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A note from the department head

Welcome to the Biological Sciences newsletter for spring/summer 2018! Another academic year is in the books and it has been another terrific success. In this issue we highlight one of the department's little-known gems, the **Massey Herbarium**, and a number of exciting initiatives launched by its new curator (page 2). We also have much to celebrate in the way of new grants in support of research, several of which you can read about on page 6. And we reflect on a lifetime of achievement and the remarkable career of University Distinguished Professor Emeritus, **John Cairns**, a pioneer in the fields of freshwater ecology and restoration biology, who passed away in November (page 3).

I would like to especially draw your attention to the remarkable accomplishments of our students present and past. This year we once again count a **Goldwater Scholar** among our undergraduates, a remarkable young woman you will meet on page 10. We were also honored to be the home department of the College of Science's **2018 Outstanding Senior and Outstanding Master's Student** and this year's recipients of the **VT Outstanding Dissertation Award** in the STEM Category and the Graduate School's **Service Excellence Award**. Our graduate students also secured an unprecedented number of prestigious awards from foundations and professional societies this year, including an **American Heart Association Predoctoral Fellowship**, an **NIH Ruth L. Kirschstein Predoctoral Award**, and research excellence awards from the **American Ornithological Society**, the **Society for the Study of Evolution**, and the **Virginia Lakes and Watershed Association**. To add to



Dr. J.P. Morgan, Associate Dean of Strategic Initiatives and Graduate Studies, College of Science, with Spencer Bell, 2018 Outstanding Master's Student for the College of Science

these awards, numerous undergraduate and graduate students were recognized with scholarships endowed by our alumni, as you will see on page 11, including the recently-established **Noel Krieg Graduate Fellowship** (see the Fall 2014 newsletter) and the **College of Science Roundtable's Make-A-Difference Scholarship**. Of course, our students are not just demonstrating excellence while in Blacksburg and Roanoke, but are securing outstanding career opportunities once they graduate. You will read about the wonderfully diverse, and sometimes surprising, careers of many of our alumni again in our "Alumni Highlights" section on pages 4 and 5, and also see where our most recent M.S. and Ph.D. students have gone following their defenses, on pages 7 and 8.



Dr. Sally Morton, Dean of the College of Science, with Nicole Ward, 2018 COS Roundtable's Make-a-Difference-Scholarship Awardee, and Dr. Cayelan Carey, Assistant Professor of Biological Sciences (and Nicole's advisor)

As always, we are very grateful that so many of you stay in touch with your Hokie Home Department so that we can watch your careers unfold over the years. Please do send us your news

items, large and small, so that we can continue to share in the lives of our 11,000+ current alumni. We're very proud of all of you!



Brenda S.J. Winkel, Professor and Department Head

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.



Our first Giving Day, March 20, 2018, was a very good success, with 79 donors contributing \$7838 to the Biological Sciences Annual Fund. These are invaluable discretionary funds that the department will use in support of student and faculty recruiting, Research Day, Biology Graduate Student Association picnics, and now, also some new investments in the department's future. A sincere thanks to the many who contributed! The future is indeed bright, thanks to our generous extended family!

News from the Massey Herbarium

By Dr. Jordan Metzgar, Herbarium Curator

The challenge of coupling novel research with public outreach has become an increasingly urgent necessity for researchers everywhere. We live in a society that is driven by technology and scientific discoveries, yet there is an increasing gulf between scientists and the broader public. That fissure has led to frequent ignorance and even contempt or distrust of scientists. This challenge is particularly urgent at Virginia Tech with its land-grant university status and guiding philosophy of *Ut Prosim*.



The Massey Herbarium has been located in the Biological Sciences department since 1927 and has long excelled at research. Our collection has amassed over 115,000 scientific specimens of plants and fungi that have contributed to many research projects over the decades. These specimens have been used in over 600 peer-reviewed scientific publications that have been cited in excess of 13,000 times. To put that in more accessible terms, that is 25% higher than the average Nobel Prize winner!

We've recently begun to expand our outreach program to share what we have discovered about Virginia's plants with the public. Some of these efforts are online, like our new website (<https://www.masseyherbarium.org/>) and social media accounts (@MasseyHerbarium). We have mainly focused on talking with New River Valley residents about the local flora.

This included our very first public exhibit! We hosted the Library of Virginia's travelling Flora of Virginia exhibit during the spring semester and partnered with other campus and community organizations to sponsor events across the area. The exhibit commemorates the 2012 publication of the Flora of Virginia. This text covers 3,164 species and is the first comprehensive guide to Virginia's plants published since the 1700s. The Massey Herbarium's staff and specimens were involved in many aspects of its creation.

Our Derring Hall exhibit included the Library of Virginia's panel displays on the history of the flora project. We also created displays with some of our more note-worthy specimens and hands-on collecting objects for visitors to examine. We partnered with the University Libraries' Special Collections to exhibit an original copy of *Flora Virginica* from 1762, along with period artwork of the Virginian flora. We also sponsored a visit from VT alumna and flora illustrator **Lara Call Gastinger** to give a workshop on botanical illustration at the Hahn Botanical Garden. The most enjoyable event was our Botanical Bricks Contest! Local youth could enter their plant-based Lego photographs and builds for judging to win Lego prizes. We received dozens of great entries.

We have also worked extensively with the New River Valley Chapter of the Master Naturalists. This active group has members volunteering for many different environmental programs. Members started working with the herbarium at our booth at the VT Science Festival. Many then attended our first Specimen Transcription Day to help database our specimens and make them globally accessible online.

We also taught a weekly lesson at the Chapter's Junior Naturalists after-school program for elementary-aged children in an underserved neighborhood of Blacksburg. These kids were really excited to see actual museum specimens and to make their own miniature versions to take home. They were most excited to spin the Botanical Wheel of Destiny and win plant-themed stickers and temporary tattoos!



