ATMOSPHERIC AND OCEANIC SCIENCES: RESEARCH PROGRAM, MS

This is a named option within the Atmospheric and Oceanic Sciences MS. (http://guide.wisc.edu/graduate/atmospheric-oceanic-sciences/atmospheric-oceanic-sciences-ms/)

For the MS Research named option, students will work with faculty, students, and staff engaged in research across the entire spectrum of topics in the Atmospheric and Oceanic Sciences.

SYNOPTIC METEOROLOGY (HTTPS://WWW.AOS.WISC.EDU/RESEARCH/SYNOPTIC/)

Understanding the synoptic and mesoscale behavior of tropical and extra-tropical cyclones requires a wide range of techniques. We are investigating tropical cyclone initiation and developing an idealized model of the cyclone life cycle. Other projects include work in forecast sensitivity, targeted observations, 4-D assimilation of satellite winds into numerical forecast models, and the nature of the mid-latitude occlusion process and cyclone decay.

CLIMATE AND CLIMATE CHANGE (HTTPS://WWW.AOS.WISC.EDU/RESEARCH/CLIMATE/)

Climate research involves defining the physical, chemical, and biological behavior of many components of the climate, modeling these components in an interactive system, and obtaining appropriate observational information to define the climate and its changes. We have ongoing studies on paleoclimate and recent climate observations and use these in conjunction with comprehensive climate system models to try to understand the characteristics and physics of climate variations on many time scales.

LARGE SCALE DYNAMICS (HTTPS://WWW.AOS.WISC.EDU/RESEARCH/DYNAMICS/)

Substantive forcing and nonlinear processes are important for large-scale dynamics of both the atmosphere and ocean circulations. The challenge remains to define and study the interactions of circulations with many time and spatial scales to understand the observed lifecycles of atmospheric and oceanic systems and the dominant variability of time and spatial scales. Our studies include atmospheric intraseasonal and interannual variability and oceanic decadal variability.

RADIATION AND REMOTE SENSING (HTTPS://WWW.AOS.WISC.EDU/RESEARCH/RADIATION/)

Radiation emitted and absorbed by the Earth's system drives the large-scale circulations of the atmosphere and ocean. We are working to understand the flow of radiant energy through clear and cloudy skies and to use measurements of radiation to remotely sense properties of the atmosphere and surface.

CLOUD AND ATMOSPHERIC PHYSICS (HTTPS://WWW.AOS.WISC.EDU/RESEARCH/PHYSICS/)

Clouds are the most visible part of weather phenomena and influence the larger-scale environment through the release of latent heat. We study the physical and chemical processes related to the formation and growth of cloud and precipitation particles (cloud and raindrops, graupel, hail, and snow crystals) and the interaction between clouds and their dynamic environments. Other projects center on processes such as atmospheric electricity, aerosol physics, and air pollution problems.

OCEANOGRAPHY (HTTPS://WWW.AOS.WISC.EDU/RESEARCH/OCEANOGRAPHY/)

The ocean acts as the flywheel of the climate system because of its huge thermal inertia and ability to regulate the atmospheric carbon content. The ocean plays a critical role in short-term climate variability (including phenomena like El Nino) and long-term climate change. Research at the University of Wisconsin focuses on the fundamental physical and geochemical processes that drive ocean circulations, and on the climatic impacts that result.