Our Students

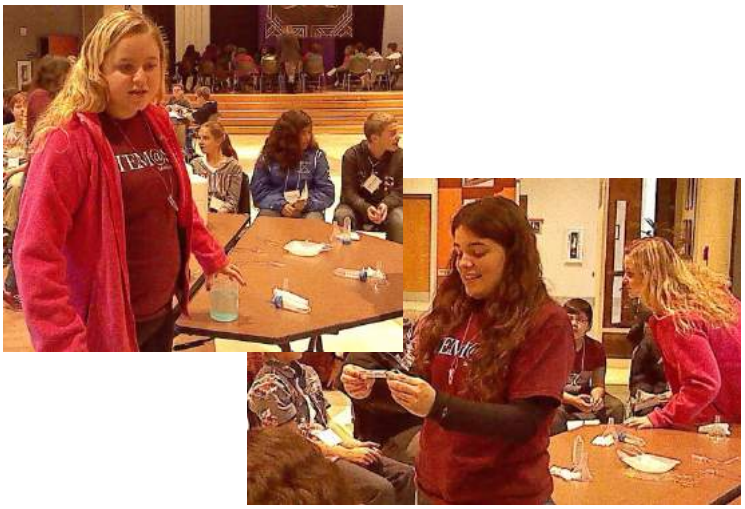
Hannah Ennerfelt is the recipient of the 2017 **Biology Faculty Award**. She has been accepted into the PhD program at the University of Virginia and University of North Carolina, Chapel Hill. She is also a finalist for Fulbright Scholarship to study at Upsalla University in Sweden.

Lalisse Geleta who received her BS in Biology (class of 2012) & MAT (class of 2016) in Education from Salisbury University is currently teaching biology & chemistry at the Internationella Engelska Skolan Nacka, in Stockholm Sweden.

Kelsey Mitchell recently finished her MS working in the Taylor-Hunter Lab. After receiving her MS, she took some time to work in Wyoming and California doing some very interesting jobs. She worked for various companies that specialized in experiences: horseback riding on a dude ranch, white water rafting, and snowmobiling, just to name a few. Kelsey just accepted a position with Second Genome: The Microbiome Company. Second Genome, Inc., a leader in the development of novel medicines through innovative microbiome science, has partnered with the Mayo Clinic Center for Individualized Medicine to support the development of therapeutic products for multiple disease indications, starting with inflammatory bowel disease, metabolic disorders, and colorectal cancer (http://www.secondgenome.com/). Kelsey has moved from cutting-edge frog behavior research to cutting edge microbiome research and product development.

Maryland STEM Festival

In November, ASBMB members April DeMell (left) and Sam Allen (right) helped about 100 middle school students isolate DNA from strawberries and preserve it in necklaces during the Maryland STEM Festival held at Worcester Technical High School. Dr. Patti Erickson provided technical support.



J. Craig Venter INSTITUTE

Students from Contemporary Genetics (Biol440), Modern Molecular Biology (Biol510), and our American Society for Biochemistry and Molecular Biology (ASBMB) chapter visited the J. Craig Venter Institute in Rockville, MD. The field trip included research presentations by JCVI scientists about the dynamics of the CRISPR/Cas system in nature as well as its applications in genome editing, plus a brief history of the Institute. Our group also toured the laboratories and met several more scientists, including those who worked on the generation of *Mycoplasma mycoides* JCVI-syn1.0, the first organism with a chemically synthesized genome!

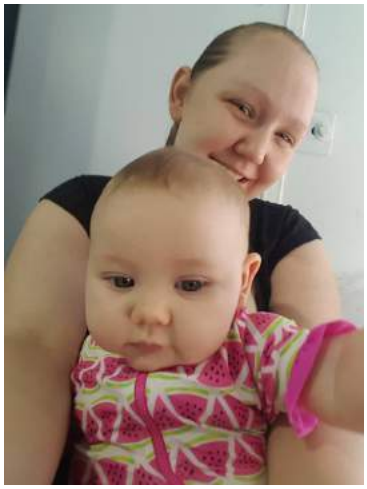
From left to right, standing: Will Gough, Brenna Noone, Andrew Baskerville, Mariama Diallo, Dr. Philip Anderson, Callie Brown, Sam Allen, Dr. Alex Voorhies, Dr. Lauren Oldfield, Dr. Sanjay Vashee, Amanda Golden, Shayla Butler. Seated: Ruthie Heying, Dr. Patti Erickson, & Lauren DeLong.

Births

Dr. Christina Bradley and her husband John Schmidt welcomed their son Logan on January 24, 2017.

