

Biological Sciences

VOL. 4, NO. 2

SPRING 2006

VIEW FROM THE DEPARTMENT

Undergraduate research (UR) provides opportunities for “hands on” learning and dramatically increases a student’s chances to be accepted in graduate or professional school, or hired by a corporation. We strongly encourage our students to get involved.



Each year, over 100 heed our advice and participate in UR programs. In the typical UR experience, students are forced to integrate knowledge across disciplines to solve a problem. Thus, UR is something of a “capstone” that helps to tie educational experiences together, and hone critical thinking skills. The university, college and department have agreed that UR experiences are important, and will be a target for growth in the coming years.

On this cover page we describe research being conducted by one of our newest professors, Dr. Carla Finkelstein, and show a photograph of her research lab personnel. Nine of those pictured are undergraduates. For those students, the opportunity to work with world class researchers, such as Dr. Finkelstein, is one of the unique qualities that makes VT a special place for learning.

Sincerely, *Robert H. Jones, Head*

NEW TRICK FOR AN OLD CLOCK

Dr. Carla Finkelstein, an Assistant Professor of Biological Sciences who joined Virginia Tech in summer 2005, is studying the details of the complex interplay between the circadian clock and cell cycle systems. A fundamental feature of nearly all living organisms is circadian rhythmicity (~24h oscillation), which controls many physiological processes. Circadian rhythms create an internal timing system that leads to outward manifestations such as the well known sleep/wake cycle in humans. They are entrained by external cues, *i.e.* light and temperature, conferring adaptive advantages to organisms, enabling them to anticipate and prepare for daily environmental changes. Circadian rhythms are strongly related to human behavior and health. They are deranged by shift-work and jet lag, and by such medical conditions as insomnia, sleep syndromes (e.g., advanced sleep phase syndrome), coronary heart attacks, and depression. They have also been implicated in development of cancer.

Circadian rhythms may have originated in the earliest cells to protect replicating DNA from high ultraviolet radi-

ation during daytime. As a result, the DNA replication phase of the cell cycle occurs in the dark. This suggests that the molecular mechanisms that control the cell cycle may be linked with those that control circadian rhythms. Armed with the tools of modern molecular biology, researchers have confirmed this linkage. Since the two systems apparently share some elements of their molecular architecture, it is not surprising that aberrant circadian regulation may also cause some types of cancer.

Research in Dr. Finkelstein’s lab focuses on cancer development and progression and on novel therapeutic strategies for improving the efficacy of cancer treatment. Much of her work is taking a close look into the circadian clock. However, finding the links between circadian rhythms and cancer is difficult because the clock regulates many cellular processes in addition to those involved in cell replication. To tackle this complex problem, Dr. Finkelstein plans to determine if patients suffering circadian disorders show a higher predisposition to develop cancer, and if (and how) the expression of clock genes is affected in the case of tumors. She is seeking the mechanisms through which the cellular circadian clock regulates cell-cycle checkpoints, which are crucial for stopping damaged cells from forming tumors. Her research lab is also determining how circadian proteins elicit functions not related with the clock, such as angiogenesis, that also favor cancer progression. Dr. Finkelstein is using traditional molecular biological approaches in her work, and also a suite of methods that identify the 3-dimensional structure of key proteins.

The structural information will guide experiments aimed at defining enzymatic function, providing clues for developing new cancer therapies. Dr. Finkelstein recently obtained funding for this work through the Jeffress Foundation.

Her lab team of several undergraduates and a postdoc will soon be joined by two new graduate students. ●



Research in Finkelstein lab is currently carried out by undergrads and a postdoc. Dr. Finkelstein is in the front row holding a red jacket

AWARDS

Biologist, Duncan M. Porter, Wins Lifetime Achievement in Science Award

Duncan M. Porter, professor of botany in the Biological Sciences Department, was selected for a Lifetime Achievement in Science Award for 2006 by the Science Museum of Virginia.

As part of the Virginia's Outstanding Scientist award program started in 1985, the Lifetime Achievement Award honors individuals whose careers in science have shown extraordinary distinction. This prestigious award is not offered annually, but at the discretion of the award selection panels. Eighteen individuals have received the Lifetime Achievement in Science Award since 1989.

