

Biological Sciences



Vol. 11, No. 2 -- Fall 2014

<http://www.biol.vt.edu>

One of the best indicators of the quality and impact of a department's activities is the career trajectory of its graduates. On page 4 you will see a letter from one of our alumni, **Betsy Hagan**, who earned her B.S. with us and went on to earn D.D.S. and M.B.A. degrees from VCU. She recently retired as Senior Associate Dean and Director of Clinics for the VCU School of Dentistry. Also on page 4, you will read that one of **Noel Krieg's** former students is leading the charge on establishing a graduate fellowship in his name. The student, **Paul Hoffman**, is now a professor in the School of Medicine at the University of Virginia. In past issues we have profiled several former undergraduates who have gone on to careers including in academia, industry, health care, and conservation. Here are some recent graduate student success stories:

Two Ph.D. students graduated from the Belden lab this past summer. **Jenifer Walke** joined the faculty of the Biology Department at Roanoke College in August as a Visiting Assistant Professor. Dr. Walke's dissertation was entitled, "The structure and function of amphibian bacterial symbionts and their role in susceptibility to a fungal pathogen," in July. **Matthew Becker** landed a prestigious Smithsonian Institution Fellowship and a postdoctoral appointment at the National Zoological Park in Washington D.C. His dissertation was on, "The role of symbiotic bacteria in disease resistance and conservation of the critically endangered Panamanian golden frog."

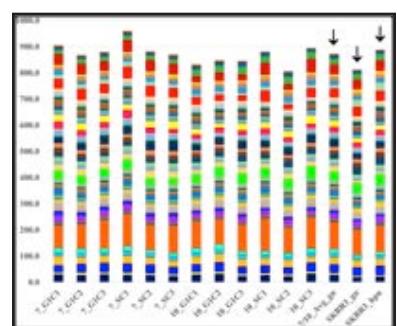
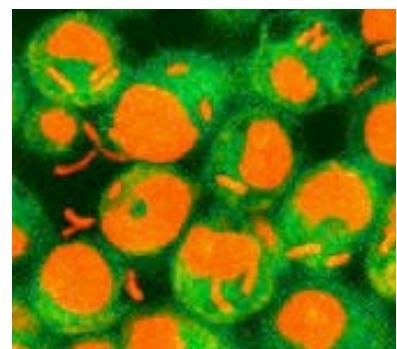
Several graduates took positions at Virginia Tech. **Hualan Liu** of the Melville Lab defended her Ph.D. work in May on the topic of, "Adventures with *Clostridium perfringens*: From Genome to Proteome." Hualan was a recipient of the **Lewis Edward Goyette Graduate Fellowship** while a member of the department. She is now a Laboratory Specialist in a joint appointment in the Veterinary College's Department of Biomedical Sciences and Pathobiology and the Department of Civil and Environmental Engineering. Two others were hired by our department, **Wooram Lee** (M.S. in the Lazar Lab) as General Biology Laboratory Coordinator, and **Stephanie Voshell** (Ph.D. in the Hilu Lab) as Instructor.

Katlyn Amos earned her M.S. degree in July as a member of the Benfield Lab with a thesis entitled, "Investigating historical and contemporary land cover effects on macroinvertebrate communities and water quality in Piedmont streams." She is now employed as a Geospatial Analyst with the Virginia Department of Conservation and Recreation.

Many Ph.D. students who defended in the past year have gone on to high-profile postdocs at research institutes or academic labs, including **Revathy Ramachandran** (Stevens Lab), now a Visiting Fellow at the NIH; **Bianca Baker** (Li Lab), now a postdoc at the NIH; **Jeff Norman** (Barrett Lab), at Michigan State University; **Michelle Jusino** (Walters Lab), at the University of Wisconsin-Madison; **Kevin Geyer** (Barrett Lab), at the University of New Hampshire; and **Lawrence Lin** (Webster Lab) at the University of Alabama.



Much more difficult to track are those of you who earned B.S., M.S., or Ph.D. degrees from the department years ago. Please help us (re)connect by joining the VT Biological Sciences network on Linked In at <https://www.linkedin.com/groups/Virginia-Tech-Department-Biological-Sciences-8174864> TODAY!!!



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 (vsutherland@vt.edu) via e-mail, or write to us at the Department of Biological Sciences, Mail Code 0406, Virginia Tech, Blacksburg, VA 24061.

Bacteria may be key to feeding nitrogen to plants, reducing harmful fertilizers

By Rosaire Bushey

Birgit Scharf, assistant professor of biological sciences, is interested in making plants grow and in finding a way to do it without environmentally-disastrous chemically-synthesized inorganic nitrogen fertilizers.

