UNIVERSITY AT ALBANY State University of New York Department of Atmospheric and Environmental Sciences



The University at Albany is an internationally recognized public research institution located in the state capital of New York.

Established in 1844 and designated a university in 1962, UAlbany puts the world within reach for nearly 18,000 students at the *graduate* and *undergraduate* levels.



The Department of Atmospheric and Environmental Sciences offers two undergraduate degrees: a *Bachelor of Science (B.S.) in Atmospheric Science,* and an interdisciplinary *Bachelor of Science (B.S.) in Environmental Science.* Both degrees are recognized as being particularly challenging and attract students of high caliber who are interested in studying the fundamental processes operating within the atmosphere and broader environment. Students pursuing the B.S. degree in Environmental Science are required to also choose one of four concentrations (*Climate Change, Ecosystems, Sustainability Science and Policy,* or *Geographic Information Systems*) which dictates their coursework after a core group of environmental science requirements.

The current group of faculty cover a broad range of research interests in the atmospheric and environmental sciences. The research and teaching can be organized into three broad headings: *Synoptic and Mesoscale Meteorology, Climate and Environmental Systems,* and *Atmospheric Chemistry and Physics*.

In addition to a wide range of course offerings with small class sizes in both majors, the department provides students with numerous opportunities beyond the classroom setting. Many of our students do internships directly related to their major at some point in their undergraduate studies. Atmospheric science majors can intern at the National Weather Service and the New York State Mesonet, both on campus and short walks from the department. Environmental science majors may intern at the Department of Environmental Conservation or with one of several public or private environmental or atmospheric science organizations in the region. Students may also choose to take on their own research project for academic credit, overseen by one of our expert faculty members, and possibly presented by the student at a local conference.



Map of UAlbany and ASRC/NWS

Strategic Location: The University at Albany enjoys a strategic location in the City of Albany. The capital of the State of New York offers something for everyone, the center of a region remarkable for its natural and cultural resources.

The Capital Region includes the cities of *Albany, Schenectady, Troy,* and *Saratoga Springs,* and has a population of approximately 875,000. Within a short distance are the Berkshires, the Catskills and the Adirondacks, the latter of which is the largest wilderness area east of the Mississippi River. Major ski areas such as Killington, Gore, Hunter, and Mt. Snow are within easy driving distance.

Within Reach: Geographically, the city of Albany is only:

- •150 miles from New York City
- •175 miles from Boston
- •225 miles from Montreal, Quebec.

The New York State Thruway and two major interstate highways intersect one mile from the main campus. Bus, rail, and air terminals are all within ten minutes of UAlbany's campus.



Department of Atmospheric and Environmental Sciences

Bachelor of Science in ATMOSPHERIC SCIENCE

The **Atmospheric Science program** at the University at Albany is internationally renowned. The combination of the Department of Atmospheric and Environmental Sciences (DAES) and the Atmospheric Sciences Research Center (ASRC) gives the University the largest program of education and research in the atmospheric sciences in New York State, and one of the largest in the nation. In addition, the National Weather Service's regional office and the New York State Mesonet are both located on the main UAlbany campus. This gives students in the department a unique opportunity to work closely with researchers and forecasters in multiple fields of study within the atmospheric sciences.

Typical B.S. Program in Atmospheric Science (Required courses in **bold**)

Semester 1 MAT 112 (Calculus I) PHY 140/145 (Physics I with Lab) CHM 120 (Chemistry I) Elective/University Gen Ed. Requirement

Semester 3 MAT 214 (Calculus III) ATM 315 (Env. Statistics/Comp.) ATM 209 (Weather Workshop) ATM 210 (Atmos. Structure, Thermo, Circ.)

Semester 5 ATM 316 (Dynamic Meteorology I) ATM 320 (Thermodynamics) ATM Elective Electives/Gen-eds Semester 2 MAT 113 (Calculus II) PHY 150 (Physics II) Elective/University Gen Ed. Elective/University Gen Ed.

Semester 4 MAT 311 (Differential Equations) ATM 211 (Weather Analysis & Forecasting) Elective/University Gen Ed. Elective/University Gen Ed.

Semester 6 ATM 317 (Dynamic Meteorology II) ATM 321 (Physical Meteorology) ATM 350 (Meteo. Datasets & Computation) Electives/Gen-eds



<u>Internships</u>

<u>Internships</u>:

DAES allows multiple internship opportunities. Some examples are:

Liccuves/ Gen cus

Semester 7 ATM 418 (Dynamic Meteorology III) ATM Elective/Internship/Research ATM Elective/Internship/Research Electives/Gen-eds Semester 8 ATM 419 (Numerical Weather Prediction) ATM Elective/Internship/Research ATM Elective/Internship/Research Electives/Gen-eds

Examples of Electives in Atmospheric Science

ATM 305 (Global Physical Climatology) ATM 306 (Climate Change and Variability) ATM 311 (Severe and Hazardous Weather) ATM 327 (Meteorological Instrumentation) ATM 335 (Meteorological Remote Sensing) ATM 400+401 (Synoptic Meteo. I+II)

ATM 405 (Water and Climate Change) ATM 409 (Precipitation Processes) ATM 413 (Weather, Climate, Societal Impacts) ATM 414 (Air Pollution) ATM 415 (Climate Laboratory) ATM 421 (Tropical Meteorology)



The department's weather map room



National Weather Service (NWS)

The NWS Forecast Office in Albany, a 10minute walk from DAES, provides an internship that allows students to work with forecasters, launch weather balloons, assist with the forecast process, conduct storm damage surveys, pursue research projects, visit observation sites, etc.

