The NCAR Mesoscale and Microscale Meteorology Laboratory. *MMM's mission is to advance the science of atmospheric prediction through understanding of the mesoscale and microscale aspects of weather and climate, and to apply this knowledge to benefit society.*

COMMUNITY FACILITIES

Weather Research and Forecasting Model – WRF is a state-of-the-art mesoscale numerical weather prediction system designed to serve both atmospheric research and operational forecasting needs. It offers a host of options for atmospheric physical processes and can run on a variety of computing platforms. It features two dynamical cores, a data assimilation system, and a software architecture facilitating parallel computation and system extensibility. The model serves a wide range of meteorological applications across scales from tens of meters to thousands of kilometers. WRF allows researchers to generate atmospheric simulations based on real data (observations, analyses) or idealized conditions. WRF offers operational forecasters a flexible and computationally-efficient platform, while providing advances in physics, numerics, and data assimilation contributed by developers in the broader research community.

The WRF system is supported for the community by MMM and is freely available for download at the link shown below. In addition to providing the code and documentation for the core WRF system, the site also provides information on WRF use, releases, known problems, code contributions, workshop and tutorial events, and related links.

More information: www.mmm.ucar.edu/wrf/users

Model for Prediction Across Scales – **MPAS** is a collaborative project for developing atmosphere, ocean, and other Earth-system simulation components for use in climate, regional climate, and weather studies. This nascent community model, being developed in collaboration with Los Alamos National Laboratory, includes a global nonhydrostatic atmosphere solver (MPAS-A) and an ocean solver (MPAS-O). MPAS-A has the potential to expand the ability of the research community to conduct fine-scale modeling of moist convection on the globe, and atmospheric motions on scales from severe thunderstorms to global modes of variability. MPAS-A offers the capability for greater lead times in tropical cyclone forecasts than can be achieved from regional models, and is well suited for regional climate applications.

More information: mpas-dev.github.io

OPPORTUNITIES

MMM organizes and hosts a number of workshops and tutorials each year in support of the community. These include the Weather Research and Forecasting (WRF) model workshop and biannual WRF tutorials, the Rising Voices (RV) workshop, and the Engineering for Climate Extremes Partnership (ECEP) workshop. ECEP and RV are part of the Capacity Center for Climate and Weather Extremes (C3WE). Other recent workshops have included those led by the NCAR Data Assimilation (DA) Program and the NCAR Geophysical Turbulence Program (GTP). Specific dates and registration details are announced to the community and posted to relevant websites several months in advance of the events.

More information:

www.c3we.ucar.edu
www.da.ucar.edu
www.ecep.ucar.edu
www.gtp.ucar.edu
www.risingvoices.ucar.edu
wrf-model.org/events/events.php

Visitor Program. MMM provides opportunities for university graduate students, professors, and community researchers to collaborate with staff members on projects that advance their research objectives, invigorate science, and align with the laboratory's goals. These include advancing the science of atmospheric prediction by developing more accurate and computationally efficient numerical models, improving effective systems of data assimilation, and creating better representations of processes not currently resolved in numerical weather prediction (NWP) models.

Accordingly the main areas of MMM research include:

- NWP research focused on advanced computational strategies and community models
- Data assimilation research focused on assimilating remotely sensed satellite and radar data at convective and/or mesoscales
- Dynamical meteorology research focused on a range of mesoscale weather systems, including thunderstorms, mesoscale convective systems, extratropical cyclones, tropical cyclones, mountain waves, and sea breezes
- Boundary-layer and turbulence research focused on basic and applied problems concerning the structure and turbulent dynamics of atmospheric and upper-oceanic boundary layers
- Physical meteorology research focused on physical and thermodynamic processes in the atmosphere, especially cloud and precipitation physics
- Regional climate research focused on improving understanding and prediction of high-impact weather and climate
- Societal research focused on the communication and use of weather-related information

Led by some of the most highly regarded scientists in the field, these research areas form the MMM Program.

More information: www.mmm.ucar.edu/about/visitors-program

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The National Center for Atmospheric Research is sponsored by the National Science Foundation. Any opinions, findings and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.