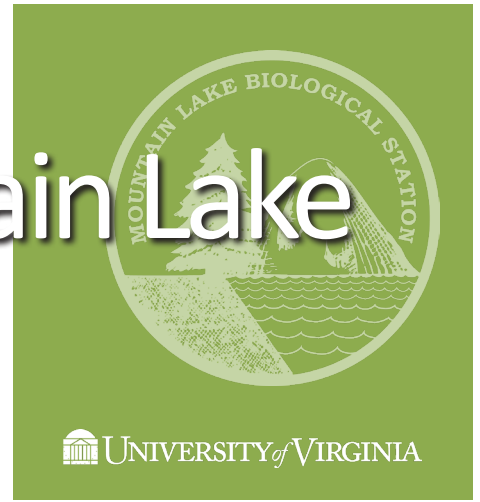




Mountain Lake



Produced by the University of Virginia's Mountain Lake Biological Station mlbs.org

In This Issue Fall 2024, Vol. 25



Dendrochronology Field School 2024

by Dr. R. Stockton Maxwell, Professor at Radford University

The Dendrochronology Field School (DFS; formerly the North American Dendrochronology Fieldweek) is an intensive, 9-day workshop for students and professionals seeking to incorporate tree-ring analysis techniques into their research. This year we had the opportunity to bring DFS back to Mountain Lake Biological Station for the third time. We previously held the workshop at the station in 1993 and 2011. The field school is structured around hands-on projects where participants learn how to develop research questions, collect samples in the field, analyze and date samples in the lab, and finish out with a presentation at the end of workshop. We often liken the field school to the experience of drinking out of fire house! You get a lot of information and training in a short period of

time. But by the time you leave, you are dendro-dangerous!

This year we had five project groups – Introductory, Climatology, Ecology, Fire History, and Archaeology. The Introductory group focused on the fundamentals of dendrochronology by sampling a table mountain pine forest on Brush Mountain outside of Blacksburg. The chronology (or average growth of the species) was used to help date the fire-scarred cross sections collected by the Fire History group. The Fire History group also sampled on Brush Mountain to learn about the rich history of wildfire prior to fire suppression practices on

US Forest Service land. The Ecology

group set up plots along the War Spur trail to learn about forest succession following the decline and death of the old-growth hemlock that once were abundant. The Climatology group sampled red spruce at the nearby bog to learn about how the local environment affected how the species responds to changes in temperature and precipitation. Finally, the Archaeology group collected samples from a historic structure in Botetourt County to determine the build date and provide valuable information for historic preservation of the structure.

If you would like to learn more about this year's projects, please visit <https://sites.google.com/view/nadef/home>. Or reach out to the director of DFS, Dr. Stockton Maxwell, professor of Geospatial Science at Radford University (rmaxwell2@radford.edu).



From the Director

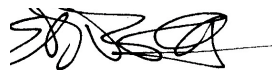
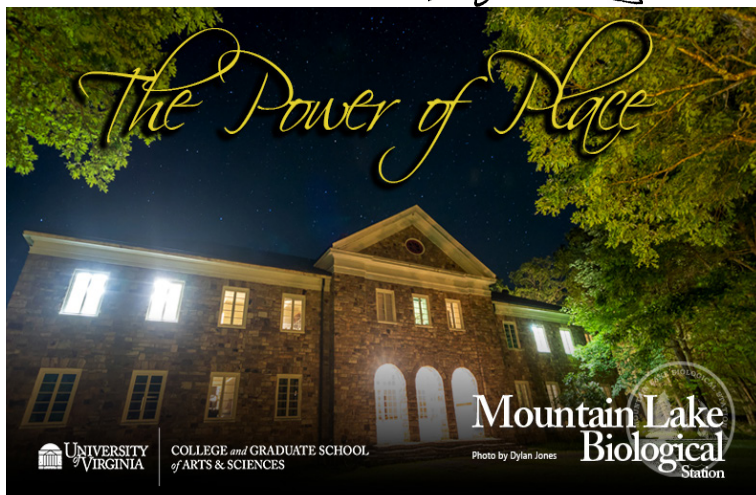
Each issue of Echoes gives me an opportunity to take stock of the intervening time and reflect on the changes, progress, and activities that have taken place. This time around, it is autumn and the leaves are absolutely electric, signaling the changing of the seasons. This feels especially poignant this year as the Station is undergoing its own major changes.