Dr. Jeremy Corfield & his wife Lindsey welcomed their daughter Brynnley on Nov 3rd, 2016.

Dr. Jessica Clark & her husband welcomed their son Gavin on August 29th 2016.



Samantha Thewes Williams (Biology major, class of) & her husband Darren Williams welcomed their daughter Kaylee on August 31st, 2016. The Williams live in New South Wales, Australia.

Kate Baltrosky née Bassett (Biology major, class of 2004), her husband Art & their daughters Goldie & Margo welcomed their son Marty on October 2nd 2016. The Baltroskys live in Queensland, Australia.

Our Faculty

New Faculty Profile: Dr. Jennifer Nyland

With a baby 'gator in New Orleans, on the Nyland lab outing during the Society of Toxicology meeting. March 2016

In a boat with my post-doc mentor Dr. Silbergeld (Johns Hopkins University), shortly before it sank. June 2008

My career in science began in my mother's kitchen, but not with cooking as you might think. Rather, as the inquisitive oldest child of a chemist and a mechanical engineer, I worked with my chemist mother in the kitchen to mix "chemicals" together and hypothesized about the reactions that developed. I even started my career in toxicology by attempting to poison my youngest brother with one of these reaction products. I suppose it's lucky that he survived so I could be free to continue to develop an interest in how things in our environment can make people sick.

Chemicals and hazardous substances in the environment: That foundation in inquiry-based science at home lead to an undergraduate degree in chemistry from Cornell University. While I loved attending my parents' alma mater, I will admit that I was lost on such a huge campus. I graduated, but needed a break from the studies. My first post-baccalaureate job was in a small pharmaceutical company in Lancaster, PA doing stability testing on their main product (suppositories). At least most of that testing took place in incubators and not in the medically-appropriate anatomical location! I was putting my degree to use and as part of a small and fun team, but it was quickly evident that the work was not challenging enough. Next came a move to an environmental engineering firm in Syracuse, NY. As a member of the data validation team, I had oversight of the field sampling and laboratory analyses for samples collected on hazardous waste sites. While these jobs were interesting and at times fun, they were just not challenging enough.

Yeast, viruses, and autoimmune disease: Graduate school at State University of New York Upstate Medical Center in the Microbiology and Immunology program certainly added to the challenge. I completed research rotations in a yeast laboratory using a two-hybrid system, a virus laboratory examining the effects of mutations in the DNA polymerase gene of herpes simplex virus, and

ultimately joined an autoimmune disease laboratory investigating antibody-based vaccines for systemic lupus erythematosus in a mouse model. I got married mid-way through graduate school and my husband helped work the computer for my dissertation seminar. I was lucky to be able to give the seminar twice, once at Cornell and once at SUNY Upstate, since my laboratory mentor was faculty at both universities. This opportunity led to an offer of a post-doctoral fellowship at Johns Hopkins. *More viruses, hazardous substances, and autoimmune disease:* The post-doc at Johns Hopkins brought all of my eclectic scientific experiences together under one slightly crazy set of projects. I worked with two mentors – one a clinician and widely considered to be the grandfather of autoimmunity and the other a genius magpie environmental engineer with an interest in mercury and eventually antibiotic-resistant bacteria. My projects examined the effects of mercury on a virus-induced model of autoimmune heart disease in mice and the effects of mercury on biomarkers of autoimmunity in humans. I bounced between the medical school and the school of public health and within three different departments to conduct the projects. It was hectic, but exciting. During my post-doc we welcomed our daughter to the family and I spent a lot of time directing students in the lab while standing in the hall "wearing" the baby in her carrier.

My own lab, more hazardous substances, and alligators: The National Institutes of Health has a grant program that is meant to encourage young scientists and speed them into faculty positions and larger grant programs. The K99/R00 is a 5-year grant with a 2-year mentored research component and a much larger 3-year independent research component. I was very lucky to be awarded one of the first of these K99/R00 grants from the NIH National Institutes of Environmental Health Sciences to continue my post-doc research project and expand it for my own independent research. This grant helped me gain a faculty position at the University of South Carolina School of Medicine in Columbia, SC. I was responsible for team teaching immunology to graduate students and 2nd year medical students and for conducting research in my own lab. I developed collaborations with researchers in Amazonian Brazil and Canada to study the effects of mercury exposure from small-scale artisanal gold mining on the immune system in humans. These epidemiological studies meant that I had the opportunity to travel to Brazil to meet with collaborators and the population I was interested in studying. On that first trip, our boat sank in the river. We rescued our supplies and continued the trip, but it was not until we were all safe on shore that our guide pointed out all the alligators in the river! During my time at South Carolina, my lab worked on mercury – we examined the effects of prenatal mercury exposure on the mouse immune system and continued to explore the toxic effects of mercury on the immune system in humans – and we began working on arsenic – we examined the effects of arsenic exposure on type 2 diabetes, obesity, and inflammation in mice and on immune cells in culture. The lab work was exciting, but I was disappointed with the amount of teaching I was able to do. So, I was very happy to see an opening for an immunologist here at Salisbury University and was pleased to join the faculty here last fall.

