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The Salamander Population & Adaptation Research Collaboration Network



Written by: Dr. M. Caitlin Fisher-Reid, Bridgewater State University

MLBS has a long and well-established history of salamander research, especially research focused on the diminutive eastern red-backed salamander (*Plethodon cinereus*). These fully terrestrial, woodland salamanders are lungless, as are all members of the family Plethodontidae, relying on cool and moist forest floors to make their living. A recent article¹ by members of The Salamander Population and Adaptation Research Collaboration Network (SPARCnet) confirmed the findings of earlier research that red-backed salamanders are often the most abundant vertebrate species, attaining the highest biomass of all vertebrates in forest ecosystems (average 1.15 salamanders/m² across the range). To put that in perspective, if you take all the red-backed salamanders on Salt Pond Mountain and put them on one side of a scale and put all the deer on Salt Pond Mountain on the other side of the scale, salamanders would win. That is quite the accomplishment when a large, adult salamander tops out around 1.5g and your average deer around 36-72kg (minimally, ~24,000 large salamanders = 1 deer). This extreme abundance, combined with the environmentally sensitive physiology of an amphibian and the mid-level consumer position of salamanders in food webs, make red-backed salamanders specifically, and salamanders more broadly, fantastic study species for countless questions within the fields of ecology, evolution, and behavior.

MLBS happens to be one of those places where red-backs are not just abundant, but super-abundant, with estimates² of ~2.8 salamanders/m². With these absurd densities and MLBS's long history of red-backed salamander research, it was no surprise that SPARCnet members arrived at MLBS as soon as we could. SPARCnet is a distributed research network with members at dozens of institutions across the red-back's geographic range. Founded in 2013 by collaborators at Pennsylvania State University and United States Geological Survey, members of SPARCnet all follow the same, standardized coverboard plot design and mark-recapture methods to monitor their local red-backed salamander populations. Ten years after SPARCnet's founding, in 2023, two important things happened which finally brought SPARCnet to MLBS: new Virginia Tech



faculty Dr. Jen Moss inquired about starting up SPARCnet plots at MLBS, and a team of SPARCnet researchers, led by MLBS alumna Dr. Caitlin Fisher-Reid, were awarded a National Science Foundation Research and Mentoring Postbaccalaureates (NSF-RaMP #2319645) grant.

With the RaMP grant, SPARCnet has been able to support three cohorts of 8-10 postbaccalaureate scholars for a full year of mentored research and professional development to better prepare them for STEM careers and graduate programs. Each cohort starts the SPARCnet RaMP program with a week-long salamander 'bootcamp' at MLBS to help bond the cohort, expose them to field station life, and introduce them to SPARCnet research and goals using Dr. Moss's plots on the mountain. During the week, they learn the basics of mark-recapture methods and mark-recapture math, start brainstorming project ideas for the coming year, and complete classic MLBS hikes (War Spur Overlook, Wind Rock at sunset, Cascades Waterfall) - all while soaking in the scientific energy of MLBS and natural beauty of the southern Appalachians. Summer 2026 will mark our third and last funded bootcamp, but we are confident SPARCnet members and alumni will continue to make their way to MLBS for many years to come.



References

Grant, E.H.C., J. Fleming, E. Bastiaans, A.B. Brand, J.L. Brooks, C. Devlin, K. Epp, M. Evans, M.C. Fisher-Reid, et al. 2024. Range-wide salamander densities reveal a key component of terrestrial vertebrate biomass in eastern North American forests. *Biology Letters* 20:20240055. <https://doi.org/10.1098/rbl.2024.0055>

Mathis, A. 1991. Territories of male and female terrestrial salamanders: costs, benefits, and intersexual spatial associations. *Oecologia* 86:433-440. <https://www.jstor.org/stable/4219625>

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Upcoming Events

Dining Hall Open May 24-August 1
REU Program May 25-July 31
Summer 2026 Courses Session I: May 25-June 12 Session II: June 22-July 10 Session III: July 14-July 31
ArtLab July 5 - 19
July 4th Festivities
Open House July 18
View our web calendar for up-to-date announcements.

From the Director

Even after many years on the mountain, it seems like every summer focuses my attention on something new in the surrounds. It kind of surprises me each season when I discover for myself some group of organisms or natural process that has been right in front of me every year, but I hadn't really given my attention before. Often, I'm led to my annual focus by someone who is working with a species, but sometimes it's as simple as just slowing down and noticing the details of the world I walk through every day.

Last season it was the diversity of ferns that captured my curiosity. They are, of course, everywhere on the mountain since they are one of the few things in the forest that the deer don't eat. We all notice the giant cinnamon ferns that are the dominant understory plant in most places, but there are at least six or seven fairly large and common ferns that can be encountered just walking around the roads and main paths of MLBS. For most non-botanists, they all look like ferns, but I felt like I should be able to name them and recognize their different habits. Field guides and iNaturalist helped, but there's no substitute for a local natural historian to point out the features and mnemonics to really learn the species. I leaned on our resident botanist, Jaime Jones, for some education and learned tricks like New York fern is the one that "burns the candle at both ends" (i.e., it narrows at the tip and the base). By the end of the summer I was pretty confident with at least the most common taxa, and that gave me a little extra joy on my walks.

Past years I've become obsessed with groups like leaf galls, parasitic plants, and ground beetles. I have no idea what will drill its way into my consciousness this season but I'm confident that whatever it is, there will be someone at the station that knows more than I do about it who will help my education. That is one of the enduring perks of summer at the station, and, lucky for me, it's just around the corner!