The most significant change we face is the retirement of our longtime Associate Director Eric Nagy in October of this year. Eric shared that it was the right time for him to step back and pursue some adventures in his beloved motorhome Priscilla. Eric served and lived at the station for 29 years. He raised his family (shoutout to Hazel and Jesse) at the Station, and was an integral part of the cultural fabric of the community. He literally defined the position of Associate Director, leading the REU program, and spearheading numerous infrastructure improvements. Finding someone to step into his shoes is my current unenviable challenge.

Early last fall, our Department Manager Rhonda Ruff left to pursue another career direction. That job title is simultaneously the most apropos and non-descriptive of any in the UVA HR ecosystem. "DMs" are responsible for pretty much all of the operations of a unit from budget planning and oversight to HR processing and anything else a unit needs. Rhonda was the person who designed and self-published Echoes (her departure explains the missed issues last year!) and handled many of the uncategorizable tasks that make the unit function. After several months without a DM, we were able last spring to hire the outstanding Megan Champion into the position. This is clearly a "learn on the job" situation for Megan, but she's been more than up to the task and I think all of our Station users will quickly learn why we're so excited to have her on board.

During the last year we also lost former Director Jim Murray. Together with his wife Bess, Jim defined an era at the Station and set a standard for how future directors would handle the position. He doggedly fought for resources and attention for the Station and is responsible for getting the university's Facilities Management to take on the responsibility of caretaking the infrastructure. Jim cast a long shadow not only on the Station, but the larger Department of Biology, university grounds and wilderness areas in Virginia. You can find a link to an excellent remembrance written by friend and colleague Doug Taylor elsewhere in this issue. And, be sure to [check out the Department of Biology's beautiful annual report](#) that features MLBS heavily in print and photos!

Butch Brodie

[Click to support the programs at Mountain Lake Biological Station by donating online.](#)

Student Corner

by Corinne Lile-King, Univ. of Virginia



To say that Mountain Lake Biological Station is a special place is an understatement. This last summer, I took a leap of faith and decided to enroll in 6 weeks of classes at the station. As an avid outdoor lover, and past camp counselor, I felt like I knew exactly what I was getting into. While that was partially true, I found much hidden meaning, both personally and professionally, to my time at the station.

My first class, Field Biology of Fishes, was the most unique class experience I have ever had. Each day, from 8am-6pm we ventured out in our smelly fish van to conquer about 3 inches of water with our wetsuits and snorkels. We traveled to over 70 tributary sites in Virginia and West Virginia, identifying over 130 species of freshwater fish. And while I am now thrilled to know morphological differences among freshwater fish, what I enjoyed most about this class was the people. After a long day of fishing together, it was so refreshing to hang out on the cabin porch, or go play games until midnight in the Pavillion. Being on a remote mountain really has a way of bringing out the best in folks, and allows you to truly experience the beauty of being so close to nature. I am extremely thankful for the friendships I built in those short 3 weeks, and for the opportunity to be around such genuine (and hilarious) people.

While completely different in substance and structure, my second course at MLBS also provided me with a deep sense of direction. As someone interested in ecological dynamics, public health, and medicine, Wildlife Disease Ecology combined so many topics that I already loved to learn about. I got to learn about disease dynamics across multiple wildlife populations at the station (and around the globe), disease vectors, host-parasite interaction, and even host-behavior manipulation by a pathogen. It was truly epic to witness the progression of disease on multiple levels, from the immune response of a single animal, to the spread of an endemic pathogen, and ultimately to a global pandemic. Without a doubt, this class deepened my interest in exploring global disease professionally, whether that be on a mathematical and analytical level, an ecological research level, or as a physician. My incredible professors and classmates made this experience such a blast, whether that was during our lectures, or playing "Werewolf" with our professors' kids around the campfire. To say that MLBS is a special place is an understatement; I have learned so much about myself, where I fit into the science world professionally, and how important it is to continue working around such sincere people.