To that end, Scharf, also an affiliate of the university's Fralin Life Science Institute, has received approximately \$900,000 through a National Science Foundation CAREER Award to analyze the role of proteins within *Sinorhizobium meliloti*, a nitrogen-fixing bacterium that forms a symbiotic relationship with the important crop legume, alfalfa.

In soil, the bacteria move toward plant roots, invade the host plant, and provide nitrogen to plants for growth.

"We have three objectives we've been working on," said Scharf. "First we have been analyzing how two novel proteins allow *S. meliloti* to respond to quickly-changing environmental signals, which is essential to survival. Then we want to determine the activities of chemotaxis components – what makes the bacterium move to the host plant – to help us predict its behavior during crop interaction. Finally, we want to identify how its flagellar motor works, which will impact our understanding of how bacterial symbionts respond to plant signals and effectively move through the soil."

Scharf found that *S. meliloti* is attracted to particular amino acids that are exuded by the roots of host plants.

The research team then identified a bacterial chemotaxis protein that senses proline and other amino acids and determined how the attractant response is transmitted to the flagellar motor.

Her research group also discovered that another group of chemicals, betaines, exuded by the host plant, serve to attract these beneficial bacteria. Betaines protect plants against environmental stress, but their role in communication with bacteria is a new discovery.

The team is now exploring how betaines bind to bacterial receptor proteins to better understand this previously-unknown signaling system.

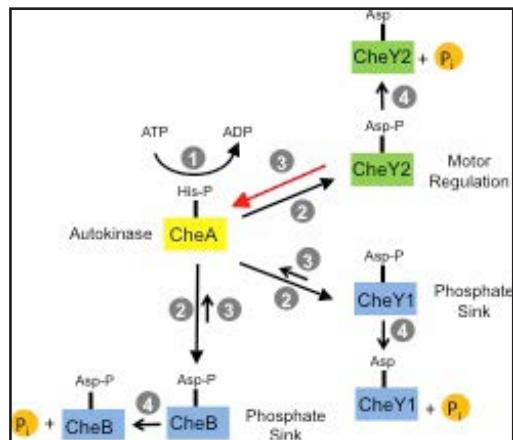
"Working with a group at Rutgers University, we are looking into the structure of one of the novel proteins that will help us understand its interaction with partner proteins and its function in signaling termination," Scharf said.

By increasing the understanding of the cues bacterial symbionts use to interact with host crops, Scharf's work will provide a new angle to long-standing, but as-yet largely ineffective efforts to enhance nitrogen fixation to help increase crop yields and to reduce the use of synthetic fertilizers that have an especially negative impact on aquatic ecosystems.

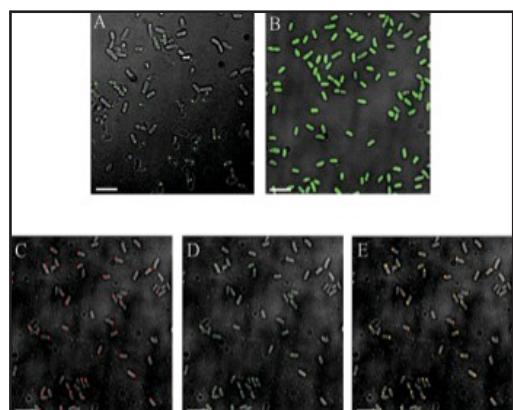
Scharf joined Virginia Tech in 2008, and has published more than 40 research papers. She received her doctoral degree from the Max-Planck Institute of Molecular Physiology in Germany and has held post-doctoral fellowships at the Max-Planck Institute, Harvard University, and the University of Regensburg (Germany). She held an independent group leader position at the University of Regensburg from 2000 to 2007.

Scharf is co-advising the Undergraduate Microbiology Club and with the club, was honored with a College of Science Outreach Excellence Award in 2013. The club offers hands-on microbiology-related workstations and no-cost supplies to local elementary schools and participates in annual science fairs including Kids' Tech and the recent Virginia Science Festival at Virginia Tech, with booths designed to educate visitors about microbiology.

For more information on research in Dr. Scharf's lab, visit her website at <http://www.biol.vt.edu/faculty/scharf>



Central phosphotransfer reactions in the *S. meliloti* chemotactic signaling system.

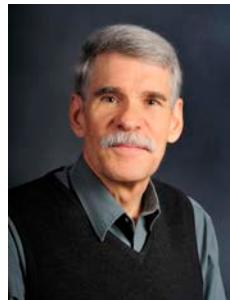


Localization of CheS (fused to eGFP) and CheA (fused to mCherry) in *S. meliloti* by fluorescence microscopy. CheS in wild type (A), CheS in DcheA (B), and co-localization of CheS and CheA (C-E).

