

# EARTH SCIENCE FIELD STUDY PROGRAM



West Point  
**READY** 

READY TO SERVE. READY TO LEAD.





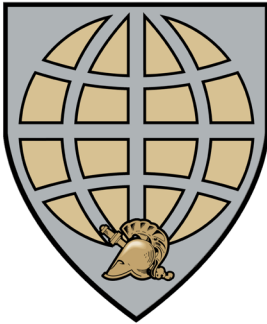
MAJ Jim Hughes and cadets in front of a supercell shortly after observing a tornado that touched down south of Roswell, NM on 30 May, 2021. Cadets reported the tornado to the National Weather Service, triggering a tornado warning.



Cadets compare field notes, maps, and descriptions to the surrounding landscape in Garden of the Gods, Colorado Springs.



DEPARTMENT OF GEOGRAPHY  
& ENVIRONMENTAL ENGINEERING



West Point's broad-based education creates officers well suited to approaching problems or questions from a variety of perspectives. Much of what cadets learn from their education and studies will be applied outside of the classroom, long after their four years at West Point have come to an end. Indeed, knowing how to take what one has learned and

apply that knowledge in unknown or changing circumstances is a skill required of any leader in our increasingly interconnected world. This makes bridging the classroom to "real world" divide demonstrably more important for West Point cadets, who will eventually be called upon to make decisions and interpretations in their personal and professional military lives. This will often occur while serving internationally and perhaps even in times of war or national crisis.

The Earth Science Field Study Program will encompass all earth science-related Advanced Individual Academic Development (AIAD)s. Gift funds will allow cadets to participate in two- to three-week AIADs focusing on geology, aquatic science, meteorology, and a host of other earth science topics. The experience will offer field-based education, and introduce and reinforce disciplinary depth, critical thinking and creativity, and lifelong learning skills not easily developed in the classroom. The location of the course would vary based on the subject. For example, the Colorado Rockies would be a potential location for a geology field course, and the Severe Weather AIAD could cover multiple states as it follows different significant weather events.

The Earth Science Field Study Program will provide experiential learning that enables cadets to better understand some of the abstract scientific concepts presented in the classroom, achieving USMA Academic Program Goals. The value of such "hands-on" learning is exponentially greater than the learning achieved only via classroom lecture, and field courses can capitalize on it. These AIADs will bring the classroom to life for the cadets, similar to how staff rides are used to effectively immerse military leaders in the landscape. For example, when taught in the classroom, West Point's Physical Geology course has 10 lab exercises and one field trip; when taught as Field Geology in the summer, the hands-on learning is increased over three times (to 70+ hours, all field time). By taking a field course for credit in the summer, cadets are afforded the opportunity to add an additional class in the academic year that can assist in adding a minor, conducting a semester abroad, competing for scholarships, or graduating with honors.

The relationships cadets build and the understanding they gain from these experiences will grow the skill set needed as they become Army officers. Often a cadet's senior capstone project is directly augmented or informed by an AIAD experience. The Earth Science Field Study Program is a part of West Point's Department of Geography and Environmental Engineering. The department's programs in geography, the environment, and geospatial information science are critical to the needs of the Army and to the continued security of the country. Through course work, research, internships, and cutting-edge technology, cadets are inspired to think globally and geospatially and apply their understanding of human-environment interactions to develop culturally appropriate, sustainable solutions. This background, improved by field experiences such as the Earth Science Field Study Program, prepares cadets to become strong and adaptive leaders in a rapidly changing world.

## EARTH SCIENCE FIELD STUDY PROGRAM EXPERIENCES

### *Geology Field Course*

Cadets learn physical geology hands-on by applying their knowledge of rocks and minerals, together with a compass and a hand lens, to generate their own version of a geologic map. Through partnership with the US Air Force Academy (USAFA), we examine world-class geology throughout Colorado; experiences difficult to replicate in the Northeast. Cadets investigate geological processes that shape the Earth and concentrate the natural resources necessary for modern society. At each site, cadets lead peer discussions about geology and the stories that the rocks have to tell over billions of years. Melanie Yell '24 said, "I'm grateful for this experience. There's a rich geological history in Colorado, but also American history. Geology relates to my Geospatial Information Sciences major so that I can have a better understanding of the earth that I will be studying." Matthew Marino '21 summed it up succinctly saying, "A textbook can't do this."

### *Aquatic Science Field Course*

West Point is strategically located along the Hudson River estuary, and is within easy driving distance of exemplary wetland, lake, river, and ocean ecosystems. Yet, our schedules and the seasonal weather limits our ability to expose cadets to these ecosystems at their peak productivity. In this course, cadets will combine experiences with basic and applied science, tracing the water cycle from watersheds such as the Hudson River headwaters at Lake Tear of the Clouds, through the river continuum that supports creeks, tributaries, saltwater estuaries, coastlines, and eventually the Atlantic Ocean. We visit State and Federal Agencies responsible for ensuring clean, safe water for humans while protecting our most vital natural resource. Cadets lead peer discussions on course concepts as well as tracing the history of Environmental Law, born in the Hudson Valley and commonly referred to as Storm King Doctrine. This course is muddy-boots science where cadets see, hear, smell, and catch-and-release the flora and fauna of aquatic ecosystems, often donning waders to experience it.



Cadets identify and quantify fish and macroinvertebrates during a water chemistry lab in the Hudson River.

### *Severe Weather AIAD*

West Point cadets spend 11 days exploring the Great Plains and Southwest United States to experience and learn about severe weather. The Severe Weather Preparedness and Training AIAD is largely unscripted to allow the team to assess and move to severe thunderstorm activity across the region. This allows them to witness a variety of weather phenomena including supercells, rotating wall clouds, shelf clouds, mammatus clouds, dramatic lightning, large hail, gustnadoes, and intense downdrafts.

The trip also fosters an appreciation of how severe weather impacts military installations, and through numerous base visits, cadets learn about the Air Force's essential role to provide weather support to the Army, which will inform them as future leaders. Cadet feedback shows the value of immersive learning. CDT Cammack Shepler '23 notes that, "This AIAD helped solidify concepts learned in a classroom environment by providing real-life examples. Also, this helped to contextualize class content in new and personal ways."



CDT Anna Tovkach '22, explores an ice cave on one of Iceland's glaciers adjacent to active volcanic landscapes.

### *Iceland AIAD*

A land of fire and ice, Iceland provides four cadets an opportunity to experience the creation and destruction of the Earth's surface firsthand. On a full country tour, cadets will explore these unique landscapes and experience how humans have adapted to these extreme conditions. Iceland has the most accessible glaciers, volcanoes, tectonic activity, and geothermal fields of any location all within a day's journey. Cadets will discuss and explore contemporary issues like climate change, innovative methods of power generation, cultural geography, and the strategic importance of Iceland in the Atlantic Ocean from World War II to the current mission of NATO. Cadets complete short staff-ride style briefs at significant locations and maintain a journal during travel.





# FUNDING OPPORTUNITIES

**GENEROUS GRADUATES AND FRIENDS OF THE ACADEMY WHO SUPPORT THE EARTH SCIENCE FIELD STUDY PROGRAM WILL TAKE PRIDE IN THE TRANSFORMATIVE POWER OF THEIR GIFTS.**

Earth Science Field Study Program Endowment ..... \$560,000  
One Cadet ..... \$125,000 endowment/\$5,000 annual

MARGIN OF  
EXCELLENCE



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