Probably our most rewarding effort has been helping to form the campus Natural History Collections Club (@NHCCatVT on social media). These students are passionate about natural history museums and have joined together to support the herbarium and other natural history collections on campus (e.g., Museum of GeoSciences, mammal collection, entomology collection). The students have worked with the herbarium in many ways, including work nights where they help process backlogged specimens and prepare materials for outreach events. They also have collected new specimens, staffed our booth at outreach events, and inspired the natural history curators to create a new museum internship course. My favorite event was their herbarium movie night, where we watched the 1971 movie "A New Leaf," starring Elaine May and Walter Matthau.

Our outreach activities over the past year have given us the opportunity to discuss botany and the herbarium with thousands of people in the New River Valley. These efforts are the beginnings of our work to improve science in the general public. Please visit our social media accounts online and visit us in person on the 3rd floor of Derring Hall the next time you are in Blacksburg!

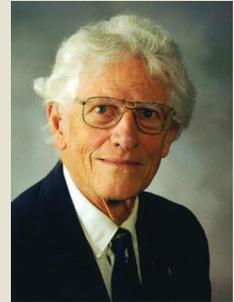


In Memoriam: John Cairns, Jr.

Written by Steven Mackay, Communications Director, College of Science

John Cairns Jr., a University Distinguished Professor Emeritus of Environmental Biology, died Sunday, November 5, 2017, in Blacksburg. He was 94.

Cairns joined the Virginia Tech faculty in 1968, having previously worked as curator of limnology at the Academy of Natural Sciences in Philadelphia from 1948 to 1966, and then a professor of zoology at the University of Kansas from 1966 to 1968.



At Virginia Tech, he taught more than 20 courses, including protozoology, limnology, ecotoxicology, restoration ecology, ethics in science, hazard evaluation, and ecosystem risk analysis. He chaired or co-chaired more than 70 graduate committees, most at Virginia Tech. He also spent portions of every summer from 1961 to 1994 teaching at either the Rocky Mountain Biological Laboratory or at the University of Michigan Biological Station.

His research in what is now the Department of Biological Sciences, part of the College of Science, focused primarily in ecotoxicology, ecological restoration, protozoan community dynamics, and, for more than 20 years of his career, sustainable use of the planet. Cairns retired from Virginia Tech in 1995 as director of the University Center for Environmental and Hazardous Materials Studies.

In 1991, Cairns was named to the National Academy of Sciences and received the Virginia Lifetime Achievement in Science Award. He was also an elected member of the American Philosophical Society and the American Association for the Advancement of Science, a foreign member of the Linnean Society of London, and received the U.S. Presidential Commendation for Environmental Activities, among many other honors and awards.

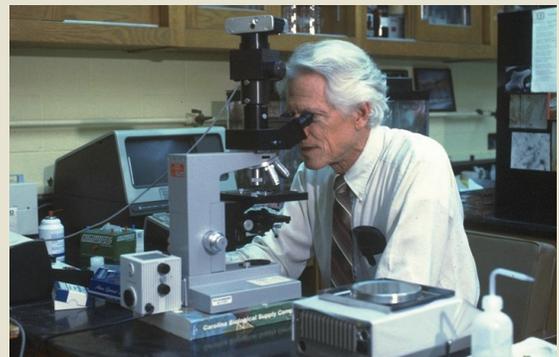
In retirement, Cairns continued to be a prolific writer of books and peer-reviewed journal articles. Among the books was the online “Goals and Conditions for a Sustainable World,” the second edition of “Ecotoxicology,” and “Eco- and Sustainability Ethics and An Odyssey through Stressed Ecosystems: A Continuing Scientific Detective Story.” In all, he authored close to 1,800 articles and solely wrote, edited, or contributed to 65 books.

Found on his personal website in a biographical sketch was this statement by **Darla Donald**, Cairns’ assistant for 40 years: “[He] lived and portrayed a life that reflects Mother Theresa’s message and that of his Quaker heritage: ‘Live simply so others may simply live.’”

The biography continued, “Internationally, [Cairns was] revered for his contributions to ecotoxicology, for his seminal work in ecological restoration, and for his renowned work in protozoology and microbial ecology and their application to environmental problems.”

“Dr. Cairns was my mentor,” said **William T. Waller**, a University of North Texas Regents Professor Emeritus. “I was a Ph.D. student of Cairns’ at the University of Kansas. One day, I was working in the lab and Dr. Cairns entered and announced he was moving to Virginia Tech, and he wanted me to move with him. I was pretty shocked and went home to tell my wife. We started looking through all the information we could find on Virginia Tech. Like where in the heck is Blacksburg, Virginia? We arrived at Virginia Tech in 1968, the year before Derring Hall was completed, along with fellow graduate students, **Kenneth L. Dickson**, **Richard Sparks**, **Guy Lanza**, and **Jeanne Ruthven**, all of whom received their Ph.D. degrees under Dr. Cairns’ tutelage. My experiences at Virginia Tech under Dr. Cairns’ were better than I could have ever imagined. We will miss him.”

Cairns earned a bachelor’s degree from Swarthmore College and master’s and doctoral degrees from the University of Pennsylvania. He completed a postdoctoral course in isotope methodology at Hahnemann Medical College of Philadelphia. He served in the U.S. Navy during World War II.



For additional information on Dr. Cairns’ fascinating life and legacy, visit <http://www.johncairns.net>

Alumni Spotlights



Allen Albright received a B.S. in Biology from Virginia Tech in 1984, a Ph.D. in Microbiology & Immunology from Uniformed Services University (USUHS) in 1994, and completed postdoctoral studies at the Johns Hopkins School of Medicine in 1995. Over the last 20 years, Dr. Albright has been involved in drug development Regulatory Affairs

having started his professional career at the US Food and Drug Administration (FDA) as a Regulatory Review Scientist and then transitioning to the private sector side at several biopharmaceutical companies with a focus on oncology drug development and approval, including Amgen, Astellas, Anadys Pharmaceuticals, and Halozyme Therapeutics. He is currently Head of Regulatory Affairs and Quality Assurance at Mirati Therapeutics in San Diego, California.



