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A Year Later

by MLBS Staff



In last fall's *Echoes*, we ran the cover story "Navigating the Pandemic." It feels like that was a lifetime ago in a different world. To think we had hoped to run a "normal" 2020 summer season seems absurd now.

In 2020, we had to do a complete about-face and all but shut down. Only a few pre-approved, highly regulated research teams were allowed on site. Protocols had to be reviewed by UVA at the Dean's level. Folks lived and worked in isolation. No out-of-state users were allowed, and most research programs were put on pause. Two MLBS staff members battled COVID-19 illness before the summer even began.

We lost a year, but our friends and coworkers are okay, and the Station was never really at risk of closing permanently. Other field stations in the US have not been so lucky.

Of course, that was all in pre-vaccine. Summer 2021 was very different. COVID-19 vaccines were available, and we better understood how to reduce risk of infection. Early in the year, the University was still operating only partially "in-person" and the fate of summer programs was uncertain. Since preparations for the upcoming season must begin in January or earlier, we proceeded to plan all our normal programs and reached out to research labs to help them prepare as much as possible for a still-uncertain field season. It looked hopeful. The vaccines were rolling out faster than expected and seemed to be working. We were optimistic we could open with a high vaccination rate, a COVID-19 prevalence screening program administered on site, and arrangements for

quarantine and isolation if needed.

But a heavy shoe dropped in April when the University announced it was cancelling all student in-person summer programs. Once again, all MLBS programs were put on hold just weeks before starting. Through intensive negotiation with the Dean's and Provost's offices, we settled on what felt like "terms" for opening. By doing so, MLBS lead the way for the University's other off-Grounds field stations and facilities to reopen as well.

Under the following terms, we were finally given the green light to offer in-person programs.

- User tracking and contact tracing
- COVID-19 vaccination, or negative pre-arrival tests, and weekly screenings
- Masks and social distancing
- Strict travel restrictions; students confined to the Station
- Low-density housing and outdoor dining
- Preparations for quarantine and isolation

We ran three classes and the REU program at half-capacity. All other summer programs were cancelled for a second year including ArtLab, two workshops, the seminar series, the Walton Lecture, the Open House, and other events. Housing was kept at low density and all meals were boxed "to-go." We conducted prevalence screenings as needed with PCR saliva tests. The Station's population was over 90% vaccinated and most of us

were eventually able to work mask-free. Some new traditions even emerged, like an outdoor film festival. We adapted, and things felt fairly normal.

Then Delta arrived. The Delta variant increased over the summer and brought a resurgence in community cases. The Station remained 100% infection-free but, by the end of the summer, we realized we needed to increase restrictions again. In August, we instituted a vaccination requirement (in keeping with UVA policy) and again required masks for everyone indoors. Thankfully, we did not have to cancel any fall programs, research activity, or visiting groups.

We are open and operating, and feel confident in our procedures and protocols. Still, we understand the world has changed and we are in this for the long haul. Moving forward, we remain committed to safely offering the services, support, programs, and community that make MLBS the special place that it is.



Herpetology students searching for salamanders on a field trip to Maple Flats.

From the Director

The big lesson of the 2021 season was to plan carefully but be ready to revise those plans early and often. We started working with University administration to develop a carefully thought out plan for a safe in-person research and class season starting in March, but the rapid changes to the virus and vaccine landscape meant virtually every element of the plan changed on a weekly basis. Three weeks before the start of classes and the REU program in May, we were still not fully approved to host visiting scientists, deliver classes, or serve meals. That meant that everything from opening up cottages to arranging meal service came together at the very last minute. In particular, Mike Soriano at Wikiteria was especially patient and flexible as we worked out a last-minute food service plan that avoided indoor dining.