Research / New Grants

Collaborative Research: The Performance and Evolution of Environmentally Responsive Biomaterials in a Unique Biological Adhesive System: Spider Orb Web Capture Threads (National Science Foundation)

Principal Investigator: **Brent Opell** (Professor of Biological Sciences)



Materials change their properties in response to the environment in ways that are often detrimental to performance. However, a new generation of "smart materials" capitalizes on environmental responsiveness to improve performance in the laboratory. This project investigates how such "smart materials" evolve and function in nature, focusing on how adhesives adapt to fluctuating humidity in the environment. Spider capture threads are sophisticated composite structures that generate adhesion through multiple mechanisms that could respond synergistically or independently to the environment.

Adhesion starts with the surface contact of sticky glycoproteins that are encased in liquid glue droplets and is then enhanced when those droplets and the underlying axial thread to which they are attached stretch and resist thread "pull-off" by forming a broad, suspension bridge-like interface. This whole process is controlled in part by cocktails of salts in the glue droplets that absorb atmospheric water, which then lubricates the glue and controls the extension of the droplets and axial threads. This project combines biology and materials science to compare the molecular compositions of glues, the adhesiveness of capture threads, and how webs capture insects across a community of spiders to understand how biological "smart" materials respond to their environments. It will inspire the development of new synthetic adhesive systems and "smart", environmentally responsive materials. The project will provide in-depth training in interdisciplinary research to Ph.D., undergraduate, and high school students. It will also develop new educational resources for K-12 summer camps and teacher workshops.

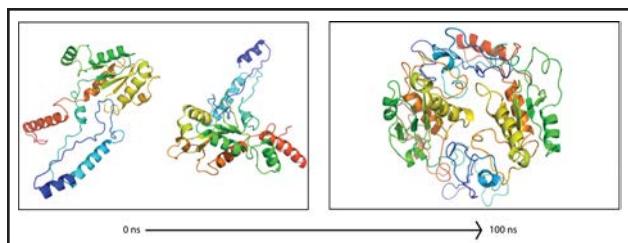


Molecular Mechanism of TIRAP Membrane Targeting (NIH: National Institute of Allergy and Infectious Disease)

Principal Investigator: **Daniel Capelluto** (Associate Professor of Biological Sciences)

PUBLIC HEALTH RELEVANCE: Distinct sorting proteins transduce extracellular signals by binding to specific lipids at the plasma membrane to trigger pro-inflammatory responses. This project seeks to understand membrane lipid recognition and modulation by sorting proteins, which occurs at specific membrane sites and facilitates recruitment of signaling proteins. Once the protein complex at the plasma membrane is established, a signaling cascade that ultimately promotes the production of pro-inflammatory proteins is activated.

DESCRIPTION: Toll-like receptors (TLRs) provide a mechanism for host defense by activating innate immune responses. Activated TLRs [e.g., by bacterial lipopolysaccharide (LPS)] dimerize, and interact with adaptor proteins through their cytosolic TIR domains to trigger a signaling cascade that ultimately leads to the expression of proteins involved in pro-inflammatory responses. One such adaptor protein is the TIR domain-containing adaptor protein (TIRAP; also known as MAL), which contains an N-terminal phosphatidylinositol 4,5- bisphosphate [PtdIns(4,5)P2]-binding region that is required for plasma membrane targeting and a C-terminal TIR domain, which mediates myeloid differentiation primary response gene 88 (MyD88) association. Upon ligand binding, the LPS-binding protein TLR4 is proposed to be recruited to PtdIns(4,5)P2-rich regions where TIRAP resides. At these sites, TIRAP recruits MyD88 to the plasma membrane via TIR-TIR domain interactions; thus TIRAP bridges MyD88 binding to activated TLR4. PtdIns(4,5)P2-mediated recruitment of TIRAP is considered to be the earliest cellular event required for TLR-mediated signaling and, consequently, it has been proposed that TIRAP defines the signaling sites at PtdIns(4,5)P2-rich membrane regions. Therefore, details of how TIRAP interacts in PtdIns(4,5)P2-rich membrane sites are crucial to understanding how the protein triggers downstream signaling upon microbial detection. A conserved stretch at the N-terminus of TIRAP (amino acids 15-35) has been shown to be sufficient to target the plasma membrane. Our preliminary data indicates that this region, which we name the PtdIns(4,5)P2 binding motif (PBM), folds in dodecylphosphocholine micelles, and binds PtdIns(4,5)P2. The solution structures of the micelle-associated and PtdIns(4,5)P2:micelle-bound states of TIRAP PBM will be solved and compared to precisely map the PtdIns(4,5)P2 binding site and define the structural basis of multi-step membrane insertion. Kinetics of the interactions of TIRAP PBM and deficient PtdIns(4,5)P2-binding mutants will be defined using NMR and surface plasmon resonance detection. The depth and angle of membrane penetration of TIRAP PBM will be elucidated with paramagnetic spin labels to better understand how binding influences membrane curvature. Given that TIRAP weakly binds to other acidic phospholipids, the contribution of these molecules in TIRAP's membrane insertion will be determined. We hypothesize that TIRAP membrane binding is regulated by the PtdIns(4,5)P2 head group, inositol 1,4,5-trisphosphate (Ins(1,4,5)P3), which accumulates in the presence of extracellular LPS. The kinetics of TIRAP's Ins(1,4,5)P3 association will be measured and compared with those calculated for PtdIns(4,5)P2. Thus, these studies will provide a basis for understanding the mechanism and regulation of TIRAP's membrane targeting, which can be used for structure-based design of high affinity specific phosphoinositide-binding modules that ultimately contribute to pro-inflammatory responses.