Nancy Gladson Diersing received a B.S. in Biology from Virginia Tech in 1979, and an M.S. in Zoology from Virginia Tech in 1982. She is currently a Science Interpreter at the Florida Keys National Marine Sanctuary. From the sanctuary website: "As the science interpreter for the sanctuary, Nancy works with outreach/education and science staff to develop materials and share information

about scientific research related to managing the sanctuary's natural resources. When not participating in an interagency committee meeting, staffing an outreach booth, or giving a slide presentation, Nancy is busy developing Science Summaries and other materials designed to communicate research results to interested stakeholders. She also manages the Florida Keys section of the sanctuary's online media library featuring photographs of marine life, maritime artifacts and people who live and work in the sanctuary."



Christopher Curfman received a B.S. in Biology from Virginia Tech in 1994, an M.S. in Chemistry from VT in 1996, a Ph.D. in Organic Chemistry from Emory University in 2000, and a J.D. in Patent Law from the Georgia State University College of Law in 2004. He is a founding principal of Meunier Carlin

& Curfman LLC in Atlanta, GA. His practice focuses on, "all aspects of patent prosecution and litigation in chemical and biotechnology related technologies.... His peers in the legal community voted him a Georgia Super Lawyer Rising Star for 2006, 2012, 2013, and 2014. Chris is also an adjunct professor of law at Emory University."

Cherise La Guardia Bogue received a B.S. in Biology in 2007 and an M.A. in Secondary Education and Teaching in 2009, both from Virginia Tech. She is currently an 8th Grade Science Teacher at Peasley Middle School in Gloucester, Virginia. She is also the school's Assistant Basketball Coach and Yearbook Advisor. In 2015, she was named Peasley Middle School's Teacher of the Year!



Ryan Althoff received a B.S. in Biological Sciences from Virginia Tech in 2001. He is currently a Senior Sales Representative specializing in microplate instruments and fluorescent microscopes for BioTek Instruments in Atlanta, GA. From their web site: "BioTek Instruments, Inc., headquartered in Winooski, VT, USA, is a worldwide leader in the design, manufacture, and distribution of innovative life science instrumentation. Our comprehensive product line includes cell imaging systems, microplate readers, washers, dispensers, automated incubators, stackers and pipetting systems."



Sabriya Stukes received her B.S. in Biological Sciences, with a concentration in Microbiology and Immunology, from Virginia Tech in 2005. As an undergraduate, she worked in **Brenda Winkel's** lab researching point mutations in genes of the flavonoid pathway in *Arabidopsis thaliana*. She was then



awarded a post-baccalaureate fellowship at the National Institutes of Health characterizing genetic differences in macaque alleles before and after infection with HIV in the laboratory of Dr. Bernard LaFont. A year later, she found herself researching *Mycobacterium tuberculosis* and the effect it has on the activation of immune cells at the NYU Langone Medical Center under the mentorship of Dr. Joel Ernst. She recently earned her doctoral degree in Biomedical Sciences at The Albert Einstein College of Medicine in the laboratory of Dr. Arturo Casadevall. Her work centered on understanding the mechanisms behind the host-pathogen interactions between macrophages and the fungal pathogen *Cryptococcus neoformans*. Outside of the lab, she is actively involved in many organizations and committees that help to increase diversity and awareness in the science fields for women and underrepresented minority communities. She is also interested in science communication and crafting better science stories.



Sean Gimber received a B.S. in Biological Sciences from Virginia Tech in 2014. He is currently an Associate Scientist with PPD (Pharmaceutical Product Development) in the Richmond, Virginia area. From the company website: “PPD is a leading global contract research organization providing comprehensive, integrated drug development, laboratory and lifecycle management services. Our clients and partners include pharmaceutical, biotechnology, medical device, academic and government organizations. With offices in 47 countries and more than 19,000 professionals worldwide, PPD applies innovative technologies, therapeutic expertise and a firm commitment to quality to help clients and partners bend the cost and time curve of drug development to deliver life-changing therapies that improve health.”



Christie Maszkiewicz received a B.S. in Biology from Virginia Tech in 2003, and an M.S. in Applied Sciences – Biology from Colorado State University-Pueblo, in 2008. From 2007 to 2015, she worked as an Environmental Health Specialist and later as an Emergency Preparedness and Response Coordinator for the El Paso County (Colorado)

Public Health Department. She is currently a Cytogenetic Technologist-FISH (Fluorescence in Situ Hybridization) Trainee for LabCorp, “The world’s leading health care diagnostics company,” in the Raleigh-Durham, North Carolina area.



Dipan Oza received a B.S. in Biological Sciences from Virginia Tech in 2011. As an undergraduate, he conducted research in **Khidir Hilu’s** lab. After leaving Virginia Tech, he went to St. George’s University, Grenada, where he received an M.S. in Public Health. Dr. Oza conducted his research in India with a team that

was involved in establishing diabetes and hypertension screening camps to identify undiagnosed people and to raise awareness of the insidious onset of both of those diseases and their risk factors in the area. His primary project involved working on developing a protocol with the Grenada Health Department to reduce hospital waste (specifically by reducing unnecessary repeat lab tests). He started Medical School at St. George’s in 2013, and after two years moved to do two more years of clinical rotations at NYU-Brooklyn and New York Presbyterian Brooklyn Hospital. Dr. Oza is currently a first-year Internal Medicine Resident at St. Agnes Hospital in Baltimore.