Just a few weeks into summer, we were able to transition from pre-arrival and weekly prevalence testing to a community with virtually 100% adult and teen vaccination. This allowed us to return to some semblance of normality, though we had already set class sizes and the REU program at 50%. We had fewer people on the mountain, but those who were here were able to operate largely as they would in any year, with the exception of indoor dining. Eric Nagy worked closely with the VPR's office to execute PCR saliva testing through UVA that allowed us to monitor for cases in the early season, and that further enabled us to pre-test and host large groups even after the Delta variant hit exponential phase in August. Above all, it was individual Mountain Lakers getting vaccinated early on and agreeing to restricted travel and visitors that allowed us to pull off a semi-normal season.

Now that we are faced with the more transmissible Delta variant, we've had to reinstitute some of the stricter precautions for fall groups. We have remained open to some visiting classes, but require vaccination for all visitors, masks in all buildings, and appropriate distancing indoors and out. I'm grateful that everyone has been willing to honor these policies, because it has let us get back to providing those experiences for which we exist. Last weekend, I asked students from a class visiting from Mary Baldwin College how they were doing and got a chorus of "best time EVER!!". That's what makes the sometimes torturous planning and replanning worthwhile.



Butch Brodie



Pizza night out by the pond.

Student Corner

by John Corado, Univ. of Virginia



When I signed up for Stream Ecology at MLBS, I did not expect to love it as much as I did. After a year of COVID university, it was a relief to return to in-person classes. On top of that, it was a

class that would allow me to gain some field experience in the day-to-day life of a biologist. Prior to arriving, I thought that it would only be my classmates and my professor, but I soon learned that I was surrounded by other biologists, REU Program students, and PhD students.

I remember getting up for the first day of class and not knowing what to expect. The last thing I expected was to go and catch cray fish as a first-day bonding experience. I quickly learned that I not only loved to catch cray fish but also enjoyed learning about all the intricacies involved in stream ecosystems.

After our fun filled days of using fancy equipment and taking macro-organism samples, my classmates and I would find new adventures to partake in around the Station. Those adventures would be anything from bon fires and movie nights to hiking or catching newts in the pond. Mountain Lake Biological Station allowed me to immerse myself into the world of a biologist. Being surrounded by people with a passion for biology, I was able to view the science from their perspective. My experience at MLBS is one I will forever cherish; I am so grateful that I was able to interact with people who deepened my passion for biology.



2021 Stream Ecology Class

Research Spotlight

by Colleen Mullins, University of Virginia



Colleen Mullins
University of Virginia
2021 MLBS REU Researcher

For decades, the “Junco Crew” has been at MLBS studying a small gray sparrow: the dark-eyed junco (*Junco hyemalis*). Dr. Ellen Ketterson (Indiana University) has led the junco research with a focus on the endocrine basis of life-history trade-offs. More recently, research has turned to the evolution and physiological adaptations supporting migration. *J. hyemalis* is a superb study species to explore adaptations for migration since both migratory and non-migratory populations co-occur here on Salt Pond Mountain during the winter. Migrating birds grow more quickly, are smaller as adults, and have

longer and more pointed wings than non-migratory birds. Migratory juncos also breed later in the spring (while in their northern latitude homes) than the southern non-migratory MLBS-resident population. Given that photoperiod (day length) in northern latitudes where migrant young are born is longer than here in Virginia, our research this past summer set out to determine if photoperiod during development drives the variation in anatomy and physiology we observe in the wild. There is also a climate change angle to this research. It appears that in response to climate change, and warmer conditions across their range, birds are doing their spring migrations earlier. Given that breeding and developmental timing is part of the adaptation for migration, this new earlier migration behavior could have important adaptive consequences.

