Bachelor of Science Degree in Atmospheric Science

The Atmospheric Science program at the University at Albany is nationally and internationally renowned. The combination of the Department of Atmospheric and Environmental Sciences (DAES) and the Atmospheric Science Research Center (ASRC) gives the University the largest program of education and research in New York State, and one of the largest in the nation. Additionally, the National Weather Service’s regional office is collocated with the ASRC on the main 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.

Faculty research covers a broad range of interest in the atmospheric and environmental sciences. Topics of research and study include:

- Synoptic-dynamic meteorology
- Weather systems and predictability
- Climate and climate change
- Atmospheric chemistry and pollution
- Mesoscale meteorology
- Hurricanes and tropical meteorology
- Cloud and precipitation physics
- Meteorological instrumentation

Research and Teaching Facilities

Maproom (right): DAES runs a fully equipped electronic map room with satellite, radar, lightning, and model data. The room is used for teaching and frequent weather discussions. The room also houses Linux workstations on which students can study or hone their forecasting skills in one of our many forecast contests.

Whiteface Mtn. Observatory (below): ASRC operates an observation center atop Whiteface Mountain in the Adirondacks, measuring chemical species, cloud properties, acid precipitation, and aerosol content.
Atmospheric Science Curriculum

Students planning to study atmospheric science should have a good academic preparation in physics and mathematics. Below is a sample four-year plan for an atmospheric science major, with **required classes listed in bold** (including twelve elective credits):

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Additional (Elective) Courses

- ATM 100: The Atmosphere
- ATM 103: Introduction to Climate Change
- ATM 107: The Oceans
- ATM 110: Weather and Climate Issues for the 21st Century
- ATM 200: Natural Disasters
- ATM 301: Surface Hydrology and Hydrometeorology
- ATM 304: Air Quality
- ATM 305: Global Physical Climatology
- ATM 306: Climate Variability and Change
- ATM 307: Atmospheric Chemistry
- ATM 311: Severe and Hazardous Weather
- ATM 327: Meteorological and Environmental Measurement
- ATM 335: Meteorological Remote Sensing
- ATM 400: Synoptic Meteorology I
- ATM 401: Synoptic Meteorology II
- ATM 405: Water and Climate Change
- ATM 409: Precipitation Processes
- ATM 413: Weather, Climate Change, and Societal Impacts
- ATM 414: Air Pollution
- ATM 415: Climate Laboratory
- ATM 421: Tropical Meteorology

*In Dynamic Meteorology, students use a rotating fluids tank in order to demonstrate fundamental atmospheric processes.*
Internship and Research Opportunities

**Internships:**
DAES allows multiple internship opportunities, all of which provide students with a valuable learning experience and credit towards the major. Some examples are:

**National Weather Service (NWS)**
The NWS Forecast Office in Albany, a 10-minute 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 125 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.

**Research:**
Many students work on a research project with a faculty member during their junior or senior year. Research ideas may come directly from faculty, but students often come up with their own ideas that fit with a specific faculty member's research interests.

Some recent undergraduate research projects are:

- Large-scale precursors to major lake-effect snow events
- The effect of the Appalachians on mid-summer squall lines
- Using the convective available potential energy tendency equation in the analysis of a major severe weather outbreak
- Case study of an unusually strong late summer Arctic cyclone
- Processes that lead to an abundance of eastern U.S. heat waves in late August and early September
- Lightning in complex terrain for varying weather patterns
- Analysis of tornado track length and downdraft strength
- Case study of the major tornado outbreak of 27 April 2011
- Warm-season Mohawk–Hudson convergence thunderstorms
Honors Program:
Students with a cumulative GPA of at least 3.25, and 3.5 in the major, are eligible to apply for a B.S. with honors in atmospheric science. Students must complete 82 credits including two semesters of Undergraduate Research (ATM 499) leading to an undergraduate thesis and oral presentation.

Graduate Program:
Our department also has an active graduate program, offering Ph.D. and M.S. degrees in atmospheric science. A multitude of prominent research in atmospheric science has come from graduate work at UAlbany, and many of our alumni are now employed at some of the top research and teaching facilities in the world.

Minors:
While adding a minor isn’t required for atmospheric science majors, many of our students choose to minor in one of these related fields:
- Math (only two additional courses required)
- Physics
- Chemistry
- Computer Science
- Broadcast Meteorology (only for atmos. Sci. majors)
- Sustainability
- Business
- Informatics
- Geographic Information Systems (Certificate)

Careers:
Many of our undergraduate degree recipients continue their education in graduate school, although there are a significant number of jobs available to students with Bachelor’s degrees. Some of the more common jobs are in:
- Research
- Teaching
- Air quality monitoring
- Weather forecasting (private sector and NOAA)
- TV broadcasting and production
- Solar and wind energy, and energy forecasting
- Risk management
- Finance/derivatives
- Meteorological instrumentation
- Environmental legislation
- Forensic meteorology
- Scientific and engineering consultation

Students launching a weather balloon in ATM 327
Preparing an ATM 401 discussion
Graduates at the senior dinner and faculty roast
Faculty Research Interests and Contact Information

Lance F. Bosart, Distinguished Professor (Ph.D., MIT)
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Synoptic meteorology and the weather-climate interface

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Tropical cyclones and lightning

Aiguo Dai, Associate Professor (Ph.D., Columbia Univ.)
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Climate change and the global water cycle

Oliver Elison Timm, Associate Professor (Ph.D. Univ. of Kiel)
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Paleoclimatology and regional climate change

Robert Fovell, Professor (Ph.D., Univ. of Illinois)
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Numerical weather prediction and mesoscale meteorology

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Atmospheric electricity

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Atmospheric chemistry

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Synoptic-dynamic meteorology

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Synopt meteo. and troposphere-stratosphere interaction

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Synoptic and mesoscale meteorology, and forecasting

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Atmosphere-ice-ocean interactions

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Mountain meteorology and mesoscale meteorology

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Tropical cyclones

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Planetary-scale climate dynamics

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Tropical atmospheric waves and midlatitude interaction

Brian H. Tang, Assistant Professor (Ph.D., MIT)
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Tropical cyclones and mesoscale meteorology

Christopher D. Thorncroft, Professor and Dept. Chair (Ph.D., University of Reading)
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West African monsoon and African easterly waves

Ryan Torn, Associate Professor (Ph.D., Univ. of Washington)
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Predictability, data assimilation, and mesoscale meteorology

Kevin R. Tyle, Manager of Departmental Computing (M.S., University at Albany)
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Big data, and meteorological data visualization

Mathias Vuille, Associate Professor (Ph.D., Univ. of Bern)
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Tropical paleoclimatology and climate change

Junhong Wang, Research Associate Professor (Ph.D., Columbia University)
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Climate observations and instrumentation

Liming Zhou, Associate Professor (Ph.D., Boston University)
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Remote sensing and land-climate interactions

CONTACT THE DEPARTMENT

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