Seeing in color: studying color vision in wild hummingbirds

by Sarah Solie, Postdoctoral Research Associate at Princeton University

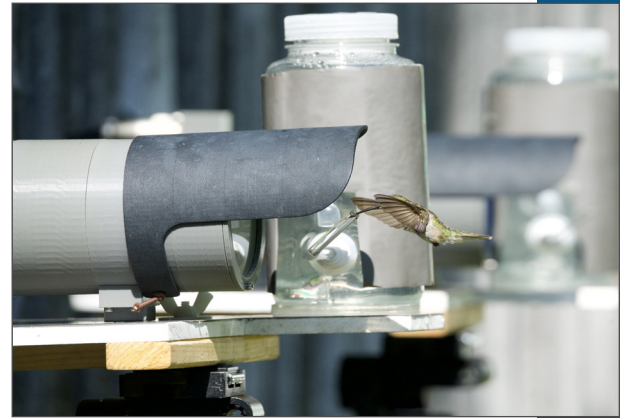
Have you ever wondered what the world looks to other animals? Because animals vary widely in their ability to perceive spatial detail, motion, and color, understanding how a particular animal sees the world can tell us a lot about what might be important to it. For example, a red pattern directing pollinators to a floral nectary is unlikely to be of much use to a honeybee, which can see ultraviolet (UV), blue, and green, but not red. The same pattern, however, may be much more useful in guiding a butterfly because butterflies can see colors spanning the spectrum from UV to red.

Color perception involves not only the colors of physical objects and the sensitivity an animal's color vision, but also how color information is processed by the brain. We know that humans perceive yellow when our green and red cones are stimulated at the same time, and we perceive purple when our red and blue cones are stimulated at the same time. However, we know less about how animal brains process similar color information, and researchers from the Stoddard Lab at Princeton University have been working to understand this problem using wild, free-flying hummingbirds. Because most birds have four color-sensitive cone types (including one that is UV-sensitive) compared to our three, the lab is particularly interested in understanding how hummingbirds perceive and

discriminate color mixtures that stimulate different combinations of cone types.

Hummingbirds are an excellent model system for exploring color vision in the wild. Starting with Broad-tailed Hummingbirds (*Selasphorus platycercus*) at the Rocky Mountain Biological Station in Gothic, CO, the Stoddard Lab demonstrated that hummingbirds were able to discriminate between color mixtures like UV+red and pure red. These results suggested that avian brains may process color information similarly to human brains, which sum and compare the relative stimulation of each cone type (Stoddard et al. 2020).

To extend their studies beyond Broad-tailed Hummingbirds, researchers from the Stoddard Lab have been conducting experiments at MLBS, which is home to a vibrant breeding population of Ruby-throated Hummingbirds (*Archilochus colubris*). Camped for hours each day behind Wilbur Lab, Drs. Sarah Solie and Ben Hogan use programmable LED light tubes paired with rewarded and unrewarded hummingbird feeders to perform behavioral experiments that test hummingbirds' ability to discriminate between color pairs. Our preliminary analyses suggest that these two hummingbird species may be



Photos above taken by Raul Zabala

perceiving and discriminating colors in similar ways. In future years, we hope to return to MLBS to investigate questions related to within-population variation in color vision and the relationship between color and brightness perception.



Photo taken by Jarome Ali

News & Notes

MLBS Computer Network Connected to UVA Campus Network

Mountain Lake hopped on the Internet with two dial-up modems back in 1998. In 2001 we installed an Ethernet local area network in the two lab buildings and a 1/4 T1 Internet circuit with the (then) staggering speed of 0.38 Mbps. Wifi was not a thing yet; neither was Google, or streaming. In 2002, and in cooperation with the American Distance Education Consortium, we switched to a satellite Internet connection. A few years later, when the price of wired connections came down enough, we moved to a 10Mbps connection, over copper phone lines. In 2017 when NEON came along and installed fiber optic cable to the station we collaborated with New River Community College in setting up a 100Mbps microwave link from Bald Knob to Virginia Tech. We are thrilled to announce the next advance in our network communications – UVA has just rebuilt our LAN with new fiber connections among many high-speed switches and wifi access points and installed a 1Gbps all-fiber internet connection. For the first time MLBS is part of UVA's "on-Grounds" computer network with all the speed, resources, security and support we get on campus. It has been a long journey.