To answer these questions in summer 2021, the Junco Crew (led by Indiana University post docs Dr. Adam Fudickar and Dr. Allison Byrd) collected nestling juncos around MLBS and equally split each nest into one of two experimental groups: a group under “Alaska” (northern latitude) photoperiods, to resemble the migrant breeding environment, or a group under “Virginia” (southern latitude) photoperiods, to resemble the resident breeding environment. The nestlings were fed from sunrise to sunset as defined by their experimental photoperiod, which meant early mornings and late nights for the Junco Crew. Summer days are very long in Alaska! We measured the nestlings’ growth by taking their mass, wing length, and tarsus length every day. The birds under the longer Alaska photoperiod were larger in mass and in tarsus length, but wing lengths didn’t differ between the two groups. These results do not support our primary hypothesis, and don’t explain the differences observed in the wild among migratory and non-migratory juncos. This does not mean the research “failed,” it just means something other than day length drives these patterns. So our work was a success and will continue! Interestingly our results are consistent with “Bergmann’s Rule” which observes that for many animals body size seems to increase with latitude. What is responsible for Bergmann’s Rule is rarely clear. Perhaps in juncos it is day length!

At the end of the summer the experimental juncos were transported from MLBS to Indiana University and are currently free-flying in a large open aviary. But the study will continue. To address migratory timing questions, the second part of this experiment will be conducted in early spring 2022. Gonadal growth, which occurs earlier for non-migrants, will be measured, and trackers will be placed on the juncos to measure migratory restlessness, an indicator of the urge for migration.



Nesting dark-eyed juncos. Photo by Colleen Mullins.



2021 Junco Crew



Dark-eyed junco nest at MLBS last season. Photo by Adam Fudickar.



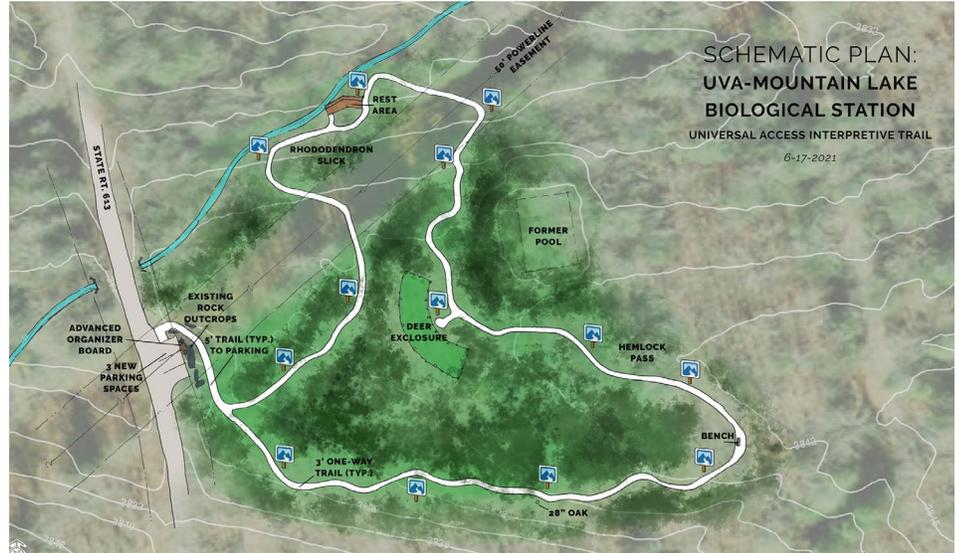
Dark-eyed junco released after banding last season. Photo by Alex Becker.



News & Notes

New Public Interpretive Trail Coming

Planning is underway for construction of a publicly accessible interpretive nature trail at MLBS. The 0.25-mile trail will feature signage that provides visitors with an overview of the natural and human history of Salt Pond Mountain, and introduces them to the concept of biological research in the field. Funds for the project come from the Appalachian Trail Conservancy's Community Impact Grant program and the University of Virginia's Arboretum and Landscape Committee.