Molecular dynamics simulation of human TIRAP. Formation of a dimer structure with symmetry is observed in the simulation of two identical TIRAP homology model proteins after 100 ns.

The Noel Krieg Graduate Fellowship

Do you remember "The Lecture"? Mid-winter. Gray sky. Gray buildings. Gray ground. And of course the icy wind. The classroom is dark, though the room is filled to capacity in anticipation. Two candles flicker eerily on the podium. As the clock strikes the hour, a dark hooded specter resembling the Grim Reaper approaches the podium. Candlelight casts a pallor upon his face; eyes under stern-sunken brows cast a penetrating glance over the affair. "I am Typhus," it says, "the scourge of Europe. I have killed more people than any disease in the history of man. It was I who defeated Napoleon at Waterloo – his men too sick to fight." A sinister mocking laugh then follows. A scene you will never forget. Thus, **Noel Krieg**, one of the most popular teachers in the Biology Department captured the imagination of countless pre-med students and stimulated the morbid curiosity of many others, including those who would become his graduate students. His pathogenic microbiology course was always packed, as he gave personality and some dignity to the parade of pathogens, replete with gory details, their toxins, their diagnoses, and their cures. For many, a good grade in this course and a letter of recommendation from Dr. Krieg was a near guarantee for admission into Virginia medical schools.



In a fitting gesture of appreciation, Krieg's former students are establishing a graduate fellowship named for him, which will support graduate education in the Department of Biological Sciences within the College of Science. The goal to raise \$500,000 over the next five years and endow the fellowship has gotten off to a fast start, with a \$100,000 gift by **Paul Hoffman** (biology '72, Ph.D. microbiology '78). All former students of Krieg's are encouraged to participate.

Krieg joined the biology department in 1960. He served as major professor for 13 Ph.D. students and 22 master's students. In 1978, Krieg received the Carksi Distinguished Teaching Award from the American Society for Microbiology, after being nominated by both current and former students, who valued his teaching excellence. In 1983, Virginia Tech appointed Krieg to the rank of Alumni Distinguished Professor. He embraced this leadership post, which called on him to consult with the university's president in areas of science and education.

Krieg also was elected to the American Academy of Microbiology, and he was a member of Bergey's Manual Trust, providing expertise in systematics and the sensible naming of bacteria for Bergey's Manual of Determinative Bacteriology and supplementary reference works. Krieg often referred to taxonomy as "armchair biology, something that could be practiced to a ripe old age."

Although Dr. Krieg retired in 1999, he subsequently developed a new course called Prokaryotic Diversity, which he taught through the fall 2012 semester, thereby continuing to enrich and inspire young students.

To learn more about the Noel Krieg Graduate Fellowship, including how you can support it, please contact Jenny Orzolek at jorzolek@vt.edu or 540-231-5643.



Dear fellow alumni,

As a sports fanatic, I could hardly wait to complete my education and be gainfully employed, so that I could afford to join the Hokie Club. Regrettably, it was not until years later that I began to realize that I should be just as equally committed to supporting the Department of Biological Sciences. After all, it was the department and the faculty that provided each of us with the excellent academic foundation to succeed in our chosen fields. It was after I fully appreciated this that I made the decision to support the Department by making a commitment through the College Annual Fund.