Information on all the state's Outstanding Scientists and Industrialists of 2006 announced by Governor Timothy M. Kaine and Science Museum of Virginia Director Walter R. T. Witschey can be found at <http://www.governor.virginia.gov/MediaRelations/newsReleases/2006/Feb06/0228.cfm>

The honorees were introduced to the General Assembly on Thursday, March 2, and received their awards at a banquet at the Science Museum on April 4, 2006.

Porter is the third from Virginia Tech to receive the honor. The other two are John Cairns, former University Distinguished Professor of Environmental Biology, in 1991 and Ali Hasan Nayfeh, University Distinguished Professor of Engineering Science and Mechanics in the College of Engineering, in 2005.

One of Porter's most notable contributions to science has been his leading role in the Darwin Correspondence Project, which is administered jointly by the American Council of Learned Societies and Cambridge University Library. Porter joined the project in 1991 as a senior editor and assumed the role of director in 1997. He and his colleagues are transcribing, cataloguing, and annotating all of Charles Darwin's many thousands of letters (written and received), year-by-year, and then publishing the annotated letters in a set of volumes that will ultimately number 30.

"Charles Darwin is considered one of the greatest thinkers of all time, and is considered a national treasure in the United Kingdom," said Robert Jones, head of Biological Sciences at Virginia Tech. "It is a clear indication of Duncan's stature as a scholar that Cambridge University placed its trust in an American to lead this high-profile project."

When asked to evaluate the importance of Porter's work on the Darwin project, John Tyson, University Distinguished Professor of Biology at Virginia Tech and a Virginia Outstanding Scientist for 2004, said, "This work will be read and cited as long as people are interested in the historical and scientific foundations of the life sciences. Few Common-

wealth scientists have had the opportunity to make such an important and lasting contribution to the public understanding of science."

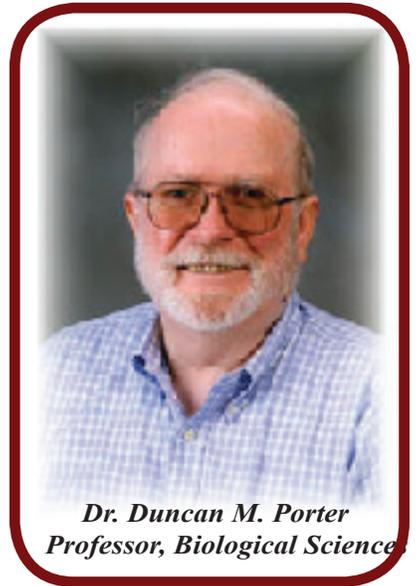
In addition to his work on the Darwin Correspondence Project, Porter has won international recognition for his research on the flora of the Galapagos Islands. He also conducts research in plant systematics and conservation biology, with a focus on tropical and local plants, including rare and endangered species in Virginia. He has described the ecology and status of two of the rarest plants on earth, Virginia's round-leaved birch and Peter's Mountain mallow, and made major contributions toward protecting them from extinction.

Porter received his bachelor's and master's degrees from Stanford University and earned his Ph.D. from Harvard University. He joined the Virginia Tech faculty in 1975 and was made full professor in 1984. Porter has published 18 books and monographs, 55 papers in selected journals and has been invited to present research seminars at more than 60 institutions throughout the world. He is a Fellow of the Linnean Society of London and the American Association of the Advancement of Science. ●

Article courtesy, Catherine Doss, University Relations

"These select people are at the top of their fields," said Governor Kaine. "This year's Outstanding Scientists and Industrialists have expertise in medicine, biology and national security. Their creativity, contributions and dedication are aimed at making life better for us all."

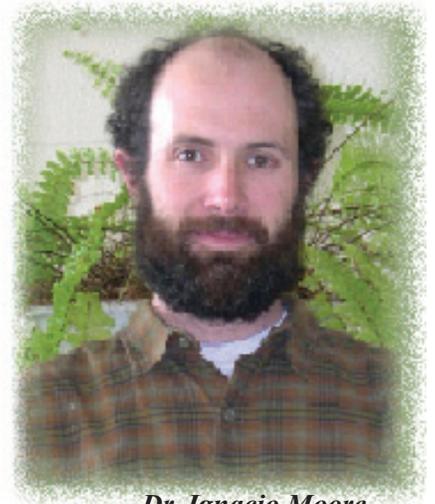
"Science and industry are such an integral part of our existence that we often take for granted," says Dr. Witschey. "Virginia's Outstanding Scientists and Industrialists awards give us the opportunity to stop and recognize the people whose hard work and talent have helped create the technology and lifestyle we enjoy every day."