Remembering Jim Murray

Former Director of Mountain Lake Biological Station, James J. Murray Jr., passed away this past year. Jim had an outsized impact on the Station, the University, and the Commonwealth. He is remembered on the mountain especially for his decades of stewardship and heroic efforts to leverage support for the Station from the University. His wisdom and perspective will be dearly missed. A fuller account of his incredible path and contributions can be found here. <https://mlbs.virginia.edu/remembering-jim-murray>

ArtLab 2024

This summer's artist-in-residency program was an exceptional success. In addition to the traditional six professional artists, six UVA Studio Art majors, and the Lucile Walton Fellow, three artists returned from last year's ArtLab cohort. Lucile Walton Fellow Julia Galloway broke new ground by being our first potter in the program. In addition to giving a stunning talk to the station, she and our own Susan Brodie invited the entire station community into their studio to throw and hand build their own work, which they helped glaze and fire. It was truly a wonderful and inspirational artists' collective.



Cottages Get a Facelift

When cottages at MLBS were built in the 1930s they were at least partially painted. No outside painting or preservation work has been done since, so we are all used to the charming, natural, and weathered look. Facilities Management is giving the cottages a new old look with help from the Office of the Architect. The project works hard to preserve the cottages' historic charm while at the same time calling back to their early design and appearance.



Eric Nagy Retires

MLBS Associate Director Eric Nagy retired in October of 2024 after 29 years of service to the Station and University of Virginia. It is no exaggeration to say that Eric defined the position of Associate Director, as the first and only person to hold that post. Eric was the person responsible for so many years of continuous support for our NSF REU program and over his time impacted the lives and careers of several hundred undergraduates that came through that program. He is also the person most responsible for bringing modern internet service to the station, culminating in the recent upgrade to our status as a regular university node. His fundamental contributions are too many to list here, but know that he will be sorely missed by everyone on the mountain as he heads off on his next adventure in his RV, Priscilla!



Lewis Hall Renamed Ruth Patrick Hall

by Butch Brodie

Mountain Lake Biological Station's most recognizable structure is the stone laboratory and classroom building that sits at the head of the lawn. It holds the position of the Rotunda in the scale model of UVA's central grounds that is the MLBS lawn. In October 2023, The UVA Board of Visitors approved the name "Ruth Patrick Hall" for the building.

The building had been known as Lewis Hall since its completion in 1939, in honor of the co-founder of Mountain Lake, Ivey Lewis. Lewis was a critical force in the birth of the Station, as well as the first Chair of the Department of Biology at UVA, founder of the Virginia Academy of Sciences, and the Dean of the University. But Lewis is also recognized as one of the principal architects of the eugenics movement at UVA and the nation more broadly. He was a vocal leader in pushing for institutional and legal policies based on his interpretation of the discredited "science" of hereditarianism, including the infamous legal statutes of forced sterilization, anti-miscegenation, and school and cultural segregation. The Station and University felt that it was not appropriate to continue to honor that history with a building name.



The new name for the building honors Ruth Myrtle Patrick (1907-2013), who was one of the first women to earn a PhD in the sciences at the University of Virginia in 1934 and a student at the Station. Dr. Patrick was a founding contributor to the study of aquatic ecology who introduced the concept that biodiversity is an indicator of water quality. She led the formulation of the 1972 Clean Water Act. She was elected to the US National Academy of Sciences (1970) and awarded the Presidential Medal of Science (1996).

For more on the history of all of our building names, including the recent renaming, please visit: <https://mlbs.virginia.edu/buildingnames>

REU Science Communication Workshop

by Jaime Jones

Each summer MLBS offers a 10-week NSF-funded Research Experiences for Undergraduates program. MLBS REUs work with a mentor to develop their own original research in field biology, and participate in weekly workshops and seminars to build a variety of other related skills. One of these workshops aims to introduce students to the world of science communication. Led by Nikki Forrester (science journalist and previous

MLBS REU), this year's science communication workshop gave REUs experience conducting interviews, being interviewed, and writing about research for broad audiences. The results of their efforts are collected in the [2024 Mountain Lake Times](#).