Elizabeth Hepner received a B.S. in Biological Sciences from Virginia Tech in 2012. She worked as an undergraduate researcher in **Lisa Belden’s** lab for three years. After graduating, she went stayed in Blacksburg and in 2016 earned both an MPH in Public Health (with an Infectious Disease Concentration) and a DVM. She is currently a Veterinarian at Calvert Veterinary Center in Pasadena, Maryland.



Derrick Scott received a B.S. in Biology from Virginia State University in 2004, an M.S. in Biological Sciences from Virginia Tech in 2009, and a Ph.D. in Molecular Biology from the University of South Carolina at Columbia in 2014. At VT, he defended his thesis in **Christopher Lawrence’s** lab when it was located



at VBI. He is currently a tenure-track assistant professor of bioinformatics at Delaware State University. He is co-PI on a recent \$443K, four-year NSF grant, funded through the EPSCoR program (Experimental Program to Stimulate Competitive Research). The grant is entitled, “Advanced biomanufacturing: Catalyzing improved host development and high quality medicines through genome to phenome predictions.”



Sharmistha Mitra received a B.S. in Zoology/Animal Biology from the University of Calcutta in 2006, a B.S. in Cell and Molecular Biology from the University of New Hampshire in 2008, and a Ph.D. in Structural Biology / Biological Sciences from Virginia Tech in 2013, working with **Daniel Capelluto**. After leaving Virginia Tech, she worked

as a postdoc at the Baylor College of Medicine and as a research associate at the Indian Institute of Science. Since July 2017, she has worked as a postdoctoral researcher at the University of Texas Southwestern Medical Center at Dallas in the field of pediatric neurology. She is currently investigating ubiquitination and its role in human diseases.

We love hearing from our alumni! Drop a note to vsutherl@vt.edu to let us know about your time at Virginia Tech, and what you’re doing now!

New Grants

Collaborative Research: Consequences of changing oxygen availability for carbon cycling in freshwater ecosystems (National Science Foundation, 4 years, \$1,000,000)



Principal Investigator: **Cayelan Carey** (Assistant Professor of Biological Sciences); Co-PI's: Madeline Schreiber (VT-GEOS), John Little (VT-CEE), Paul Hanson (UW-Madison), Francois Birgand (NC State)

The project examines how fluctuating oxygen conditions due to land use and climate change are altering the role of reservoirs as carbon sinks in the landscape. The Carey Lab will be working closely with Roanoke's water utility to conduct whole-ecosystem oxygenation experiments in Falling Creek Reservoir, the lab's focal study site.

Hot Spot Analysis of the Breast Cancer Susceptibility Protein

(National Cancer Institute/National Institutes of Health, 5 years, \$2,505,023)

Principal Investigator: **Deborah Kelly** (Associate Professor of Biological Sciences/VTCRI)

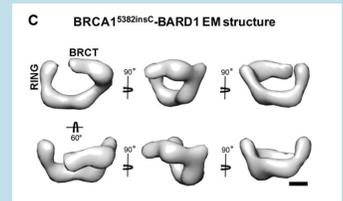
Hereditary breast cancer is a genetic disease for which there is no precise form of targeted therapy. This project will investigate the molecular actions of the breast cancer susceptibility protein, BRCA1, that is heavily linked to hereditary forms of breast and ovarian cancer. Using state-of-the-art imaging tools, the Kelly Lab will investigate BRCA1's actions in the cell's nucleus and determine how specific errors in the protein fuel cancer susceptibility.

Multi-scale imaging of breast cancer proteins during DNA Repair

(National Cancer Institute/National Institutes of Health, 5 years, \$2,100,000)

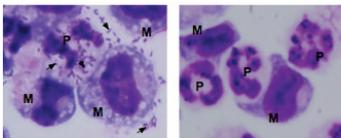
Principal Investigator: **Deborah Kelly** (Associate Professor of Biological Sciences/VTCRI)

This project will integrate multi-scale imaging tools with molecular and cellular biology approaches to investigate the functional role of BRCA1 during last-resort transcriptional repair processes. The Kelly Lab expects to uncover new clinical paradigms to outsmart cancer based on mechanistic targeting.



Altered innate leukocyte programming dynamics in sepsis

(National Institutes of Health, 5 years, \$2,012,500); Principal Investigator: **Liwu Li** (Professor of Biological Sciences)



M: Macrophage; P: Neutrophil; Arrow: Bacteria

Sepsis poses grave health concerns with no effective prevention or cure. The key stumbling block is the highly complex nature of the disrupted innate leukocyte homeostasis. The goal of this project is to characterize novel mechanisms underlying the disrupted homeostasis of innate monocytes and neutrophils, as well as a novel strategy to modulate innate leukocyte homeostasis.

Specificity of chemotaxis-driven motility in *Sinorhizobium meliloti* host interaction

(National Science Foundation, 3 years, \$991,000)

Principal Investigator: **Birgit Scharf** (Associate Professor of Biological Sciences); Co-PI's: **Florian Schubot** (Associate Professor of Biological Sciences), Richard Helm (Associate Professor of Biochemistry)

Using the Alfalfa-*S. meliloti* interaction as a model system, this project aims to elucidate the molecular mechanisms that govern legume-rhizobia communications. Understanding these mechanisms could open important new avenues for addressing daunting agricultural and environmental issues. This research will characterize *S. meliloti* chemoreceptors for which we lack a functional understanding. In an orthogonal approach, this research will define the nature of plant-derived compounds responsible for the recruitment of *S. meliloti* to the host rhizosphere.