AWARDS

Moore Receives Prestigious National Science Foundation Career Award

Ignacio Moore received a prestigious National Science Foundation Career award for young investigators. This 5 year grant will support his research of reproduction in tropical birds, and the development of an undergraduate study abroad ecology course in the Andes Mountains and Galapagos Islands of Ecuador. Dr. Moore earned a B.S. in Biochemistry from the University of Arizona in 1994 and a Ph.D. in Zoology from Oregon State University in 1999. Following postdoctoral training at the University of Washington, he joined the VT faculty in 2004. Dr. Moore's central research theme is the interaction between hormone systems, behavior, and reproduction in vertebrates. ●



*Dr. Ignacio Moore,
Assistant Professor, Biological*

Professor Jack Cranford Receives National Advising Award

Jack Cranford, associate professor and associate head of the Department of Biological Sciences in Virginia Tech's College of Science, was awarded the National Academic Advising Association's (NACADA) Certificate of Merit for Faculty Academic Advising.



NACADA's awards committee recognized Cranford for his demonstrated qualities associated with outstanding advising of students and outstanding administration of the department's undergraduate program.

"Jack is known for quickly identifying students with learning disabilities or other disadvantages and working with them not only to help them understand the material in his class, but to get them the help they need on campus to succeed in college," said Robert Jones, department head. "His dedication to our students continues to amaze me."

Cranford has been conducting mammalian biology research, teaching, and advising at Virginia Tech since 1977. As an advisor, he has gained the respect and admiration of students and faculty alike. He spends hours outside his regular office hours helping students find their way through academia and into their most suitable careers.

A native of San Mateo, California, Cranford received bachelor's and master's degrees from San Francisco State College and a Ph.D. from the University of Utah. He holds life memberships in the American Society of Mammalogists, Sigma Xi, The Ecological Society of America, the Veterans of Foreign Wars, and the American Legion, and has held memberships in the International Hibernation Society, the British Ecological Society, the National Geographic Society, and the Virginia Academy of Science. ●

Article courtesy, Catherine Doss, University Relations

Grants, Presentations & Awards

Brenda Winkel (Biological Sciences) has received a \$460,000 grant from NSF's Molecular Biochemistry Program to continue characterizing the structure and subcellular localization of the flavonoid multi-enzyme complex in *Arabidopsis thaliana*. Co-PI **Erin Dolan** (Biochemistry) will carry out an associated study on the impact of NSF Research Experience for Undergraduate supplements on the careers of the 35 undergraduates who have done research in the Winkel lab over the past 12 years. **Robin Andrews** gave an invited talk titled "P02 in utero and the transition to viviparity in sceloporine lizards" at the Fifth World Congress of Herpetology in Stellenbosch, South Africa in June 2005. She also attended the Joint Meeting of Herpetologists and Ichthyologists in Tampa in July where Scott Parker presented their co-authored talk titled "Oviductal oxygen availability as a physiological constraint on the evolution of viviparity in phynosomatid lizards." **Lori Blanc** was awarded an NSF Doctoral Dissertation Improvement Grant for \$6,864 for the project titled "An Experimental Test of the Role of Keystone Processes in a Cavity-Nesting Bird Community." Lori was also named a P.E.O. Scholar in May 2005 and was awarded \$10,000 for the 2005-06 academic year. Lori also received the "Excellence in Graduate Student Service" award of \$1,000 from the Virginia Tech Graduate Student Assembly in March 2005.

Continued - see "Awards" pg 7

FOCUS ON RESEARCH

Virginia Tech Biologists Use New Protocol To Track How Land Use Influences The Way Streams Work

Virginia Tech biology researchers have applied tools from geology, geography, and hydrologic modeling to determine the effect of different land uses on stream quality across 10



watersheds of the French Broad River in the North Carolina mountains. The result is a new protocol for determining the health or condition of huge land-water systems. The research has also resulted in a set of tools for predicting the effect of development decisions in the watersheds studied, which are near Asheville, N.C.

Biology professor Maury Valett, recent doctoral graduate Chris Burcher, and biology professor Fred Benfield presented their research at the Geological Sciences of America national meeting in Salt Lake City, Oct. 16-19.