UNIVERSITY of VIRGINIA

Who We Are

Butch Brodie, Director
bbrodie@virginia.edu

Megan Champion, Department Manager
mcc8t@virginia.edu

Jaime Jones, Station Manager
jjones@virginia.edu

Chris Moye, Facilities Superintendent
fhb8ae@virginia.edu

Contact Us

University of Virginia
Mountain Lake Biological Station
mlbs@virginia.edu

UVA Campus Office
PO Box 400327
Charlottesville, VA 22904
(434) 982-5486 o

Station Office
240 Salt Pond Circle
Pembroke, VA 24136
(540) 626-7196 o
(540) 626-5229 f

mlbs.org

August 7, 2024 Issue 4

The Mountain Lake Times

EXPLORING MOSQUITO-PLANT INTERACTIONS: INSIGHTS FROM MOUNTAIN LAKE RESEARCH
Researchers are embarking on groundbreaking research into the fascinating interactions between mosquitoes and fly poison.

By **Quinn Worthington**

All organisms living together in a community affect each other. Species interactions shape diverse patterns for example, when humans get bit by mosquitoes, it's not a pleasant experience. Mosquitoes feed on human blood, and they also bite some birds, mammals, and various domestic animals. In addition, mosquitoes are important pollinators for many plants. Some plants have evolved defenses to protect themselves from mosquito bites, while others use mosquitoes as pollinators. In a recent study, researchers at Mountain Lake Biological Station in Shenandoah National Park explored the complex interactions between mosquitoes and fly poison, a highly toxic plant common throughout the Eastern US. Fly poisoning is one of the most common methods of pest control in agriculture. The researchers are studying how spraying the entire forest with fly poison impacts the mosquito behavior and the behavior of the plants in response. The study is currently ongoing and will be published in the next few months. The researchers are also studying the impact of fly poison on the development of other mosquito control methods.



LIFE AFTER DEATH: HOW WE CAN KEEP OUR FORESTS HEALTHY BY LEAVING DEAD LOGS TO BECOME CRITTER CONDOS
Researchers at Mountain Lake Biological Station investigate what species reside in fallen logs to better inform forest conservation efforts.

By **Naiah Garcia**

The forest is a complex ecosystem with a hidden world of life and death. In the quiet woods, there are many small critters that live in fallen logs. These logs are not just dead wood, they are homes for many different species of insects, fungi, and other organisms. The researchers at Mountain Lake Biological Station are studying these critters to better understand their role in the forest ecosystem. The study is currently ongoing and will be published in the next few months. The researchers are also studying the impact of forest management on the forest ecosystem.

© 2024 Mountain Lake Biological Station. All rights reserved. This publication is for informational purposes only. It is not intended to be used as a substitute for professional advice. The information contained herein is not intended to be used as a substitute for professional advice. The information contained herein is not intended to be used as a substitute for professional advice.

A Look Back at the 2024 Season

Snapshot

3 summer courses
 3 internship and professional program
 8 REU program participants
 413 station users
 49 institutions represented
 5 visiting courses/programs
 5 station activities
 7 facility projects
 \$43,099 in fellowships awarded
 \$8,509 in donations received
 40 research programs
 44 journal publications



Station Users

5,599 user days

413 individuals from 49 institutions:

- 94 faculty/staff/researchers
- 13 postdocs
- 117 undergraduate students
- 41 graduate students
- 61 guest/family
- 13 artists
- 74 visiting group/program participants

Station Activities

- July 4th festivities
- Volleyball tournament
- Gourmet S'more Cookoff
- Open House
- ArtLab Lucile Walton Fellow lecture
- Movie nights
- Square dance
- Swing dance lessons

REU Participants

- Jiron Griffon
- Simone De Montigny
- Sarah Garcia
- Evelyn Lepsch
- Quianday Worthington
- Shelby Zink
- Taylor Rand
- Connor Erwin

Financial

Fellowships Awarded \$43,099:

- 6 summer course students
- 8 researchers

Station Projects

- Eleven cottage exteriors painted
- Internet upgrade
- Invasive plant removal
- Burns Garden improvements
- Herbarium, insect, and herpetology collections moved to Wilbur Lab
- Electrical improvements in Jefferson Dining Hall and Wilbur Lab
- Self-serve key distribution system implemented