Recent Defenses

Summer/Fall 2016:

Ph.D.: **Xiaolin Zhao** (Capelluto Lab) "Structural basis of membrane targeting of the innate immunity adaptor TIRAP by its phosphoinositide binding motif." (Currently Project Manager for Creative-Biomart in Shanghai)

Ph.D.: **William Hendrick** (Melville Lab) "Molecular Analysis of Type IV Pilus Assembly in *Clostridium perfringens*." (Currently an Associate Scientist with Sygenta Crop Protection in Durham, NC)

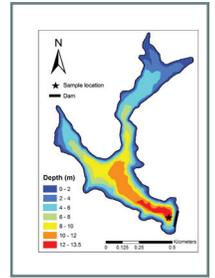
M.S.: **Kate Hamre** (Carey Lab) "Responses of bloomforming phytoplankton populations to changing reservoir chemistry and physics." (Currently a Science Instructor/Tutor and Watercolor Artist in Portland, OR)

Ph.D.: **Benjamin Webb** (Scharf Lab) "Elucidation of the specificity of *S. meliloti* chemoreceptors for host derived attractants." (Currently a Program Coordinator at the Pali Institute for Outdoor Education in San Bernardino, CA)

Ph.D.: **Tatpong Tulyananda** (Nilsen Lab) "Vegetative anatomy of *Rhododendron* with a focus on a comparison between temperate and tropical species." (Currently a Lecturer/Faculty of Science at Mahidol University in Bangkok, Thailand)

Ph.D.: **Sally Zemmer** (Belden Lab) "Trematode communities of the Appalachian stream snail, *Elimia proxima*: the importance of scale in parasite ecology research."

Ph.D.: **Michael Painter** (Phillips Lab) "Magnetoreception in mammals: From biophysics to behavioral ecology and back again." (Currently a Researcher in the Department of Game Management and Wildlife Biology at Czech University of Life Sciences, Prague)



Spring/Summer 2017:



Ph.D.: **Tristan Hayes** (Lawrence Lab) "Characterizing the immune response of human airway cells to Alt a 1, a unique fungal allergen." (Currently an NIH Postdoctoral Fellow at the University of Indiana School of Medicine)

Ph.D.: **Samuel Schiffhauer** (Finkielstein Lab) "Crosstalk signaling between circadian clock components and iron metabolism." (Currently a Scribe at Carilion Clinic in Roanoke, VA)

Ph.D.: **Skylar Hopkins** (Belden Lab) "Multi-scale transmission ecology: how individual host characteristics, host population density, and community structure influence transmission in a multi-host snail symbiont system."

(Currently a Postdoctoral Associate at the University of California Santa Barbara)

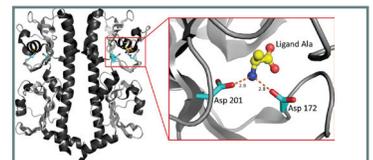
M.S.: **Samantha Murray Soncini** (Melville Lab) "Characterization of type IV pilus system genes and their regulation in *Clostridium perfringens*." (Currently working as a Lab Technician in the Schmidt Lab, Department of Microbiology and Molecular Genetics, University of Pittsburgh School of Medicine)

M.S.: **Kevin Eliason** (Benfield Lab) "The short term responses of benthic macroinvertebrates to the removal of riparian *Rhododendron* in southern Appalachian streams." (Currently a Ph.D. student at West Virginia University)

M.S.: **Matthew Hedin** (Barrett Lab) "The response of soil microbial communities to antibiotic residues in dairy cattle manure." (Currently a Ph.D. student in Biological Sciences at Virginia Tech)

Ph.D.: **Sahnzi Moyers** (Hawley Lab) "Behavioral heterogeneity and disease dynamics in house finches (*Haemorhous mexicanus*)."

Ph.D.: **Laura Schoenle** (Moore Lab) "Coping with chronic infection: The role of glucocorticoid hormones in mediating resistance and tolerance to parasites." (Currently a Postdoctoral Scholar at the University of South Florida and Hamilton College)



M.S.: **Valerie A. McDonald** (Hrubic/Sible Labs) "Evaluating the immunotoxicity of quaternary ammonium compounds." (Currently a Research Associate in the Hrubic Lab, Virginia College of Osteopathic Medicine)

Fall 2017/Winter 2018:

Ph.D.: **An Duong** (Stevens Lab) "Investigation of *Pantoea stewartii* quorum-sensing controlled regulators and genes important for infection of corn." (Currently a Postdoctoral Fellow at the University of Arizona)

(continued on page 8)

Congratulations to our retiree and to all of our award winners!



Professor Emeritus **E. Fred Benfield** retired from Biological Sciences this spring after 47 years at Virginia Tech; for 17 of those years, he served the department as associate department head. Dr. Benfield and Professor Emeritus **Jack Webster** are the founders of Virginia Tech's Stream Team/Ecosystem Research Group, which is a collection of biology professors and students who study different aspects of ecosystem ecology. His research has focused on the responses of stream systems to current and historical land-use change as reflected by ecosystem level processes and biodiversity; he has authored over 100 publications and presented many papers at national and scientific meetings.

Dr. Benfield's teaching assignments have included general biology, zoology, ecology, and freshwater ecology, and he has advised undergraduate students, helping them through their program at Virginia Tech and guiding them in their development of successful careers after graduation. During his career in Biological Sciences, Dr. Benfield acted as the graduate advisor for 16 masters and 16 doctoral students, and also served on graduate advisory committees in multiple department and colleges. He has served extensively on committees and editorial boards of several professional societies including, serving as president of the Society for Freshwater Science in 1994-1995. In 2012, he received the Distinguished Service Award for his many contributions to the Society.

Assistant Professor **Frank Aylward** has been selected as a 2018 Alfred P. Sloan Research Fellow in Ocean Sciences. Recipients of these prestigious fellowships will receive an award of \$65,000, which Dr. Aylward will use to fund personnel in his lab and to purchase a server for computational genomic research. The Sloan Research Fellowship announced this year's winners in a full-page advertisement in the *New York Times*. The awards seek to stimulate fundamental research by early-career scientists and scholars of outstanding promise in the fields of chemistry, computational or evolutionary molecular biology, computer science, economics, mathematics, neuroscience, ocean sciences, or physics. Dr. Aylward's current research focuses on understanding the processes that shape the structure and function of microbial communities.