Valett and Burcher use the **“domino effect”** as an analogy to describe their research process. “When you knock down a string of dominos, the first one is the stimulus and the last one to fall is the response,” said Valett. “We are looking at all the important entities in between.” The stimuli include such land uses as parking lots, farms, and urban development. The entities are components of stream – land ecosystems.

The scientific term is “path analysis” and it is a statistical process more often used in social sciences than physical sciences, Burcher said. But he found it a valuable approach for accounting for the multiple influences of different land uses on how disturbance is translated across landscapes. “The ‘land-cover cascade’ approach helps identify the specific pattern whereby earth manipulation results in erosion and sedimentation that combine to influence the organisms that live in streams,” Burcher said.

“We would like to follow a particle from a parking lot to a

stream, but we can’t do that so we allow path analysis to show us how the dominos are falling,” said Valett. “A realistic goal is to try to figure out where you can prop up a domino or take one out to manage a situation to improve stream health.”

Burcher said 10 watersheds provided a good representation of the range of what humans are doing to the landscape. He had to learn to use geographic information systems (GIS) and hydrologic modeling to observe land use at that scale, however. He used Landsat imagery in GIS to identify three land uses – agriculture, urban, and forested, within zones where water and sediments differentially moved or settled. Burcher was back in his own field when it came to measuring responses. The lives and times of stream fish and insects were summarized by 13 metrics that indicated when a cascade of terrestrial events caused significant aquatic damage.

Land use can cause erosion, change bank height or steepness, change stream shape, water speed, deliver sediment to make for a muddy stream, or can change the chemistry or structure of the streambed. Insects, such as stoneflies and mayflies, are signs of a healthy stream because they process energy and matter – that is, they eat leaves and then are eaten by fish. If the insect population becomes one that derives energy from algae, for instance, the balance changes. “Total density of fish was one of the best models for stream health,” Burcher said.

Valett, Burcher, and Benfield’s talk, “The Land Cover Cascade: Linking terrestrial and aquatic subsystems,” was part of a special session at the GSA meeting organized by Virginia Tech geosciences professor Madeline Schreiber and Valett to present biology-geology approaches to studying the flowpaths that integrate terrestrial and aquatic ecosystems.

Different presentations from several universities, including two more from Virginia Tech, were at the session held on Oct. 16 in Salt Palace Convention Center.

Learn more about the Stream Team at Virginia Tech at <http://www.biol.vt.edu/research/streamteam/>.

Virginia Tech faculty members and students presented more than 30 papers at the GSA national meeting. ●

Article courtesy: Susan Trulove, University Relations

FOCUS ON TEACHING

Botanizing The Alps

Botanizing the Alps is a study abroad international summer course with the objective of learning about human culture and the biological diversity of the Swiss Alps and adjoining Italian Mediterranean region. Dr. Hilu begins a series of meetings with his students during the Fall and Spring semesters. The course formally begins during Summer Session I with a week of extensive training at Virginia Tech. Directly following that, Dr. Hilu's



class flies to Germany where they spend about a week working with colleagues at a German university, exploring the academic institute, the botanic gardens, and taking trips to some

nearby locations. The students work closely with their peers in German universities (University of Bonn or Dresden Technical Institute) and receive



lectures from German professors. At least one of the colleagues from these institutes travels with them throughout most of their stay in Europe, which provides the students with an opportunity to know the professor more closely. In fact, in one of the classes, a class of 12 German students joined them. After Germany, they travel to Switzerland. While in Switzerland, they make the Virginia Tech facility at Riva San Vitale their headquarters, from which they take various trips around the region. Emphasis in the academic part of the class is on the natural vegetation of the region, its ecology and natural history. The course includes hiking in the colorful meadows of the Alps and to the alpine region where snow dominates all year round and only special vegetation can survive. The students learn about the ecology, geology, biodiversity, and human impact on the vegetation and the environment. The Alps are quite unusual in their geological history, which is reflected on their intricate and rich biodiversity. Additional trips include a visit to an Italian botanical garden on Lake Como to be exposed to plants in cultivation, an overnight trip across an Alps pass to Zermatt to be exposed to the changes in vegetations from lowest to highest available altitudes in that area, and to see the magnificent Matterhorn. They then travel to the Italian Mediterranean Sea where they hike trails along the coast to compare two extremely different but connected types of vegetation. The trip ends in Milan with a visit to some of the important sites in the city.