New York State Mesonet

The NYS Mesonet, started in 2015, is a dense network of 126 weather stations across the state. With its control center on campus, students can intern in this project and support field technicians, monitor network communications, assure data quality, and work on related research utilizing Mesonet data.

Broadcast Meteorology

Students can intern with a local TV meteorologist. Duties include working behind the scenes on weather graphics, and practicing on-air time leading to a demo tape.



<u>Research</u>



Research projects are required for students pursuing an Honors degree, but research is also encouraged for any atmospheric science major interested in gaining a deeper understanding of a part of the field. In many cases, students have also had the opportunity to present their research at meteorology conferences. Some of our recent undergraduates' research includes:

• Investigation of a new variable used for tornado prediction

A forecaster launches a weather balloon from the NWS office, located on the UAlbany campus

- Upstream precursors to major lake-effect snowstorms in western New York
- A case study of a major "upslope" snow event in Vermont
- A case study of heavy snowfall bands in a major northeast blizzard
 A climatology of tropical moisture plumes in the Southern Hemisphere

Department of Atmospheric and Environmental Sciences

Bachelor of Science in ENVIRONMENTAL SCIENCE

Addressing environmental problems from a scientific perspective is becoming ever more import in today's world. We are faced with an increasing number of environmental challenges such as air pollution, water and soil contamination, climate change, land degradation and loss of biodiversity. Training the next generation of environmental scientists is therefore a mission of critical importance. **The B.S. degree in Environmental Science** at the University at Albany offers an excellent education and training in these areas and prepares our students for a successful career with governmental or non-governmental organizations, environmental consulting firms or graduate school. Our faculty members are engaged in world-class research relevant to the needs of society and focusing on a wide variety of aspects within the earth system, including research on planetary, atmospheric, hydrologic, cryospheric and terrestrial processes. Our students are also required to take some classes in the Geography and Biology Departments, where some are exposed to biologic and ecologic aspects of environmental science, while some trained in computer mapping and Geographic Information Systems (GIS).

Prof. Mathias Vuille working on an automated weather station at 5760 meters in the Peruvian Andes



Typical B.S. Program in Environmental Science

(Environmental Science *core* courses in **bold**)

Semester 1 BIO 120 (Biology I) CHM 120+124 (Chemistry I and Lab) MAT 112 (Calculus I) Elective/University Gen Ed.

Semester 3 PHY 140 (Physics I) GEO 221 (Understanding the Earth) BIO 201 (Intro. Biology Lab I) Elective/University Gen Ed. Elective/University Gen Ed. Semester 2

BIO 121 (Biology II) CHM 121+125 (Chemistry II and Lab) ENV 105+106 (Intro. Env. Sci.+Lab) Elective/University Gen Ed.

Semester 4 BIO 202 (Intro. Biology Lab II) ATM 210 (Atmos. Structure, Thermo., Circ.) ENV 315 (Env. Stats. and Computation) Elective/University Gen Ed. Elective/University Gen Ed.

Semester 5 ENV 302 (Ocean Science) BIO 330 (Principles of Ecology and Evolution) Specialization Requirement Elective/Gen Ed. Elective/Gen Ed.

Semester 7 Specialization Requirement Specialization Elective Specialization Elective Elective/Internship/Research

<u>Semester 6</u>

ENV 327 (Meteo. and Env. Measurement) Specialization Requirement Specialization Requirement Elective/Gen Ed. Elective/Gen Ed.

Semester 8

ENV 490 (Major Topics in Env. Science) Specialization Elective Specialization Elective Elective/Internship/Research

Environmental Science Concentrations Required Courses

<u>Climate Change</u>

Climate Variability and Change Water and Climate Change Climate Laboratory Paleoclimatology

<u>Ecosystems</u>

Introductory Genetics

Experimental Ecology

Evolution

Geography

Sustainability Science and Policy

Introductory Urban Geography Introduction to Cartography Geographic Information Systems Air Quality Environmental Sustainability Topics in Political Science and/or Public Policy

Internships:

Internships:

DAES students have many nearby opportunities for **paid and volunteer internships and seasonal jobs**, all of which can provide students with a valuable learning experience and credit towards the major. Some examples are:

• NY State Department of Environmental Conservation_is the state agency tasked with

- protecting and enhancing the environment of New York.
- NY State Museum houses a wealth of artifacts on the ecology, geology, anthropology, and culture of the state.
- New York State Mesonet is a network of 125 environmental stations across the state based on the UAlbany campus.
- Albany Pine Bush Preserve Commission protects and manages open space and wildlife



at the one of the best remaining examples of an inland pine barrens ecosystem in the world
Huyck Preserve and Biological Research Station is a non-profit organization with over 2,000 acres of forest, field, and wetland habitat. It is dedicated to research, education, recreation, and conservation.

Prof. Justin Minder's Adirondack Environment class trip to Whiteface Mountain

Department of Atmospheric and Environmental Sciences

Research and Teaching





Tropical Cyclones and Tropical Meteorology





Dr. Lance Bosart

Dr. Kristen Corbosiero Dr. John Molinari Dr. Paul Roundy Dr. Brian Tang Dr. Christopher Thorncroft Dr. Ryan Torn

Climate and Environment Systems



Physical Meteorology and Atmospheric Chemistry



Dr. Vince Idone

Dr. Robert Keesee

Dr. Justin Minder

Dr. Christopher Walcek

...and other Faculty in the



