ATMOSPHERE AND OCEAN SCIENCE AND MATHEMATICS (PHD)

Department Website (http://caos.cims.nyu.edu)

NYSED: 22665 **HEGIS:** 1799.00 **CIP:** 27.9999

Program Description

The importance of climate research is universally acknowledged because of its obvious importance to all life on our planet. Pushing the boundaries of the fundamental understanding of complex climate processes that occur and interact over vastly different length and time scales is crucial for reducing the uncertainty in climate forecasts.

Our center offers an interdisciplinary PhD in Atmosphere Ocean Science and Mathematics (AOSM). The program shares many exciting features with the PhD in Mathematics. Our goal is to train mathematically talented students both in the tools of modern applied mathematics and disciplinary atmosphere-ocean science. By drawing students from new pools of talent, our program seeks to be a significant channel for the recruitment and training of excellent students into the important and highly interdisciplinary fields of atmosphere, ocean, and climate science. We are committed to the education and training of our graduate students.

The Courant Institute at New York University has a world-leading reputation in applied mathematics and scientific computation and the placement of the Center within the Courant Institute provides a unique platform for interdisciplinary research. Our students greatly benefit from being part of the broader NYU community, and the NYC area.

Who Should Apply

The AOSM PhD program lies within the Mathematics Department (https://math.nyu.edu/dynamic/) and is a closely-related sibling program to the PhD in Mathematics (https://math.nyu.edu/dynamic/graduate/overview/). We seek to admit and train scholars who possess great intellectual potential to shape the future of the atmospheric and oceanic sciences, building bridges between applied mathematics and climate research.

Candidates should have: (1) a strong background in mathematics, physics, and/or engineering; (2) experience in research (or the equivalent, e.g., through work or outreach); and (3), most importantly, a sincere interest (but not necessarily experience) in the dynamics that underlie Earth's climate.

Intellectual potential, a passion to understand the climate system, and the tenacity to overcome obstacles are the key attributes of successful PhD students in our program. These qualities can be demonstrated in many ways. Our students come from all across the United States and world, bringing diverse interests (from pure math to applied physics), educational, and life experiences.

We strongly encourage applications from women, racial and ethnic minorities, and other individuals who are under-represented in our field, across color, creed, race, ethnic and national origin, physical ability, gender, and sexual identity.

Please refer to the AOSM Degree Requirements (https://caos.cims.nyu.edu/dynamic/phd-program/degree-requirements/) page for further information on coursework, examinations and other aspects of the program.

Admissions

All applicants to the Graduate School of Arts and Science (GSAS) are required to submit the general application requirements (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc.html), which include:

- Academic Transcripts (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/academic-transcripts.html)
- Test Scores (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/test-scores.html) (if required)
- Applicant Statements (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/statements.html)
- Résumé or Curriculum Vitae
- Letters of Recommendation (https://gsas.nyu.edu/nyu-as/gsas/admissions/arc/letters-of-recommendation.html), and
- A non-refundable application fee (https://gsas.nyu.edu/admissions/arc.html#fee).

See Mathematics (https://gsas.nyu.edu/admissions/arc/programs/mathematics.html) for admission requirements and instructions specific to this program.

Program Requirements

PhD candidates for the Program in AOS and Mathematics are expected to be full-time students. The program normally requires five years of full-time study. The requirements for the PhD are the following:

Course	Title	Credits
Major Requirements		
MATH-GA 2701	Methods of Applied Mathematics	3
MATH-GA 2702	Fluid Dynamics	3
MATH-GA 3001	Geophys Fluid Dynamics	3
MATH-GA 3003	Ocean Dynamics	3
MATH-GA 3004	Atmosphere Dynamics	3
MATH-GA 3011	Adv Top in Atmosphere	3
Additional Requirements		
Additional Graduate Mathematics Courses (by advisement)		30
PhD Research (by advisement)		20
PhD Seminar (by advisement)		4
Total Credits		**72**

Additional Program Requirements

Written Comprehensive Exam

The written examination tests the basic knowledge required to begin PhD study in Atmosphere Ocean Science and Mathematics. All of the information found on the Mathematics PhD Written Examination page (https://math.nyu.edu/dynamic/graduate/phd-mathematics/written-comprehensive-exams/) applies here, with the exception that AOSM PhD students replace the exam in Complex Variables with an exam in Geophysical Fluid Dynamics (GFD).

Oral Preliminary Exam

The purpose of the oral examination is to determine if the candidate has acquired sufficient knowledge and maturity to commence dissertation research. The oral examination is comprised of a General section and a

Special section, each lasting one hour, and conducted by two different panels of three faculty members. The exam sections are usually taken together during the spring of Year II, but are offered each fall, mid-winter and late spring.

Dissertation Defense

The written dissertation should be based primarily on research published in peer-reviewed journals (at least one should be accepted before defending). The Graduate School of Arts and Sciences at NYU sets requirements for all NYU PhD dissertations; these may be found at the Doctoral Dissertation Submission Guidelines page (http://gsas.nyu.edu/academics/submitting-your-dissertation.html). Note in particular that *students must register for graduation on Albert at least **five** months prior to the defense.*

Dissertation Approval & Submission

Students must submit their dissertation for approval.

Departmental Approval

All Graduate School of Arts & Science doctoral candidates must be approved for graduation by their department for the degree to be awarded.

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
MATH-GA 2701	Methods of Applied Mathematics	3
MATH-GA 2702	Fluid Dynamics	3
MATH-GA 3001	Geophys Fluid Dynamics	3
PhD Elective		3
	Credits	**12**
2nd Semester/Term		
MATH-GA 3003	Ocean Dynamics	3
PhD Elective		3
PhD Elective		3
PhD Elective		3
	Credits	**12**
3rd Semester/Term		
PhD Elective		3
PhD Elective		3
PhD Elective		3
PhD Elective		3
	Credits	**12**
4th Semester/Term		
MATH-GA 3004	Atmosphere Dynamics	3
MATH-GA 3011	Adv Top in Atmosphere	3
PhD Elective		3
PhD Elective		3
	Credits	**12**
5th Semester/Term		
PhD Elective		3
PhD Elective		3
PhD Elective		3
PhD Elective		3
	Credits	**12**
6th Semester/Term		
PhD Elective		3
PhD Elective		3
PhD Elective		3
PhD Elective		3
	Credits	**12**
	Total Credits	**72**

Following completion of the required coursework for the PhD, students are expected to maintain active status at New York University by enrolling in a research/writing course or a Maintain Matriculation (MAINT-GA 4747) course. All non-course requirements must be fulfilled prior to degree conferral, although the specific timing of completion may vary from student-to-student.

Learning Outcomes

Upon successful completion of the program, graduates will have achieved:

1. Mastery of the fundamental methods of applied mathematics and of climate science.
2. Knowledge of the theories, concepts and open questions in the student's sub-discipline of research.
3. Mastery of the tools relevant to the sub-discipline of research (e.g. computational fluid dynamics, observational tools and methods, time-series analysis, etc.).
4. Proficiency in oral and written communication appropriate to the sub-discipline of research.
5. The ability to bring a research project to fruition in the form of a peer-reviewed publication.

Policies

NYU Policies

University-wide policies can be found on the New York University Policy pages (https://bulletins.nyu.edu/nyu/policies/).

Graduate School of Arts and Science Policies

Academic Policies for the Graduate School of Arts and Science can be found on the Academic Policies page (https://bulletins.nyu.edu/graduate/arts-science/academic-policies/).