Butch Brodie




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New Rising Stars in Field Biology Seminar

This summer, Mountain Lake kicks off a new NSF-funded seminar series that showcases the accomplishments of rising stars in field biology who have made impactful contributions to ecology, evolution, behavior, or related fields. The station will host up to two Rising Star speakers each summer from 2026-2030, and facilitate networking opportunities with students, staff, and faculty during their visit. Speakers will present their work in an evening seminar, become a member of our academical village, and receive support in exploring research opportunities at Mountain Lake. We are thrilled to announce our inaugural Rising Stars below.

Dr. Chaturvedi is an Assistant Professor at Tulane University (<https://chaturvedi-lab.wp.tulane.edu/>). She is a broadly evolutionary biologist who leverages empirical and theoretical approaches to examine the causes and consequences of natural selection. Her lab's research integrates evolution, ecology, and -omics to study the genomic basis of evolution in insects. Much of her group's current work focuses on pipevine host plants. Her group investigates genomic signatures of co-evolution between butterflies and plants, as well as the genomic basis of adaptive evolution and consequences of hybridization. She received a coveted 2019 Harry Smith Prize for her paper 'The predictability of genomic changes underlying a recent host shift in Melissa blue butterflies' published in *Molecular Ecology* and currently serves as an Associate Editor for the journal.



Dr. Adams is an Assistant Professor at Appalachian State University (<https://ashleyshaw.netlify.app/>). She is a dynamic scientist who advances community ecology through accomplishments in research, education, and mentorship. Her lab studies the connections between soil biodiversity and ecosystem function, particularly in the context of global change. She

integrates field surveys, field and lab experiments, and synthesis of long-term datasets to address this pressing question. Her work spans basic and applied science, including carbon storage in Appalachian forests and how compost impacts soil health in California rangelands. The high impact of her work has been recognized at broad scales, leading to a competitive postdoctoral fellowship from the USDA National Institute of Food and Agriculture and committee service for the NSF Long Term Ecological Research site program in Antarctica.

News & Notes

Introducing the MLBS Field Practicum

MLBS has selected two students to participate in a new, ten-week Field Practicum. They will sample a range of topics in ecology, evolution, and organismal biology by taking three field courses, joining a research team for a week, and participating in Station workshops and activities throughout the summer. Full or partial funding was made available to these students through the Margaret Walton Scholarship for Mountain Lake.



Photo credit: Virginia Museum of Natural History

MLBS goes to Reptile Fest

Who loves spending their Saturdays talking about salamander shenanigans? We do! MLBS hosted an education booth during the annual Reptile Festival at the Virginia Museum of Natural History on April 25 to showcase the amazing diversity in these often-undererrated animals. Visitors gasped in amazement when they saw our preserved specimens of the Eastern hellbender, the largest salamander in North America that can reach a whopping two feet, and the pygmy salamander that maxes out at around two inches. Think salamanders are boring? Well, think again! A computer monitor played slow motion videos of species with chameleon-like tongues that capture prey faster than the blink of an eye, a sky-gliding salamander that can climb as high as 300 feet up trees, and another species that somersaults down the rocky foothills of the Sierra Nevada to escape predators. Oh, and did you know that many salamander species can glow in the dark?

Introducing 2026 Station Assistants

High season operations wouldn't be possible without the help of Station Assistants, who work hard all summer long to keep everything running smoothly. This year's assistants are Jordy and Victoria, both of whom will graduate this May from Virginia Tech's College of Natural Resources and Environment. The Station is thrilled to have them on board!



Radio Upgrade

Station users have probably noticed the radios MLBS staff carry around at all times. This year they are getting a much-needed upgrade! Old units will be replaced with more powerful models, and additional radios will be available for researchers to checkout. The Station is grateful to UVA's Security and General Safety committee for contributing funds toward this important project.

New Leadership at Mountain Lake Lodge

The Station's nearest neighbor, Mountain Lake Lodge, recently welcomed Spencer Priest as its new general manager. MLBS appreciates the lodge's longstanding support of our research, and we look forward to continuing our partnership. Welcome to Salt Pond Mountain, Spencer!





Summer 2026 Courses

3 credits each

Field Herpetology

May 25 - June 12

Christian Cox, Florida International University

We will focus on the ecology and evolution of reptiles and amphibians, leveraging their diversity in the southeastern United States. In the field and laboratory, we will study 1) evolutionary relationships among reptiles and amphibians, 2) key evolutionary innovations that characterize each major lineage, 3) reptile and amphibian systems in ecological and evolutionary research, and 4) location and identification of reptiles and amphibians.



Who We Are

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Field Biology of Fishes

June 22 - July 10

David Neely

This class is an immersive introduction to fish biology, with a particular focus on the freshwater fish fauna of eastern North America. Students will develop proficiency in ichthyology through extensive field sampling and in-situ observation. Themes will include fish identification; patterns and drivers of diversity; interactions at individual, population, community, and ecosystem levels; evolution; and influences of human activities.

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Field Behavioral Ecology

July 13 - 31

Scott Villa, Davidson College

This course will illustrate principles of behavior and provide experience with methods used in animal behavior research. Students will develop an understanding of the scientific process as applied to behavior research, learn how behavior evolves and why we see the behavioral patterns that we do, and learn how to conduct research in wild populations. The class will work collaboratively to develop and carry out a field research project.