Assistant Professor **Cayelan Carey** is the recipient of the 2018 Yentsch-Schindler Early Career Award from ASLO, the Association for the Sciences of Limnology and Oceanography. The significant award honors an early-career scientist for outstanding and balanced contributions to research, science training, and broader societal issues such as resource management, conservation, policy, and public education. From the ASLO website: "Carey's nominators noted that her "fundamental ecological research ties naturally and seamlessly to both her pedagogical interests and to her outreach to environmental managers. This integrative and balanced approach to science is what the Yentsch-Schindler Award is all about. Cayelan is an excellent example of an early career researcher who excels in all aspects of her career. We are thrilled to acknowledge her accomplishments with this award," said ASLO President Linda Duguay."

Recent Defenses (continued from page 7)

Ph.D.: **Rafael Castaneda Saldana** (Scharf Lab) "Characterization of the *Sinorhizobium meliloti* chemotaxis system." (Currently Greenhouse and Sales Manager at Riverbend Nursery in Riner, VA, and in the process of applying for a teaching position at New River Community College.)

Ph.D.: **Jason Lancaster** (Tholl Lab) "Identification and functional characterization of sesquiterpene pheromone biosynthetic genes in stink bugs (Pentatomidae)." (Currently a Staff Fellow at the US Food and Drug Administration)

M.S.: **Nicole Smith** (Lazar Lab) "Use of kinase inhibitors to illuminate signaling pathways in breast cancer." (Currently an M.D. student at the University of Arkansas)

Spring 2018:

Ph.D.: **Manisha Shrestha** (Schubot Lab) "Mechanistic studies of the roles of the transcriptional activator ExsA and anti-activator protein ExsD in the regulation of the type three secretion system in *Pseudomonas aeruginosa*."

Ph.D.: **Jonathan Doubek** (Carey Lab) "The effects of hypoxia on zooplankton communities in lakes and reservoirs." (Starting a postdoctoral position at the University of Vermont)

M.S.: **Spencer Bell** (Brown Lab) "An invasion in Mountain Lake: Impacts of invasion on native symbiotic systems." (Starting a Ph.D. program with advisor Jennifer Howeth at the University of Alabama)

M.S.: **Mengyao Luo** (Lawrence Lab) "Innate immune responses in the *Alternaria*-dendritic cell interaction." (Starting a Ph.D. program in Bioinformatics and Computational Biology at the Worcester Polytechnic Institute in Massachusetts.)

M.S.: **Andreas Sukmana** (Yang Lab) "Understanding PilB, the type IV pilus assembly (T4P) ATPase."

Ph.D.: **Jingren Deng** (Lazar Lab) "Microfluidic approaches for probing protein phosphorylation in cells." (Starting an M.B.A./M.P.H. program at Boston University)



Professor **Ann Stevens** is one of the winners of the **2018 William E. Wine Award**, in recognition of “a history of university teaching excellence.” During her time on the faculty, she has not only amassed a long list of consistently outstanding student teaching evaluations, but was a major force in establishing the new Microbiology degree in our department, has been recognized out by her graduate students for her mentoring, and has been characterized by colleagues as a leader in microbiology education at the national level. Dr. Stevens is the department’s sixth Wine Award winner, joining **Noel Kreig** (1967), **Bob Benoit** (2002), **Art Buikema** (2003), **Jack Webster** (2012), and **Brent Opell** (2015) as a member of this elite group.

Senior Instructor **Mary Lipscomb** was selected to receive a **2018 College of Science Certificate of Teaching Excellence**. The chair of the college honorifics committee wrote, “We were extremely impressed with her dossier.” Dr. Lipscomb has been a leader in re-envisioning instruction in our department, a major force behind conversion of the freshman lecture courses to an active learning format, and among the first to develop online courses for both summer and winter sessions, in addition to carrying an enormous teaching and advising load each semester. These are truly outstanding contributions that benefit many many students!



Spencer Bell, a graduate student in **Bryan Brown’s** lab, has been selected as the **2018 Outstanding Master’s Student for the College of Science**; he defended his thesis, entitled, “An invasion in Mountain Lake: Impacts of invasion on native symbiotic systems,” this spring. Spencer’s academic interests range from understanding dispersal patterns of branchiobdellids between crayfish to determining how crayfish/branchiobdellid interactions shift based on environment. His specific interests focus on changes in cambarid and orconectid crayfish behavior in response to branchiobdellid attachment, also based on water conditions. This work fits under the larger umbrella of invasive species effects, an area of growing importance as environmental pressures continue to accelerate.

Ellen Garcia, a Ph.D. student in **Daniela Cimini’s** lab, has been awarded the **2018 Outstanding Graduate Student Service Excellence Award**. She was selected based on service and outreach work she performed in 2017. In a project that started in the spring and was completed at the beginning of fall, Ellen developed and set up a permanent exhibit at the SEEDS - Blacksburg Nature Center. The exhibit teaches elementary and middle school students about cell division through the use of microscopes and time-lapse movies of real cells. It will no doubt impact many young community members for years to come. Ellen already has ideas for expanding the exhibit and developing specific modules that can be brought to schools in Montgomery and neighboring counties.



Last year, Ellen also worked on making the Cimini Lab more aligned with sustainability measures and, thanks to her efforts, the lab received a “Silver Green Lab” certification in fall 2017 through the “My Green Lab” program. In the fall, Ellen started collaborating with staff at the Biocomplexity Institute to expand sustainability practices to other labs in the building and eventually to other buildings on campus.