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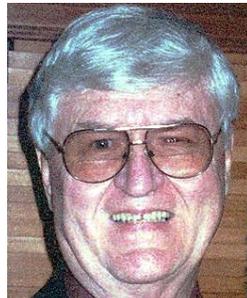
Remembering Robert (Bob) Dubay



Robert (Bob) Carr Dubay ('77)
 Lieutenant Colonel, US Army (Ret)
 MLBS Masters Program Graduate
 September 25, 1947 - August 27, 2021

Bob was born in Boston and grew up in Massachusetts, Hong Kong, and northern Virginia. He earned a Bachelor's degree from the University of Central Florida and taught secondary science. His brother Charlie, a 1976 MLBS Master's program graduate, encouraged Bob to also earn his MLBS Master's degree, which he completed in 1977. His thesis, mentored by Dr. C. Ritchie Bell of UNC, concerned pollination biology of *Asclepias syriaca*. Bob went on to serve 25 years as an officer in the US Army Medical Corps. After military retirement, he returned to teaching and served as an administrator at a medical center. His Mountain Lake work was a lifelong source of great pride. [Obituary Link](#)

Remembering Henry Carter Lindsey



Henry Carter Lindsey (60s)
 MLBS Masters Program Graduate
 March 13, 1931 - January 30, 2021

Henry grew up in Farmville, VA and taught high school biology for 40 years in the Williamsburg-James City County Public School System. He earned both a Bachelor's and a Master of Science degree from UVA, the latter through a program at Mountain Lake Biological Station that enabled secondary teachers to earn course credits in the summer and be mentored by their Mountain Lake contacts for their thesis. His thesis work, conducted in the 1960s, involved *Impatiens*. Henry, along with fellow teacher and future MLBS Masters program graduate, Charlie Dubay ('76), created a high school field biology course ("Wet and Dry") in 1971-72. This course was the first accredited high school field biology course in the Commonwealth and continues to be offered today. Many former students report it being the highlight of their high school years. [Obituary Link](#)

A Look Back at the 2021 Season October 1, 2020 - September 30, 2021

Snapshot

- 3 summer courses
- 1 internship and professional program
- 5 REU program participants
- 344 station users
- 28 institutions represented
- 27 visiting course/program participants
- 3 station activities
- 4 facility projects
- \$38,469 in fellowships awarded
- \$4,700 in donations received
- 35 research programs
- 35 journal publications



Station Users

- 4,732 user days
- 344 individuals from 28 institutions:
 - 78 faculty/staff
 - 6 postdocs
 - 162 undergraduate students
 - 26 graduate students
 - 18 K-12 students
 - 27 guest/family
 - 27 visiting course/program participants

Station Activities

- July 4th boat race and pig roast
- First annual Wiffle Ball game
- Movie nights

Facility Projects

- Invasive plant removal
- Burns Garden maintenance
- Trail signage improvements
- Interpretive trail planning/design

Financial

- Fellowships Awarded \$38,469:
 - 8 summer course students \$23,276
 - 5 researchers \$15,193
- Donations Received \$4,700:
 - Undergrad Students \$2,025
 - Walton Lecture \$200
 - Friend of MLBS \$2,475

