

University of Maryland Center for Environmental Science
Appalachian Laboratory

301 Braddock Road
Frostburg, Maryland 21532
Phone: 301-689-7100
Fax: 301-689-7200
www.umces.edu/al

1. UMCES Appalachian Laboratory

1.1 Research Programs

The Appalachian Laboratory (AL) is dedicated to the study of terrestrial and freshwater ecosystems, with special focus within the Chesapeake Bay watershed. AL researchers seek to determine the effects of natural and human-induced changes on organisms, landscapes, and biogeochemical and hydrological cycles. The research conducted at AL is both diverse and interdisciplinary, spanning scales from genes to landscapes and watersheds, and encompassing terrestrial, wetland, and aquatic ecosystems. This high degree of flexibility, coupled with a strongly collaborative faculty, has enabled AL to address a variety of research needs within the state, the country, and across the globe. AL contributes to the UMCES mission through research, education and service in four areas:

Ecosystem Ecology

Ecosystem ecology encompasses a broad range of issues and approaches but ultimately involves studies of organisms, the physical environment, and their interactions within a defined area. Emphasis in ecosystem ecology is on the status, flux, and transformation of energy, water, and materials within a particular ecosystem. Therefore, ecosystem ecology is a natural entry point into studies of global change and the effects of climate variability and anthropogenic disturbance on ecosystems. Current research in watershed ecology at AL is designed to help improve our understanding of broad-scale ecosystem and hydrological dynamics, of biogeochemical processes within watersheds as well as at the terrestrial-aquatic and terrestrial-atmospheric interfaces, and of natural controls and human influences on surface water quality and quantity.



AL Main Building

Ecosystem ecology research at AL also concentrates on landscape ecology, which reaches outside of watershed boundaries to include all aspects of scale and connectivity in the study of terrestrial ecosystems. Recent research at AL has focused on the expansion of native and invasive species across landscapes, how climate change and other ecological disturbances influence the assembly and stability of plant communities, and the role of urban heat islands in accelerating plant phenology. This type of work uses a large array of tools and techniques, including remote sensing and spatial statistics, isotopic analysis of plant and animal tissues, and phylogenetics.

Aquatic Ecology

Aquatic ecology, which includes the study of the interrelationships between living freshwater organisms and their environment, is yet another scale at which ecosystem ecology research is conducted at AL. Faculty members have focused on the biological and ecological status of wetlands, streams, rivers, and impoundments in Maryland, including long-term participation in large, state-wide ecological monitoring programs.

Molecular Ecology

Molecular ecology is a synthetic area of study that integrates ecosystem ecology with molecular genetics and genomics. The basis of molecular ecology is to relate naturally occurring genetic variation within and among individuals, populations, and species to the processes regulating the distribution and abundance of organisms, how they respond to changes in their environment, and how these responses affect the structure of communities and the flow of energy and nutrients through ecosystems.

1.2 Education & Service

The Appalachian Laboratory has a strong history of involvement with K-12 and public science education as well as with graduate education. Through the Appalachian Laboratory Environmental Science Education (ALESE) program, AL faculty and staff are involved with teacher professional development, education and outreach product development, as well as providing environmental science outreach to schools and other groups. Because the programs are built directly from scientific research activities at AL, ALESE participants learn science by experiencing research.



1. Current computing facilities for Landscape Ecology and Remote Sensing.



2. Molecular Ecology Laboratory.



3. Interactive Video Network (IVN) classroom