ATMOSPHERIC SCIENCES, PHD

for the Doctor of Philosophy in Atmospheric Sciences

Graduate programs leading to the Master of Science and Doctor of Philosophy degrees are offered. Opportunity also exists for specializing in computational science and engineering within the department's graduate programs via the Computational Science and Engineering (CSE) Option.

Admission

Applications for admission are encouraged from students with bachelor's degrees in atmospheric sciences, meteorology, physics, mathematics, computer science, geography, engineering, oceanography, and related fields. It is strongly recommended that students who intend to study for advanced degrees in atmospheric sciences know the fundamentals of classical physics and applied mathematics. Applicants whose native language is not English are required to take the English Placement Test if accepted. All applicants are required to submit three letters of reference.

Faculty Research Interests

The atmospheric science degree programs are designed for students interested in research and applications on a wide variety of atmospheric topics. Faculty areas of research include atmospheric chemistry and aerosols; climate modeling, processes, change, and assessments; cloud physics and radiative processes; convective-storm dynamics and modeling; extratropical cyclones and winter storms; precipitation and hydrometeorological processes; satellite and radar remote sensing; tropical meteorology and hurricanes; and weather and climate risk. This research is carried out in national field campaigns, in theoretical studies, and in numerical modeling efforts using a wide range of models.

Research Facilities

The Department maintains an extensive computing infrastructure, which is a vital component of all of its educational, research and outreach endeavors. A Departmental computer lab is available for hands-on class exercises. Computers and display projectors are provided in classroom areas, and wireless access exists throughout the buildings. The Department hosts a synoptic/GIS laboratory, a data visualization laboratory, and an instruments lab all within the Natural History Building. A high-capacity network connects these to various computing resources on campus as well as within the Department.

The cornerstone of the Department's research computing capabilities is the compute cluster *Keeling,* which currently is composed of several thousand CPU cores and TB of storage. *Keeling* allows for numerical simulation and analysis of atmospheric processes ranging from the formation of individual ice crystals to century long climate simulations over the globe and are used for storing, analyzing and visualizing the results. Our faculty research groups regularly take advantage of high-performance computing resources, including the Blue Waters Petascale computing facility, and the NCAR Supercomputing facility.

We receive and process a large quantity of real-time meteorological data and numerical forecasts from a variety of sources including NOAA, UCAR, peer institutions, and international vendors. These are analyzed and visualized with a variety of tools to aid in the understanding of current weather events and case studies of recent major events.

Finally, the Department has numerous capabilities for meteorological observations and measurement in teaching and research. These include: a QuantAQ system, used to collect data on air quality; two iMET mobile sounding systems; a trailer-mounted, 915 MHz radar wind profiler, manufactured by Radiometrics; and SCAMP (System for Characterizing and Measuring Precipitation (SCAMP), which is designed to quantitatively characterize the vertical profile of precipitation particles, measure the particle size distributions and surface precipitation, and also document the scavenging of air particulates by the falling precipitation. SCAMP includes a Micro Rain Radar, an OTT Parsivel Optical Disdrometer, an MPS Particle Spectrometer, a Geonor T-200B Precipitation Gauge, a TSI Optical Particle Sizer, and a Lufft Ultrasonic Weather Station. All of these instruments can be mounted on a flatbed trailer, and transported by the Department's Ford Cargo Van.

Financial Aid

More information is available on the Department Website (https://atmos.illinois.edu/admissions/graduate/graduate-financial-aid/).

for the Doctor of Philosophy in Atmospheric Sciences

For additional details and requirements refer to the department's Graduate Programs (https://www.atmos.illinois.edu/) and the Graduate College Handbook (http://www.grad.illinois.edu/gradhandbook/).

Atmospheric Sciences, PhD

Entering with approved B.S. (Direct to Ph.D.)

Code	Title	Hours
Students are required to take 5 of the 6 courses listed below:		**20**
ATMS 420	Atmospheric Chemistry	
ATMS 500	Dynamic Meteorology	
ATMS 505	Weather Systems	
ATMS 507	Climate Dynamics	
ATMS 510	Precipitation Physics	
ATMS 511	Atmospheric Radiation	
ATMS 599	Thesis Research	16
Additional approved graduate level courses (excluding ATMS 599)		28
Additional approved graduate level courses (including ATMS 599)		32
Total Hours		96

Entering with an approved M.S. degree

Code	Title	Hours
Stage I Equivalent (32 Hours) Satisfied by previous Masters degree (from either within the ATMS department or an approved MS from outside the ATMS department)		
Core courses (or equivalents) required if not completed during their M.S. degree:		0-24
ATMS 420	Atmospheric Chemistry	
ATMS 500	Dynamic Meteorology	
ATMS 505	Weather Systems	

ATMS 507	Climate Dynamics	
ATMS 510	Precipitation Physics	
ATMS 511	Atmospheric Radiation	
ATMS 599	Thesis Research	16
Additional approved graduate level courses (excluding ATMS 599)		24
Additional approved graduate level courses (including ATMS 599)		24
Total Hours		**64-88**

Graduate Other Degree Requirements

Requirement	Description
Other requirements may overlap	
Qualifying Exam Required	No
Preliminary Exam Required	Yes
Final Exam/Dissertation Defense Required	Yes
Dissertation Deposit Required	Yes
Minimum GPA:	3.0

for the Doctor of Philosophy in Atmospheric Sciences

1. All graduate students will have a fundamental understanding of the core theoretical underpinnings of atmospheric sciences.
2. All graduate students will have a high level of expertise in their chosen research field within the atmospheric and related sciences, and the ability to apply theoretical and technical skills to novel and long-standing problems relevant to society.
3. All graduate students will have the ability to formulate a research problem, demonstrate the value of its solution in advancing knowledge, and develop an approach towards solving that problem.
4. All graduate students will have ethically responsible and effective communication skills, written and verbal, at a professional scientific level.
5. All graduate students will have knowledge of the frontiers in atmospheric science research.

Graduate Degree Programs in Atmospheric Sciences

- Atmospheric Sciences, MS (http://catalog.illinois.edu/graduate/las/atmospheric-sciences-ms/)
- Weather and Climate Risk and Analytics, MS (http://catalog.illinois.edu/graduate/las/weather-climate-risk-analytics-ms/) (online)
- Atmospheric Sciences, PhD (p. 1)

for the Doctor of Philosophy in Atmospheric Sciences

Department of Climate, Meteorology & Atmospheric Sciences

CliMAS Website (https://climas.illinois.edu/)

CliMAS Graduate Programs (https://climas.illinois.edu/academics/graduate-programs/)
E-mail: atmos-sci@illinois.edu
CliMAS Faculty (https://climas.illinois.edu/directory/faculty/)

Admissions Requirements

Graduate Program Admissions & Requirements in CliMAS (https://climas.illinois.edu/academics/graduate-programs/)

CliMAS Graduate Contacts

Francina Dominguez, Director of Graduate Studies, francina@illinois.edu
Brenda Roy, Graduate Contact, broy@illinois.edu

School of Earth, Society & Environment

SESE Website (https://earth.illinois.edu/)

College of Liberal Arts & Sciences

LAS Website (https://las.illinois.edu/)