GRADUATE PROGRAM

The core of the graduate research program in the Department of Earth & Atmospheric Sciences (EAS) at Purdue University is found in three broad scientific areas that are at the forefront of earth systems discovery and learning:

- **Atmosphere-Surface Interactions**
- **Geodynamics and Active Tectonics**
- **Climate and Extreme Weather**

EAS offers graduate research programs leading to the MS and PhD degrees. We are the multidisciplinary department of the College of Science. Our research uses mathematics, physics, chemistry, biology, statistics, and computer modeling to address some of the most challenging interdisciplinary questions about the past, present and future state of the earth system. Many of our research programs include field work in the U.S. or abroad. Our department is equipped with state of the art computer and laboratory facilities for calculation, visualization, and experimentation. Currently, 96% of our students are funded by Fellowships, Research Assistantships or Teaching Assistantships. Our former students are now employed by major research institutions, liberal arts colleges, government agencies, and industry.

We invite you to join us.

PURDUE UNIVERSITY

Department of Earth & Atmospheric Sciences

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CLIMATE & EXTREME WEATHER

MODELING

ATMOSPHERE

THUNDERSTORMS

CLIMATE

CONVECTION

CLIMATE & EXTREME WEATHER (CLEW)

A record-setting overnight low temperature, or an excessive amount of daily rainfall are examples of climate extremes that occur continually around the world. These can be due simply to the natural variability

of the atmosphere and/or to anthropogenic influences on climate. Infamous weather events such as Hurricane Katrina in 2005, Superstorm '93, and the May 3, 1999 tornado outbreak in OK and KS are also regarded as extremes. Given the current level of understanding of phenomena like hurricanes, extratropical cyclones, and severe thunderstorms (which result from complex interactions between many scales of motion in the atmosphere), it is difficult to skillfully predict if these weather phenomena will become something extraordinary. Adding a sense of urgency to this already complicated problem are projections of more frequent, and perhaps more intense extreme events in future climates.

CLEW seeks to understand and predict the physical and statistical behavior of extreme weather and climate events.

AFFILIATED FACULTY

Ernie Agee
Mesoscale convection, thunderstorms and tornadoes, coherent structures and cold air outbreaks

Mike Baldwin
Characteristics of weather systems, numerical weather prediction, forecast verification, data assimilation, data mining

Noah Diffenbaugh
Climate change, biosphere-atmosphere feedbacks, paleoclimatology, Earth system modeling

Alex Gluhovsky
Atmospheric and climate dynamics: low-order models, coherent structures, predictability, time series analysis, statistics of extremes

Kevin Gurney
Global carbon cycle, inverse modeling and data assimilation, biogeochemistry, industrial CO_2 emissions modeling, climate-carbon interactions, climate change policy

Jennifer Haase
Remote sensing studies of atmospheric properties for improving numerical weather prediction

Matt Huber
Dynamics of past, present and future climates, ocean-atmosphere interactions, tracer transport

Sonia Lasher-Trapp
Cloud microphysics, precipitation, giant aerosol, cloud entrainment, numerical modeling and measurements of clouds and precipitation

Dev Niyogi
Convection initiation and land surface heterogeneity, severe weather climatology, modeling heavy precipitation, landfall hurricanes and tropical systems, Indian monsoon

Phil Smith
Dynamic meteorology, atmospheric energetics, synoptic meteorology, cyclone dynamics

Wen-Yih Sun
Geofluid dynamics, numerical modeling, boundary layer meteorology, land-atmosphere and air-sea interactions, surface hydrology

Jeff Trapp
Dynamics of mesoscale convective systems, severe thunderstorms and tornadoes, mesoscale modeling and predictability, climate change

Wen-wen Tung
Dynamical predictability, multiscale, convective systems, tropical dynamics (monsoons, waves, intraseasonal oscillation), multiscale analysis of complex time series

Qianlai Zhuang
Interactions of biosphere and atmosphere