Skylar Hopkins, a former graduate student in **Lisa Belden’s** lab, is this year’s recipient of Virginia Tech’s **Outstanding Dissertation Award in the Science, Technology, Engineering & Mathematics Category**. Dr. Hopkins’s dissertation, entitled, “Multi-scale transmission ecology: how individual host characteristics, host population density, and community structure influence transmission in a multi-host snail symbiont system,” was successfully defended in April 2017. Dr. Hopkins has already authored three papers and an invited review from her Ph.D. work, with two more manuscripts on the way. In June 2017, she took up postdoctoral position at the National Center for Ecological Analysis and Synthesis in Santa Barbara, CA, where she is continuing this strong trajectory.



Nicole Ward, a Ph.D. student in **Cayelan Carey’s** lab, has been awarded the **2018 College of Science Dean’s Roundtable Make-A-Difference Scholarship**. The scholarship honors an outstanding graduate student who will make a difference in the college and the world through research and devotion to scientific excellence. Her Ph.D. research uses field data and experimentation in conjunction with simulation models to study lake water quality responses to changing land use and climate.

Patrick Calhoun, a Ph.D. student in **Jamie Smyth’s** lab, has been awarded a highly competitive **American Heart Association Predoctoral Fellowship Award** for his work on mechanisms of adenoviral myocarditis. His grant is entitled, “Adenovirus targets cardiac gap junctions to facilitate viral replication,” and the work he has completed reveals that viruses target gap junction expression to limit communication of the intrinsic cellular antiviral response. Patrick joined the Smyth Lab as an undergraduate in 2014 and transitioned to the Biological Sciences graduate program in 2016.





Jessica Hernandez, a Ph.D. student in **Ignacio Moore's** lab, has been awarded the **2018 Joseph Grinnel Research Award from the American Ornithological Society**. The society gives just ONE such award each year, in support of "beginning research efforts of doctoral students in their first or second year of enrollment, in any aspect of avian biology." Jess is studying a free-living population of box-nesting tree swallows to understand the relationship between extra-pair copulations and pathogen dynamics in a wild avian population.

Jess (L) and **Kerry Gendreau (R)**, a Ph.D. student in **Joel McGlothlin's** lab, are both recipients of inaugural **Graduate Research Excellence Grant (GREG) R.C. Lewontin Early Awards from the Society for the Study of Evolution**. The award is intended to assist students in the early stages of their Ph.D. programs by enabling them to collect preliminary data (to pursue additional sources of support) or to enhance the scope of their research beyond current funding limits (e.g. by visiting additional field sites, or working at other labs). Kerry is investigating the evolutionary arms race between toxin-harboring newts and their snake and bird predators.



Udaya Sree Datla, a Ph.D. student in the Translational Biology, Medicine, and Health (TBMH) program, and a member of **Caroline Jones's** Lab, is the recipient of the **2018-2019 David W. and Lillian Francis Scholarship**. This prestigious award provides graduate fellowships for research emphasizing longer, safer, healthier lives. It carries a stipend of \$22,500, and tuition is covered for one academic year. Udaya's research focuses on engineering novel microfluidic platforms and biosensors to precisely quantify immune cell decision-making dynamics during infection.



Carissa James, a TBMH Ph.D. student in **Jamie Smyth's** lab, is a recipient of a **National Institutes of Health F31 Ruth L. Kirschstein Predoctoral Fellowship**. One of the NIH's training awards, the highly selective Kirschstein fellowship is conferred to top U.S. graduate students in health science-related fields. It supports mentored health and biomedical research training, dissertation research, and the graduate program in which the student receives training. Research in the Smyth Lab focuses on understanding the molecular and cellular basis of heart disease.

Mary Lofton, a Ph.D. student in **Cayelan Carey's** lab, received the **2017-2018 Leo Bourassa Award from the Virginia Lakes and Watershed Association** for her research on the effects of water quality management on phytoplankton blooms in reservoirs. The award specifically recognized Mary's contributions to the field of water resources in Virginia. She has been monitoring the water quality of several reservoirs in southwestern Virginia and is studying the effects of global change, especially storms, on phytoplankton ecology, working in close collaboration with the Western Virginia Water Authority in Roanoke.



Brynn O'Donnell and **Stephen Plont**, M.S. students in Erin Hotchkiss's Lab, each received a \$1000 endowment award from the **Society of Freshwater Science**. These grants are awarded annually to top-ranked graduate student research proposals. Brynn's proposal is entitled, "Process resilience following a storm pulse disturbance: Linking metabolic and nitrogen uptake recovery," and Stephen's proposal is entitled, "Moving beyond the stream reach: Linking energy flow and nutrient cycling."



Arianna Krinos, an undergraduate researcher in **Cayelan Carey's** Lab (and formerly in **Lisa Belden's** Lab), and triple major in biological sciences, computer science, and computational modeling and data analytics, was named a **2018 Goldwater Scholar**. The Goldwater Scholarship is the most prestigious undergraduate award of its type in the fields of natural sciences, mathematics, and engineering. This year's 211 scholars were selected based on academic merit from a field of 1,280 students nominated from the over 2,000 eligible colleges and universities nationwide. Arianna's research focuses on the use of computer models and quantitative tools, such as bioinformatics and data analytics, to describe and predict changes in freshwater ecosystems.

Tyler Miller, a biological sciences major and undergraduate researcher who graduated this semester, was named the **2018 College of Science's Outstanding Senior**. Tyler's research work and volunteerism efforts at Virginia Tech have all been geared toward disease, health, and the evolution of biological systems. In **Joel McGlothlin's** lab, Miller studied how certain garter snakes are able to eat highly toxic, rough-skinned newts. He has also volunteered in the field of medicine, both in the U.S. and abroad. This summer, Tyler is beginning classes at the University of Pittsburgh School of Medicine, with the goal of eventually working as a pediatrician and helping children and families who are going through medical hardships.