As a member of the department's Alumni Advisory Board, I have become more aware of its needs and the importance of private support. Virginia Tech, like most institutions of higher learning, is faced with increasing costs and diminished state funding. The state's General Fund, which is its predominant fund for financing higher education, provided an estimated 34.8% of the cost of operations related to the institution's educational activities in 2013-14 (source: 2013-2014 Authorized Budget Document, Consolidated Budget Summary). While the university has worked hard to reduce costs, the state's reduced level of support has definitely increased the need to grow the non-general fund resources, such as gifts, federal appropriations, grants and contracts.

There are over 9000 living biology alumni, so just imagine what could be accomplished if we each made a gift to the department. According to Professor and Department Head, Brenda Winkel, gifts to the department's general fund are among the most valuable. These unrestricted funds allow departmental leadership to allocate resources where they can have the greatest impact. To give just one example, they have been used to support professional development opportunities for students and undergraduate research. Other key opportunities to support the department include endowed faculty positions, which are powerful tools for recruitment and retention of exceptional faculty; special research and program endowments; and endowed undergraduate and graduate fellowships (see page 7).



Senior photo



We have so much to be proud of as graduates of this institution. For the first time, our university has moved into the Top 25 public universities as ranked by U.S. News & World Report in its 2014 annual survey of undergraduate programs. Virginia Tech also ranked 27th in the 2012-13 edition of Kiplinger's Personal Finance list of "100 Best Values in Public Colleges." And is it any surprise that the Princeton Review also ranked Virginia Tech first for "Their Students Love These Colleges." The accomplishments of the Department of Biological Sciences are equally impressive when one reviews its number of sponsored research grants, journal publications, and faculty and student awards (summarized in the department's annual reports at <http://www.science.vt.edu/facultystaff/annual-reports.html>).

In light of the many exciting developments at our alma mater, I urge you to be Hokie proud and start jumping (for you football fans), by making a gift to the Department of Biological Sciences. Every gift is important and makes a difference, no matter the amount. As noted on the Office of Annual Giving website, "Your gift to Virginia Tech creates a legacy of opportunity, provides for education excellence, and helps invent the future." For detailed information on giving, please refer to the department's website at www.biol.vt.edu/giving/.

GO HOKIES!!
Betsy A. Hagan, DDS, MBA

The Evolution of Academic Advising

Over the years, our department has seen many changes. One of the most important has been the academic and career advising provided to our students. In the late 1960's and throughout the 70's, the department, while recognizing the need for advising, had no centralized system in place to ensure that our undergraduates were receiving the much-needed academic and career oriented advice that they so desperately needed. The first centralized Undergraduate Advising Office was created during **Ernie Stout's** tenure as Department Head. This was a great asset to the department and, of course, to our students as they now had the ability to receive consistent and timely feedback regarding their academics as well as help with planning for future careers, graduate school, or professional school.

Another important innovation in advising was the Biology Orientation Seminar, a course developed by **George Simmons** in the early 90's. Designed for incoming freshmen, this course was another tool developed to give students guidance in both Biological Sciences and in navigating the ins and outs of the university. The Biology Orientation Seminar was a great complement to the academic advising being done at the time, primarily by faculty and by one lone full time professional advisor. This seminar did many things to ensure that students received the appropriate support needed to achieve their goals both academically and professionally. Initially, the course began by introducing students to their advisors on day one. These advisors typically held three to four group meetings throughout the semester and met with students on a one-on-one basis as requested. During the semester, students were required to create their own academic plan, thus giving them a road map to graduation and beyond. They were shown what courses to take and when to take them and were also informed of departmental policies and procedures. The Biology Orientation Seminar brought in guest speakers from around campus to highlight some of the many possibilities for study and research in the biological sciences. It was so successful that it was used as the model to create First Year Experience courses for freshmen throughout the university that are still in place today.

These advances in advising have been recognized with several major awards. In 2002, the Department had the distinction of being named a University Exemplary Department for its contributions in the area of academic advising. Two faculty advisors were subsequently recognized with the Alumni Award for Excellence in Undergraduate Academic Advising, **Jack Cranford** in 2004 and **Jack Evans** in 2011. Dr. Cranford also received a national advising award in 2005, the Certificate of Merit for Faculty Academic Advising from the National Academic Advising Association.

As the number of Biological Sciences majors has continued to grow, hitting a high of close to 1700 in 2010, so has the advising operation. Today the Undergraduate Programs Office is a well-oiled machine with an office manager, two fulltime professional advisors, and two faculty members housed together in a suite of offices on the second floor of Derring Hall. The Undergraduate Programs Office is open M-F, 8 a.m. to 4 p.m., serving not only Biological Sciences majors, but countless other students with an interest in our courses or in transferring into either the Biological Sciences major or the recently-approved Microbiology major. It is evident that advising has changed dramatically over the years to meet the needs of our majors and will continue to evolve and provide a pathway to success for generations of students to come.