Summer Courses

- Field Herpetology
- Field Biology of Fishes
- Field Methods in Stream Ecology

Internship and Professional Programs

- Research Experiences for Undergraduates program

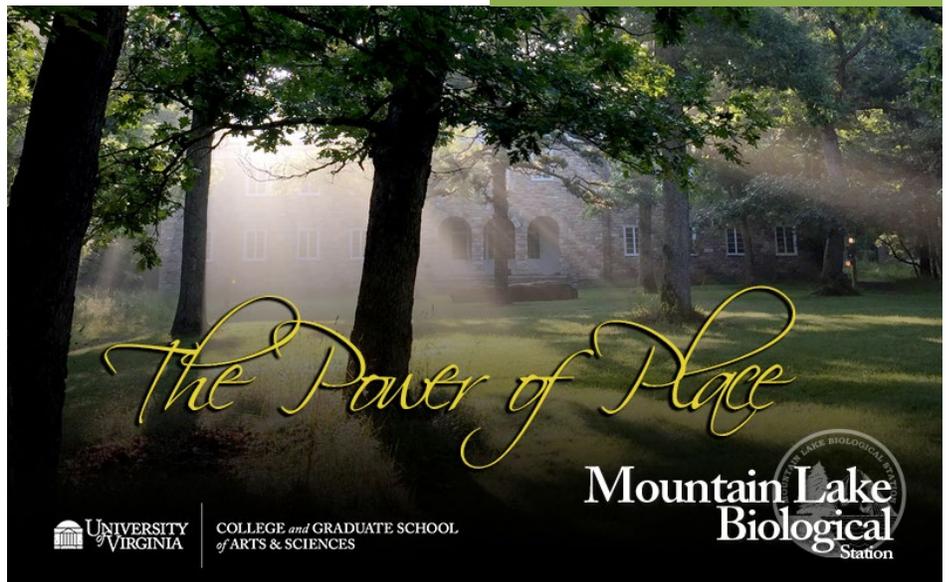
REU Participants

- Colleen Mullins
- Alejandro Medina Valencia
- Megan Roark
- Kathryn Davis
- Mason Fristoe

Visiting Courses and Programs

- Ecology class, Mary Baldwin University
- CNRE Leadership Institute, VA Tech
- Hutton Scholars program, VA Tech and American Fisheries Society
- Wilderness First Aid class, MEDIC SOLO
- Wildlife Field Techniques Class, VA Tech

Support MLBS



Click to support the programs at Mountain Lake Biological Station by donating online.
All donations are tax-deductible.

Research Programs

- The influence of climatic dipoles on plant and animal populations at continental scales
- Using Biotechnology to Uncover Biodiversity: An introduction to scientific data collection/analysis and STEM careers
- Automated behavioral tracking of mating interactions in mid-Atlantic *Opiliones*
- Understanding mechanisms of co-occurrence of North American *Lobelia*
- Combining NEON and remotely sensed habitats to determine climate impacts of community dynamics
- American chestnut restoration research
- Causes and consequences of social network variation in *Bolitotherus cornutus*
- From Wing Pollination to Florivory: The reproductive ecology of southeastern azaleas (*Rhododendron* spp.)
- Wing-mediated pollination and the reproductive ecology of *Rhododendron* and *Lilium*
- Mechanistic niche modeling and physiological evolution of plethodontid salamanders
- Role of disturbance and abiotic factors on carbon sink in eastern oak-dominated forests using a link
- Aestivation survivorship of a biological control agent against the hemlock woolly adelgid
- Evolution of social behavior in *Bolitotherus cornutus* (forked fungus beetle)
- Breed early, breed late? Molecular, neuroendocrine, and developmental mechanisms regulating timing of reproduction
- Maternal effects and mating system evolution in American bellflower
- Foliar traits and terrestrial ecosystem variability across NEON domains
- Thermal biology and ecology of *Aedes japonicus* mosquitoes
- Development of an unmanned aircraft system (UAS) to collect mosquitoes from remote areas
- Host-seeking, feeding habits, and pathogen transmission in *Culex territans*
- Patterns of phenotypic differentiation and selection in *Campanula americana*
- Combining NEON and remotely sensed habitats to determine climate impacts on community dynamics
- The role of mating systems in colonization
- Pine bark adelgid on red spruce and white pine
- Amphibian ecology and biodiversity
- Consumer-resource interactions in a woodland wildflower plant-pollinator community
- Landscapes, Life Histories, and Anuran Population Genetics: Can traits predict connectivity of a regional species pool?
- USFWS frosted elfin surveys
- Evolutionary divergence of pheromones in garter snakes
- National Ecological Observatory Network (NEON)
- Plasticity in the shape of phenology across an elevational gradient
- Collecting aphids and galls of *Hormaphis hamamelidis* on *Hamamelis virginiana*
- Environment as a selective force on plant reproductive traits
- Habitat requirements and population genetics of fungus-inhabiting beetles in old-growth forests
- Allopolyploid speciation in *Isoetes appalachiana*
- Evolutionary ecology of root-knot nematodes



Making quesadillas at the annual pig roast.



Enjoying field work in Pond Drain.

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