Teaching at SU: I'm currently teaching immunology (BIOL333), toxicology (BIOL425/525), and a cell biology lab section (BIOL350). I have four research students who joined the lab this semester (one in honors, two in BIOL415, and one just volunteering). We're starting off small, looking at macrophages (immune cells) in tissue culture and the effects of toxicant exposure on phenotype, function, and the epigenome. I expect that by the end of the year we'll move into whole animal models to study the

toxic and epigenomic effects of environmental exposures on the immune system and I promise not to repeat any of my earliest toxicology experiments on anyone here at Salisbury.

Tribute to the Late Dr. Ron Gutberlet

"The epithet of this species [*Arthonia gutberletiana*] honors Ronald L. Gutberlet Jr. (1966-2015). Ron was a biology professor at Salisbury University, where his studies were centered around the natural history of birds and herpetofauna on the Eastern Shore of Maryland. Despite his life and career being cut short by illness, Ron still had a substantial impact, both on his students and the regional conservation community. He liked to get people outdoors and was gifted at sparking their interest in the natural world that he loved." – James Lendemer & David Ray (2017).

Two new pinicolous *Arthonia* (Arthoniaceae; Arthoniomycetes) from the Delmarva Peninsula of the Atlantic Coastal Plain in eastern North America

James C. Lendemer[1,3] and David Ray[2]

[1] *Institute of Systematic Botany, The New York Botanical Garden, Bronx, NY 10458-5126, U.S.A.;* [2] *The Nature Conservancy, MD/DC Chapter, Salisbury, MD 21804, U.S.A.*

ABSTRACT. Two new non-lichenized *Arthonia* are described from the branches and wood of pine trees (*Pinus* spp.) in the Coastal Plain of southeastern North America. *Arthonia samdykeana* is a characterized by its lack of photobiont, large irregularly shaped ascomata, and 6–9(–10–12)-celled ascospores that are macrocephallic. *Arthonia gutberletiana* is characterized by its lack of photobiont, black circular apothecia with persistent margins, hyaline 2-celled ascospores and occurrence on pine wood.

KEYWORDS. Industrial forestry, lichenization, mycobiont.

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Pine trees, members of the genus *Pinus* L., constitute an important and diverse component of many forested ecosystems, including barrens, woodlands and savannas, distributed across temperate and subtropical regions of North America (Little 1971; Vankat 1990). Of the 13 pine species that are native to eastern North America, five have well expressed ranges within the Mid-Atlantic Coastal Plain (MACP, **Fig. 1** herein), including: shortleaf (*Pinus echinata* Mill.), pitch (*P. rigida* Mill.), pond (*P. serotina* Michx.), loblolly (*P. taeda* L.), and Virginia (*P. virginiana* Mill.) pines. Pitch pine is so abundant in the Atlantic Coastal Pine Barrens found north of the Delaware Bay as to give the ecoregion its name (e.g., Collins & Anderson 1994), whereas pond pine is an integral species of unique pocosin peatlands located south of the Chesapeake Bay (Hardin et al. 2000). Loblolly pine is the most abundant and commercially important pine species in the southeastern United States, and within the MACP, where it has been planted and managed on a variety of sites (Oswalt et al. 2014). A unifying feature of all of the pine dominated systems throughout the eastern United States Coastal Plain is their adaptation to disturbance by fire, whether it be the relatively frequent low intensity understory fires that maintain longleaf and shortleaf pines, or infrequent stand-replacing events associated with Virginia, and more southerly distributed, sand pine (*P. clausa* (Chapm. ex Engelm) Vasey ex Sarg.) systems (Stanturf et al. 2002).