The students are required to write a term paper on one of several topics related to the Alps and Mediterranean regions, such as ecology, vegetation, geology, medicinal aspects, human history in the

region, or human impact. They each make a PowerPoint presentation to the class and guests based on their term paper. The cultural and academic experiences from this course have left strong impressions on the students who have taken it. ●

Photos & article by Dr. Hilu, Professor, Biological Sciences

From the department head: Quotes obtained after the course ended from some of the students about their experience.

"There's no way I would ever take back these last three weeks, for they have been the BEST ever in my WHOLE entire life! Not only did I make some great friends, have some great laughs (and there were many), and learn about plants, but I learned some very valuable 'life tools'. These 'life tools' include learning about and respecting other cultures, and learning about group dynamics. This has definitely been one of the most memorable life experiences I have ever had. Dr. Hilu did an incredible job of not only being a dedicated professor and ensuring that we learned, but organizing everything and basically being our father (a personal thank you). These were all major responsibilities for one professor."

"This entire trip has been an experience of a lifetime. Educationally, I have learned so much about plants, the different families and species, and best of all how to identify them. I now know what constitutes a monocot, a legume from a fern, and an angiosperm from a gymnosperm. I have learned what plants grow best in what climates and that certain plants help aid each other in their environments. These are things that will stay with me and help aid me later in life if I want to further my education in botany and in such practical things as when I want to plant a garden. If someone were to ask me what one thing I will take from this trip, I would have to say the experience of getting to learn about an interesting subject in a classroom that was as big as you could imagine with the possibilities of what we'd see limitless."

"I learned after going on some of the hikes that we went on that I can physically do a lot more than I ever thought that I could. In all seriousness, I'd do it all again in a heartbeat."

"I really did love the course. I am a stern believer that to truly learn something and remember it, one must see and touch. I would definitely recommend this trip to any biology major who is interested in plant life. It was definitely the best trip ever!"

"The past three weeks have definitely been the best ever, and I mean THE best! I enjoyed every minute, exhausting as it may have been. Just thinking about me being in Europe on this trip makes me emotional. I never thought that I would have the opportunity to do all the things we have done, to see all the wonderful things we have seen. I want you to know, Dr. Hilu, because I do not think that something like this would have been even partially as much fun with any other professor. You did a wonderful job putting a schedule together that everyone was happy with. You just did a great job taking care of us and you are appreciated so much for that! Thank you!"

SIGNIFICANT EVENTS

Corporate Gift To Department of Biological Sciences Creates Mutual Benefits

Hundreds, and ultimately thousands, of students in the College of Science at Virginia Tech will benefit from the hands-on experience they will gain through the use of two brand new mass spectrometers. The instruments (two Sciex API 3200 mass spectrometers valued at over \$500,000) were a corporate gift from PPD, Inc. They are capable of identifying small to large molecules in biological samples, even if present in trace quantities, and will be located in a biological sciences research lab in Derring Hall.

This gift is a win-win situation since PPD's bioanalytical lab in Richmond employs a number of Virginia Tech graduates as data analysts, scientists and a wide array of technical support specialists. PPD is a leading global contract research organization providing discovery and development services, market development expertise and compound partnering programs. Its clients and partners include pharmaceutical, biotechnology, medical device, academic and government organizations.

"PPD's gift will help students prepare for productive careers and make real contributions in the work place," said Robert Jones, head of Biological Sciences. "PPD's offer of training and service support reflects a common interest in making the most advanced, top-of-the-line instruments available to students — the same equipment they will be using when they enter the working world." ●

"PPD's gift will help students prepare for productive careers and make real contributions in the work place"

-Robert Jones, Head -



The Department of Biological Sciences Hosts the First Virginia Tech Structural Biology Symposium

On March 31st and April 1st, 2006, 150 people from Virginia Tech and neighboring colleges and universities attended Virginia Tech's First Structural Biology Symposium, organized by Carla Finkielstein and Nancy Vogelaar. The symposium featured two internationally-known keynote speakers, Andrew Bohm (Tufts University), who spoke on the origin-binding domain of the large T-antigen, and Rolf Hilgenfeld (University of Lubeck), who gave an informative and entertaining lecture on the use of protein structures in anti-viral drug design and his experiences during the SARS outbreak and the worldwide rush to find a treatment. The diversity of Virginia Tech's research in structural biology was reflected by the speakers (see photo) who were drawn from four different departments in three different colleges. Our own department was well-represented by Brenda Winkel, Florian Schubot, Carla Finkielstein, and Nancy Vogelaar.