Our current Undergraduate Advising Staff (L to R): Angela Mathias (Academic Advisor), Emily Overend (Academic Advisor), Jack Evans (Advanced Instructor), Karen Fraley (Office Manager), and Rich Walker (Associate Professor and Associate Department Head)

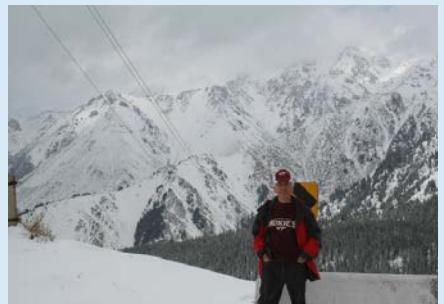
An Academic Adventure in Kazakhstan

Professor Emeritus **Asim Esen** recently completed a 9-month Fulbright Teaching/Research Scholar appointment in Kazakhstan and returned to Blacksburg. His host institution was Al-Farabi Kazakh National University, the largest and oldest university in the country, located in the city of Almaty. His host department within the university was the Department of Molecular Biology and Genetics where he taught two graduate level courses (Genomics and Methods of Genome Analysis, and Molecular Mechanisms of Genomic Stability) in the 2013 fall semester and one graduate level course (Genetic Engineering) in the 2014 spring semester. In addition,

he served as an informal consultant to the vice-President of the university on matters related to academics and revision of the university's website; was invited to give plenary lectures and talks at three different international conferences held on the campus of his host institution; attended the Fulbright South and Central Asia Research Conference in Chennai, India (March 9-12, 2014); and moderated the session on Public Health and the Fulbright Central Asia Research Workshop in Kyrgyzstan and presented a talk entitled "Glycosyl Hydrolases and Their Function in Plant Defense" (April 18-21, 2014). He has received an invitation from Al-Farabi Kazakh National University to serve as a Western visiting professor/scholar in the 2014-2015 academic year and is considering accepting the invitation for spring semester.



*Dr. Esen with some of departmental colleagues.
Approximately 80% of faculty/students in biological sciences in Kazakh universities are female.*



Dr. Esen in front of Tian Shan Mountain (highest peak, 7,200 m) near the city of Almaty, Kazakhstan.

Recent Awards

Research Scientist **Lori Blanc** has been named a 2014 Diggs Teaching Scholar. Established in 1992, the Diggs Teaching Scholar Award highlights and recognizes the innovative teaching practices of our excellent teachers. The award also provides grant support for the dissemination of those instructional innovations to the larger University community.

Dr. Blanc's research expertise is in avian community ecology, conservation biology, and endangered species management. She has over 15 years of teaching experience in topics ranging from environmental sustainability, conservation biology, and molecular genetic techniques to computer literacy, programming, and computer architecture. Since 2008, Dr. Blanc has taught

field-based study abroad programs in Australia, Fiji, New Zealand and Antarctica. Her teaching emphasizes hands-on, interdisciplinary learning, undergraduate engagement with peer-reviewed scientific literature, writing-intensive project work, service learning, self-reflection and the use of co-curricular activities to improve curricular engagement. Dr. Blanc is also the Director of the Da Vinci Living Learning Community, a First Year Experience program designed to help biological and life science freshmen successfully transition through their first year at Virginia Tech.



Dr. Blanc received bachelor's and master's degrees from California Polytechnic State University San Luis Obispo, and a Ph.D. from Virginia Tech.



Associate Professor **Dana Hawley** has received the university's 2014 Alumni Award for Excellence in Teaching. The award is presented to two VT Faculty members each year; each recipient is awarded \$2,000 and is inducted into the Academy of Teaching Excellence. "Dr. Hawley joined our faculty in the spring of 2007 and has been a strong advocate and practitioner of student-centered education in the classroom and service learning outside of the classroom from day one," wrote Department Head Brenda Winkel, in her nomination letter. "She has been an outstanding contributor to the teaching missions of our department, the college, and the university." Dr. Hawley took on the teaching responsibility of an existing course, Ornithology, and transformed a course once characterized by rote memorization of species names and taxonomy into one in which the students become engaged and active-learning community. She has accomplished this through the use of in-class discussions of recent research papers, peer evaluation of grant proposals, videos to demonstrate lecture concepts, and service learning. She also developed a new graduate course, Outreach in Biology, that aims to improve science communication more broadly by teaching scientists-in-training how to effectively communicate their work to the public.