Photo by Griffon Jiron

Summer Courses

- Field Herpetology
- Field Biology of Fishes
- Wildlife Disease Ecology

Internship and Professional Programs

- Research Experiences for Undergraduates program
- Evolution Education Teacher Workshop
- ArtLab Artists-in-Residence

Visiting Courses and Programs

- Dendroecology Field School
- Wilderness First Aid course and CPR certification, MEDIC SOLO
- Ichthyology Class, William and Mary's Virginia Institute of Marine Science
- The Wildlife Society, Virginia Tech
- Chesapeake Bay Watershed Ecology class, Hampton University

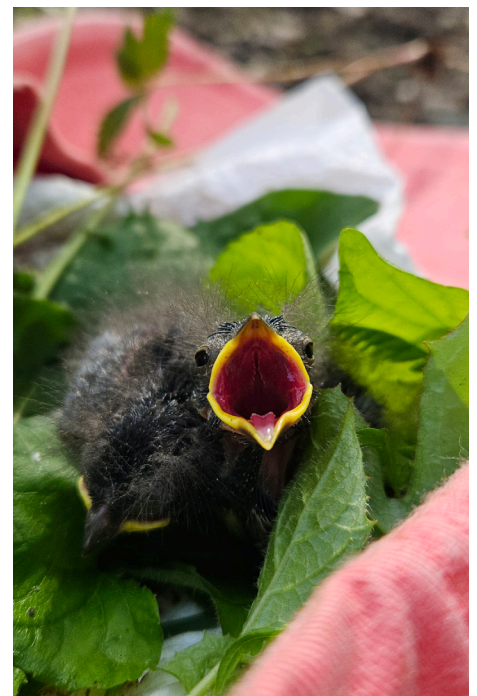


Photo by Carlie Saline

Research Programs

- The influence of climatic dipoles on plant and animal populations at continental scales
- Investigation of aquatic macroinvertebrate community structure in the Little Stoney Creek watershed
- Effects of rate-biomass tradeoffs on the relationship of ecosystem root respiration to nutrient needs
- Understanding mechanisms of co-occurrence of North American Lobelia
- American chestnut restoration research
- Wind and turbulence structure of the lower atmosphere above MLBS
- Fitness consequences of age structure in forked fungus beetles (*Bolitotherus cornutus*)
- Wing-Mediated Pollination in *Rhododendron* and *Lilium*: Investigating an overlooked mode of pollination in Virginia's flora
- Role of disturbance and abiotic factors on carbon sink in eastern oak-dominated forests using a link
- Floral fragrance evolution in *Silene stellata*
- Evolution of social behavior in *Bolitotherus cornutus* (forked fungus beetle)
- Neuroendocrine mechanisms regulating timing of breeding in a songbird.
- SARS-CoV-2 prevalence in wildlife along an urbanization gradient
- Litter decomposition across scales
- Camera Trapping in and around Mountain Lake Biological Station
- Mapping the effect of vegetation characteristics on nest site selection and predation in a ground nesting songbird
- Annual census Junco project
- Host-seeking, feeding habits, and pathogen transmission in *Culex* territans
- Genetic factors of range expansion in *Campanula americana*
- Pine bark adelgid on red spruce and white pine
- Flexible Traits and Functional Tradeoffs: An analysis of gastrointestinal plasticity in mammals
- Social Behavior, Reproduction, and Microbial Ecology of *Cryptocercus*: Advancing conservation efforts for woodroaches
- Understanding the molecular mechanisms of evolutionary reversion through loss of paternal care in darters
- Coevolutionary Arms Races Driven by Conflict: A test in social amoeba
- Local adaptation across the range of *Campanula americana*
- Worker evolution in termites
- National Ecological Observatory Network
- Lichen surveys for FWS
- Investigating color vision in Ruby-throated hummingbirds
- *Silene* census
- Remote sensing of forest structure and function
- The sensing group
- Addressing challenges in wind forecasting for tall turbines across regions with terrain and land surface heterogeneity
- The effect of host and symbiont thermal adaptation on mutualism traits



Photo by Ian Nichols

A list of publications related to MLBS are housed in a searchable [Zotero database](#).