Special features of the symposium were the traveling "Art of Science" exhibit from the Protein Data Bank, tours of the CAVE to show protein structures in three-dimensions, a poster session, and corporate sponsors demonstrated the latest in crystallization robots and crystal plate imaging technology. The VT Crystallography Laboratory was open for touring, and our department's new protein crystallization facility was inaugurated.

The symposium was sponsored by the Department of Biological Sciences, the Biochemistry Department, the College of Science, and Oxford Diffraction, Ltd. ●



Symposium Speakers and Organizers: Brenda Winkel, David Beven, Nancy Vogelaar, Jianyong Li, Paul Carlier, Andrew Bohm,

ALUMNUS

1939 Virginia Tech Alumnus - Dr. Morris Pollard



Dr. Morris Pollard, professor emeritus of biological sciences, director of Lobund Institute and an internationally recognized prostate cancer researcher continues to follow a professional regimen that would tire a researcher half his age.

Pollard has published more than 300 scientific articles and oversees the longest running medical research program at Notre Dame. For more than 40 years, he has been using germ-free “Lobund-Wistar” rats to study disease mechanisms. Pollard’s Lobund-Wistar rats have been hailed as one of the best available animal model systems for studying prostate cancer in man, particularly drug-treatment studies.

Pollard has had an illustrious scientific career, from discovering the benefits of aspirin-like drugs in treating intestinal cancer to his continuing work on prostate cancer. ●

Photo & article courtesy: William Gilroy, University of Notre

Awards (continued from pg 2)

Brenda Winkel visited the Department of Chemical and Biological Engineering at SUNY Buffalo on March 29th, 2006 and gave a presentation on her research entitled, “Let’s get organized! The how and where of Arabidopsis flavonoid metabolism.” **Ann Stevens** had a large group of faculty and graduate students from the department attend and give presentations at the 105th General Meeting of the American Society for Microbiology held in Atlanta, GA in June 2005. **Duncan Porter** was invited to present a seminar at the Univ. of New Hampshire in November, entitled “Why did Wallace Write to Darwin?” The National Endowment for the Humanities has renewed its grant for the Darwin Correspondence Project for three years (2005 - 2008) for \$230,000. **Robert Jones** (Biological Sciences), **Carola Haas** (Fisheries and Wildlife Sciences) and **Tom Fox** (Forestry) received a \$624,000 grant from the USDA to study the impacts of forest management activities on biological diversity and ecosystems processes in Appalachian Forests. **E.F. Benfield** and **H.M. Valett**, US Fish and Wildlife Service, received a USGS grant for \$132,000.00, to study the ecological role of freshwater mussel beds in providing critical habitat for endangered species and maintaining ecosystem function. **Liwu Li** has been installed as a standing member of the recently chartered innate immunity and inflammation study section for the National Institute of Health. He has also been invited to give a talk at the Department of Immunology of the Cleveland Clinic Foundation on April 4th 2006. **Brent Opell** received a grant from the National Science Foundation to study the design, diversity, and function of viscous prey capture threads that are produced by over 4000 species of orb-weaving spiders. These sticky threads are formed of small adhesive droplets suspended on elastic fibers and serve to retain insects that strike a web. **Brian Olsen** received the Smithsonian Institution Predoctoral Fellowship Award, which consists of a \$20,000 stipend awarded from May 1, 2005 until April 30, 2006. He will also be traveling to the Smithsonian National Zoological Park to conduct research with Zoo Biologists Russell Greenberg and Robert Fleischer. His project will examine how the mating system of two sub-species of the Swamp Sparrow has diverged using DNA microsatellites to evaluate rates of extra-pair fertilization. Brian was also recently recognized with an Outstanding Graduate Student Teaching Commendation Award from the Graduate School. He has made many contributions to teaching, most notably with ornithology lab and lecture. To prepare for the ornithology lecture course, Brian took the Graduate School pedagogy course and received mentoring from Jeff Walters. He did an outstanding job. Congratulations also for his excellent contributions in research and outreach where he has made strong impacts well beyond the university. **Michelle Barthet** was one of nine students selected to receive a \$500 research award from the Botanical Society of America. **Sheena Friend** received a 2005 grant from the Virginia Academy of Science for \$1200 to support her research on the molecular evolution of the allergen genes in peanut and its related wild species. **Liwu Li** recently attended a meeting on innate immunity held at the Oxford University Sir William Dunn School of Pathology England. He presented a talk entitled, “Novel role and regulation of innate immunity signaling.” **Melissa Ramirez**, a Ph.D. student was awarded a \$500 grant for her project, “Interaction-dependent localization of flavonoid enzymes in Arabidopsis,” from the Virginia Tech Graduate Research Development Project. **Joe Falkinham** received a grant award for \$60,000 from United States Council for Automotive Research (US CAR) titled “Inhibitory Effects of Selected Chemicals on Mycobacteria.” **Alexandra Class** was given honorable mention from the National Science Foundation 2005 Postdoctoral Fellowship for her potential thesis project on the hormonal regulation of seasonality in an equatorial population of birds (rufous-collared sparrows). **Chelsea Black** received a summer internship at the National Institute for Health. Chelsea was also awarded a \$500 grant from the Virginia Academy of Science Undergraduate Conference. **Amy Rowland** received a summer internship for Conservation and Land Management at the Chicago Botanic Garden. **Rohit Kumar** received a summer internship at Novozymes. **Khidir Hilu** presented the opening talk entitled: “A Century of Progress in Grass Systematics,” a special symposium on grasses at the Royal Botanic Gardens in Kew, England. The Celebration of Grasses symposium was sponsored by the London Linnean Society and the Royal Botanic Garden at Kew. **Sheena Friend**, a masters student for Dr. Hilu’s lab, received a sigma Xi grant to support her work on the allergen genes in the peanut. **Wesley Black**, received the John Neal Memorial Award which is presented by the local Sigma Xi chapter for Ph.D. research, in honor of a former biology professor, John Neal. **Matthew Mastropaolo**, received a Sigma Xi Grants-In-Aid Research Award, “Role of Escherichia coli Cytochrome Oxidases in Providing Synergy to Anaerobes During Polymicrobial Infections.” **Sarah Sebring**, received a Sigma Xi Grants-In-Aid Research Award, “Nanoscale Characterization of Polyphase Monazite Compositional Domains with High Resolution Transmission Electron Microscopy.” **Daniela Cimini**, **Carla Finkielstein**, **Liwu Li**, **Florian Schubot**, and **Dorothea Tholl** were elected to full membership in Sigma Xi, and **Amanda Malueg**, **Melissa Ramirez**, and **Eric Weigel**, were elected to associate membership.