In addition to her teaching, Dr. Hawley maintains a strong research program with a total of more than \$7 million in funding, almost \$3 million as principle investigator. She is also a member of the Fralin Life Institute; her research focuses on ecological and evolutionary factors that affect host immunity and disease dynamics, with a specialization in birds. To date, four graduate students and more than 25 undergraduate students have performed research in the Hawley Lab.

Dr. Hawley received her bachelor's degree from the College of William and Mary, and a Ph.D. from Cornell University.



Advanced Instructor **Michael Rosenzweig** has received the university's 2014 Alumni Award for Outreach Excellence. The award is presented annually to recognize outstanding contributions by Virginia Tech faculty members who have extended the university's outreach mission throughout the commonwealth, the nation, and the world. Recipients receive \$2,000 and are inducted into the Academy of Outreach Excellence. In addition to teaching core undergraduate courses for the department, Dr. Rosenzweig has been the director of the Biological Sciences Outreach Program since 2001, which supports K-12 education and encourages the growth of K-12 participation in research.

Dr. Rosenzweig also founded SEEDS (Seek Education, Explore, DiDiscover), a community education nonprofit organization located in Blacksburg. Since 1995, SEEDS' mission has been inspiring a natural curiosity and a love for the environment in children and the young at heart through discovery learning, nature education, teacher support, and civic awareness. SEEDS provides supplemental curriculum materials to schools and home schooling groups, including kits from the Biological Sciences Outreach Program. SEEDS operates the Blacksburg Nature Center at the historic Price House and gardens in Blacksburg and also offers summer field camps that explore the ecological and cultural resources of various regions.

In 1996, Dr. Rosenzweig organized the first service-learning special study class in biological sciences which engaged Blacksburg High School students in a community-based project to monitor water quality in Stroubles Creek. The final project for the class was a presentation to the Town of Blacksburg engineers to recommend riparian buffers and additional community outreach to improve awareness of the town's main tributary of the New River.

Dr. Rosenzweig received a bachelor's degree from Clark University, and master's and Ph.D. degrees from Virginia Tech.



More Awards

2014 Alumni-Supported Scholarships and Fellowships

Biology Alumni Undergraduate Research Excellence Award: Zachary Gajewski

Ralph E. Carlson Memorial Freshman Scholarship: Heather Lafrance

Ralph E. Carlson Memorial Scholarships in Ornithology (Graduate and Undergraduate): Camillo Escallón (Moore Lab), Sarah Foltz (Moore Lab), Vicki Garcia (Walters Lab), Michelle Jusino (Walters Lab), Sahnzi Moyers (Hawley Lab), and Laura Schoenle (Moore Lab)

Class of '54 Ut Prosim Scholarship: Natalie St. Clair

Class of '56 Ut Prosim Scholarship: Christine Tin

Clinton Wiley Baber Scholarship: David Vasquez

College of Science Dean's Roundtable Award: Jessica Li

Lewis Edward Goyette Scholarship: Alison Kernal Burke (Stevens Lab) and Yan Chen (Popham Lab)

Rachael Hill Memorial Scholarship: Bishal Paudel

Deborah Koller Scholarship: Kelly Drews

Steven D. Lutz Scholarship: Vraj Patel

John Palmer Memorial Scholarship: Kevin Geyer (Barrett Lab)

Patricia C. Perna Scholarship: Jessica Li

Stacey Smith Biology Research Excellence Award: Elizabeth Lee

I.D. Wilson Memorial Scholarship: Jessie Gibbons

Associate Professor **John Barrett** received a 2014 Virginia Tech Excellence in Access and Inclusion Award.

Art Buikema, Daniel Capelluto, Jack Evans, Khidir Hilu, Mike Rosenzweig, and George Simmons all received 2014 Favorite Faculty Awards from the Office of Housing and Residence Life. The award recognizes Virginia Tech faculty members for their outstanding contributions, dedication to students, and personal influence, and is designed as an opportunity to engage faculty members and students in interactions outside of the classroom.

Alison Kernal Burke (Stevens Lab), **Sarah Foltz** (Moore Lab), **Bin He** (Cimini Lab), and **Lukas Landler** (Phillips Lab) received VT Graduate School Doctoral Assistantships.

Assistant Professor **Cayelan Carey** received the 2014 Outstanding Reviewer Award from the Journal of Plankton Research.

Ph.D. students **Sarah Foltz** (Moore Lab) and **James Skelton** (Brown Lab) received NSF Doctoral Dissertation Improvement Awards.