While pines, and conifer genera and species more generally, have been the subject of extensive study by forestry scientists and ecologists, the lichens that grow on them have received considerably less attention, particularly in areas outside of Europe. Recently, as part of a study examining the impacts on lichen communities of restoring fire to pine-dominated systems on the Delmarva Peninsula of the MACP, we characterized the lichens growing on a large number of pines, including loblolly, shortleaf, pond and Virginia, within our study area (Ray et al. 2015). This project led to the discovery of an undescribed species that appears to be widespread but has likely been overlooked previously because it is non-lichenized, occurs on parts of the trees that are difficult to access and where few lichens grow, and is often found in managed pine stands that are otherwise generally not thought of as hosting high levels of biodiversity (*sensu* Stevens & Wagner 2007). Branches comprising the canopies of tall trees may represent a refugium from the heat associated with low intensity understory fires, conferring an advantage to canopy specialist lichen species exposed to this type of disturbance regime. This species is

[3] Corresponding author's e-mail: jlendemer@nybg.org
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Dr. Mark Frana – Bacterial Source Tracking Lab

Dr. Mark Frana received a contract for $22,320.00 from the Maryland Department of the Environment (MDE) and Wicomico County Health for the project Microbial Source Tracking 2017-2018: Windsor Creek/Cove Road Beach, Maryland. This project is designed to determine the possible sources of fecal contamination occasionally observed at Cove Road Beach on the Nanticoke River. Water samples will be collected during the study period and monitored for the presence of fecal indicator bacteria. Samples that register high bacterial counts will then be analyzed for the presence of human, dog, poultry and goose fecal matter using genetic probes. We hope that the results of this project will guide the Maryland Department of the Environment and the Wicomico County Health Department with remediation efforts and eliminate future fecal contamination events at this location.

New Research Horizons in the Taylor-Hunter Lab

Dr. Ryan Taylor and Dr. Kim Hunter co-direct a lab and we study animal communication in frogs. Our lab is generally interested in how signals evolve and we are especially interested in how cognitive perception and individual behavior drive complex signal evolution. We are currently using next-generation sequencing technology (ddRADSeq) to examine genetic variation among individuals as it relates to behavior. We have brought in Dr. Philip Anderson, a bioinformatician in the SU Biology Department, to collaborate with the analysis of this data. This technique expands our ability, by orders of magnitude, to study genomic variation in individual animals. This technique is already promising to give us insights into genetic variation, unimaginable only ten years ago. Not only are we gaining an increased understanding of frog biology, but we are also planning to adapt this technique to the study of temperate water corals. Tropical corals have been studied for decades, but virtually nothing is known about temperate water corals, such as those we have off the mid-Atlantic coast. We are currently working on a project to collect genetic samples of temperate water corals to answer questions about how related individual coral colonies are and where the come from. In addition to corals, we also plan to take genetic samples from sand tiger sharks. The coast of North Carolina has a resident population of these sharks, which are listed by the International Union for the Conservation of Nature (IUCN), as vulnerable to extinction. To date, very little is known about the overall movement patterns or biology of these sharks. We plan to conduct genetic analyses on the resident sand tiger shark population, which will provide information on genetic relatedness and movement patterns. These data can be a critical source of information for marine resource managers.

To this end, we have embarked on a series of technical SCUBA training courses that will give us the experience safely collect genetic samples from corals and sharks. We also went diving during Winter Break 2017 in Florida to get in more practice. We are also in the process of developing a proposal to request funds for an NSF-funded research program at SU. Specifically, we are planning to develop a Research Education for Undergraduates (REU) program, centered around marine species population dynamics. We have already partnered with Olympus Dive Center in North Carolina to provide student dive training and safe shark diving protocols. Olympus has experience both in training divers and working with scientists through NOAA and has conducted tens of thousands of dives safely with these sharks. Dr. Hunter and Dr. Taylor will provide the genetics training for the students, ensuring that they learn both how to collect samples underwater and how to conduct the genetic work in the lab.

Sand Tiger Sharks off Morehead City, NC

Dr. Ryan Taylor

Dr. Kim Hunter

Faculty Emeritus Dr. Ellen

Faculty Emeritus Dr. Ellen Lawler has been busy painting since retiring from the Biology Department in July 2015. In addition to regularly entering her work in shows at Salisbury Art Space (formerly the Art Institute and Gallery) and the Ocean City Center for the Arts, she exhibited 16 watercolor paintings at the Wicomico County Library (central branch) during the month of February. This exhibit focused on Birds of Wicomico County and included information about each species depicted, on birding in Wicomico County and on the Tri-County Bird Club. During the month of April, some of Ellen's work will hang in the office of the Lower Shore Land Trust, 100 River Street, Snow Hill, MD. In addition, Ellen will be present for a "meet the artist" session there during Snow Hill's First Friday celebration on Friday, April 7, from 5—8 pm.

Your New Editorial Team

Dr. Chris Briand (editor) & Dr. Philip Anderson (co-editor). Send any contributions to chbriand@salisbury.edu