Alumni and Friends

We need your support !

Your gifts to the Department of Biological Sciences and alumni projects have helped us move forward in our quest for excellence. Thank you!

With continued support, you can help us build strong scholars, make higher education affordable, and attract the brightest and best students and faculty to Virginia Tech. Tangible gifts reflect a donor's dedication to enriching the university experience for students and faculty alike.

We are also seeking large gifts to equip the new biology building, and establish chaired faculty positions. Your contributions are tax deductible. For more information on "Ways to Give," visit <http://www.giving.vt.edu>.

**DONORS CAN TRULY SEE THE FRUITS OF THEIR LABOR AND
FEEL A SENSE OF PRIDE WITH EACH VISIT TO CAMPUS.**

MAKE A GIFT THAT WILL LAST FOREVER.

*Make check payable to the Virginia Tech Foundation.
Write "for Biological Sciences" on your check
and mail to:*

**Dr. Robert Jones
Biological Sciences 0406
Virginia Tech
Blacksburg, VA 24061**

(see enclosed envelope)



*Biological Sciences
2125 Derring Hall 0406
Blacksburg, VA 24061
(540)231-8930*

Help us keep our records updated

Please help us by updating your address and providing comments and items of interest for future newsletters. Fill out the form below and mail to: Dr. Robert Jones, Biological Sciences 0406, Virginia Tech, Blacksburg, VA 24061. You may also send an email to: Debbie Cruise at (debbiec@vt.edu) or Robert Jones at (rhjones@vt.edu), or visit our webpage at <http://www.biol.vt.edu/alumniupdate.php>.

Name _____

Class _____

Mailing Address _____

Email _____

Web _____

Notes/comments _____

Had a Favorite Teacher?

Please drop us a line (rhjones@vt.edu) about your favorite Biology teacher. We will use your comments to support excellence at Virginia Tech.

Non-Profit Org
U.S. Postage
PAID
Blacksburg, VA 24061
Permit No. 28