2018 Biological Sciences Awards and Scholarships

Undergraduate Awards and Scholarships

Arthur Buikema and M. Alison Galway Outstanding Senior Award (Established by Alumni Distinguished Professor Emeritus **Art Buikema** and wife **Alison Galway**; presented to a graduating senior in recognition of academic achievement, leadership and service): **Tyler Miller**

Arthur Buikema and M. Alison Galway Undergraduate Research Award (Established by Alumni Distinguished Professor Emeritus **Art Buikema** and wife **Alison Galway**; presented to outstanding undergraduate researchers): **Philip Stauffer**

Ralph E. Carlson Memorial Freshman Scholarship (Established by the late **Elizabeth Bailey Carlson** in honor of her husband, Ralph E. Carlson, former professor in the Pamplin College of Business; awarded to first-year students in Biological Sciences with high academic achievement): **Jayali Samarasinghe**

Ralph E. Carlson Memorial Scholarship in Ornithology (Established by the late **Elizabeth Bailey Carlson** in honor of her husband, **Ralph E. Carlson**, former professor in the Pamplin College of Business; awarded to Biological Sciences students pursuing careers in ornithology): **Catherine Hucul**

Joe and Barbara Cowles Scholarship (Established by Professor Emeritus of Biological Sciences and Former Department Head **Joe Cowles** and his wife and former Associate Director of the VT University Honors Program, **Barbara Cowles**; awarded to undergraduate students who are planning to enter the fields of nursing, teaching, professoriate, or research): **Steve Nguyen**

Rachael Hill Memorial Scholarship (Established in honor of student **Rachael Elizabeth Hill**, who died during the tragic April 16, 2007 shooting at Virginia Tech; awarded to rising sophomore undergraduates with an high academic achievement and a record of University or community involvement): **Jordan Selep** and **Jesse Pinkman**

Robert Jones Undergraduate Research Excellence Award (Supported with a fund established by former Professor of Biological Sciences and Department Head **Robert H. Jones**; awarded to outstanding undergraduate researchers in Biological Sciences): **Evan Littleton**

Deborah Ayers Koller Scholarship (Established by alumna **Deborah Ayers Koller**; awarded to Biological Sciences students with high academic achievement who are aspiring to pursue a career in research): **Arianna Krinos** and **Philip Stauffer**

Stephen D. Lutz Scholarship (Established by alumnus **Stephen Lutz**; awarded to Biological Sciences students who are Virginia residents and have high academic achievement): **Isabella Kim**

I.D. Wilson Memorial Scholarship (In honor of Dr. **I.D. Wilson**, former head of the Department of Biology; awarded to undergraduate Biological Sciences majors who are in their last year of study and plan on pursuing a career in veterinary medicine): **Natalie Bale** and **Emily Poteat**

Graduate Awards and Scholarships

Arthur Buikema and M. Alison Galway Graduate Student Teaching Award (Established by Alumni Distinguished Professor **Art Buikema** and wife **Alison Galway**; awarded to graduate teaching assistants for excellence in instruction): **Andrew Muchlinksi** (Tholl Lab)

Lewis Edward Goyette Graduate Fellowship (Established by alumnus **Edward Goyette** in honor and recognition of his father, **Lewis Edward Goyette**; awarded to graduate students involved in the study of industrial microbiology): **Florice Gonzalez** (Scharf Lab) and **Jordan Mancl** (Schubot Lab)

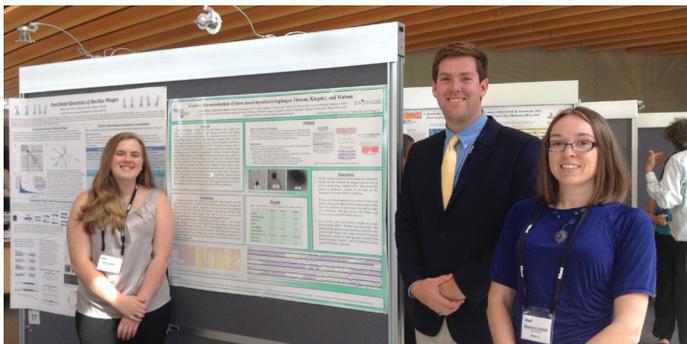
Noel Krieg Graduate Fellowship (Established by a group of former students in honor of Alumni Distinguished Professor Emeritus **Noel Krieg**; awarded to an outstanding graduate student pursuing research on microbial systems in biological sciences): **Jessica Hernandez** (Moore Lab) and **Wen Xiong** (Capelluto Lab)

John Palmer Memorial Scholarship (Established by alumna **Rhonda Leavenworth Johnson** in honor of her uncle, **John Gilbert Palmer**, former Adjunct Professor of Biology; awarded to an outstanding graduate student in Biological Sciences): **Ariel Leon** (Hawley Lab)

Robert and Marion Paterson Scholarship (Established in honor of **Robert Paterson**, Professor and Department Head of Biological Sciences, and wife **Marion**; awarded to an outstanding graduate student in Biological Sciences): **Fadoua El Moustaid** (Johnson Lab) and **Tuo-Xang Tang** (Capelluto Lab)

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Department of Biological Sciences Annual Fund



One person can make a big difference!

The Department of Biological Sciences is the hub for life sciences research and teaching at Virginia Tech, with interdisciplinary connections that span the entire university.

Our faculty tackle the world's most challenging problems through both basic and applied research, from human disease to the effects of global change. As one of the university's largest departments, we were honored last year with the University Exemplary Department Award for our outstanding teaching efforts and innovative learning environments.

Your support is critical to our future success. Contributions from our alumni, parents and friends help our many deserving students, provide state-of-the-art facilities, expand research activities, and allow our students explore a wide array of career opportunities. Gifts made without restriction allow departmental leaders to respond to opportunities immediately and to allocate resources where they can have the greatest impact.

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