini**, **Courtney Hoang**, and **Brooke Lokie**
- ICTAS Scholars: **Sarah Foltz** and **Sihui Zhang**
- Deborah Koller Scholarship: **David Owens** and **Brittany Gianetti**
- Stephen D. Lutz Scholarship: **April Kittinger**
- Mark Maly Graduate Assistantship: **Damon Ely**
- John Palmer Memorial Scholarship: **Emily Lambert**
- Robert and Marion Patterson Scholarship: **Ray Danner**
- I.D. Wilson Memorial Scholarship: **Lauren Parsons**



Biological Sciences 0406
Virginia Tech
Blacksburg, VA 24061
(540)231-8930

Non-Profit Org.
U.S. Postage
PAID
Blacksburg, VA 24060
Permit No.28