Alexandra Gerling, a graduate student in the Carey Lab, was awarded a 2014 Leo Bourassa Scholarship from the Virginia Lakes and Watershed Association.

In September 2014, Associate Professor **Dana Hawley** was named Teacher of the Week by the VT Center for Instructional Development and Educational Research.

Ph.D. student **Aboozar Monavarfeshani** (Fox Lab) has been named a Virginia Tech Carilion Research Institute Medical Scholar for the second year in a row.

Darya Nesterova (BIOL major) was named the 2014 College of Science Outstanding Graduating Senior.

2014 Faculty-Supported Scholarships and Fellowships

Arthur Buikema and M. Alison Galway Graduate Student Teaching Award
Brad Howard (Lawrence Lab)

Arthur Buikema and M. Alison Galway Outstanding Senior Award
Darya Nesterova

Arthur Buikema and M. Alison Galway Undergraduate Research Award
Carl Levy

Joe and Barbara Cowles Scholarship
Meredith Swartwout

Albert and Sharon Hendricks Undergraduate Excellence Award
Julia Button, Spencer Cesar, Megan Coughlin, and Sergio Patton

Robert Jones Undergraduate Research Excellence Award
David Vasquez

Robert and Marion Paterson Graduate Scholarship
Josh Nicholson



Tamara Fettner, a graduate student in the McGlothlin Lab, was awarded a prestigious NSF Graduate Research Fellowship. The GRF Program helps ensure the vitality of the human resource base of science and engineering in the United States and reinforces its diversity. The program recognizes and supports outstanding graduate students in NSF-supported science, technology, engineering, and mathematics disciplines who are pursuing research-based master's and doctoral degrees at accredited US institutions. Tamara also recently received a 2014 Rosemary Grant Award from the Society for the Study of Evolution.

As a member of the Eleventh Cohort of the VT-PREP program, **Kevin Hughes** worked in the Cimini Lab during the 2013-2014 year. During his year at Virginia Tech, Kevin received two prestigious awards; in May 2014, he won an award for the Most Outstanding PREP Presentation Award at the Second Annual Post-Baccalaureate Research and Education Program and Initiative for Maximizing Student Development Research Symposium at the University of North Carolina. The same month, Kevin received the Stroobants Award for Exemplary Graduate Scholarship in Post Baccalaureate Research and Education. Kevin is currently pursuing a Ph.D. in biomedical and biological sciences at Yale University.



Joshua Nicholson, a Ph.D. student in the Cimini Lab, was named the 2014 Outstanding Doctoral Student by the College of Science. Josh is researching how the aneuploid karyotype affects mitotic chromosome segregation, with particular emphasis on the cancer cell karyotype. He is also the developer of "The Winnower", an open access science publishing platform that employs open post-publication peer review. For more information on the Winnower, visit <https://the-winnower.com>.

Ph.D. student **Hang Zhang** (Xing Lab) won a 2014 Graduate Research Development Program Proposal Award from the VT Graduate Student Assembly.

Xiaolin Zhao, a graduate student in the Capelluto Lab, won the 2014 Best Student Oral Presentation Award in the Structural Biology, Biochemistry & Biophysics Section at the Virginia Academy of Sciences Annual Meeting.

Department of Biological Sciences
Mail Code 0406
1405 Perry Street
Virginia Tech
Blacksburg, VA 24061
(540)231-8930

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

Department of Biological Sciences Annual Fund



One person can make a big difference!

The Department of Biological Sciences has a rich history, a strong international reputation, and a bright future. The department oversees the largest degree-granting program at Virginia Tech, with more than 1700 student majors, and also provides instruction to thousands of students, both within the major and from across the college and university. Our undergraduate and graduate degree programs prepare society's future scientists. And our outstanding faculty members conduct cutting-edge research that impacts society as a whole.

Your support is critical to our success. Any monetary contributions you make could be used to support deserving students, provide necessary equipment, or extend our research activities. This year we are focusing our fundraising efforts on two important funds – The Department of Biological Sciences Research Day Fund (876105) and the Department of Biological Sciences General Fund (881317).

When you receive your College of Science Annual Fund letter or phone call, please earmark your support for the Department of Biological Sciences and one of these special funds. Simply make a notation on the gift card or let the caller know that you want to direct your donation to the Biological Sciences Department and then include the specific fund name and number. To make an immediate contribution, you may visit the university's web site at www.givingto.vt.edu or contact the Office of Gift Accounting at (800) 533-1144.

For more information about these funds or to learn more about other ways to give, please contact Jenny Orzolek, Director of Development for the College of Science, at (540) 231-5643 or jorzolek@vt.edu. We thank you in advance for your support!