We would like to submit for your consideration Mississippi State University’s application for membership to the University Corporation for Atmospheric Research (UCAR). Mississippi State University (MSU), located in Starkville, offers undergraduate majors in meteorology and operational meteorology. MSU is a PhD (and MS) granting institution with programs that include research on many aspects of atmospheric and space related science.

Program of Studies and Research

Mississippi State University’s teaching and research as it applies to the atmosphere occurs primarily within the Department of Geosciences. The department conducts instruction and research in the fields of meteorology, climatology, geocognition, geography, geology, and geospatial analysis. The program provides unique contributions in the areas of atmospheric, earth, and environmental science, and serves as a catalyst for economic, cultural, social, educational, technological, and scientific development in the state and the region. The strong earth and atmospheric sciences components within the department enhances the comprehensive nature of related scientific research and education across MSU. The department provides fundamental education in geosciences for all students at MSU and specialized education for those students who specifically major and/or minor in Geosciences (BSc and MSc degrees) and Earth and Atmospheric Sciences (PhD degrees). Available undergraduate programs include: Geography, Professional Geology, Environmental Geoscience, Broadcast Meteorology, Professional Meteorology, and Geographic Information Systems. The MSc degree includes concentrations in professional meteorology/climatology, geology, geography, geospatial sciences, and environmental science, as well as a specialized non-thesis concentration in broadcast meteorology. In addition, the Department of Geoscience offers a doctoral program in Earth and Atmospheric Science.

The Department of Geosciences currently has 16 tenure-track faculty, of which 10 are tenured. Additionally, there are seven full-time instructors, 40 MSc-level students, and 27 Ph.D.-level students. Over the past five years (from 2010-2015) there were a total of 109 graduate degrees awarded from the on-campus programs (97 MSc, 12 Ph.D.; 43 with a specific emphasis on atmospheric science), while over the period 2012-2015 there were a total of 237 MSc degrees awarded from distance learning programs (73 from the Applied Meteorology Program, 164 from the Teachers in Geoscience program). Regarding undergraduate degrees and enrollment, since fall semester 2010 a total of 238 BSc degrees were awarded (110 with a meteorology concentration), while current enrollment is at 201 students (113 with a meteorology concentration).

It should be noted that outside of the Department of Geosciences there are several faculty with research interests and goals in atmospheric science. Although not serving as adjunct
faculty, these researchers are currently or have been collaborators with Geoscience faculty on several projects. These faculty are mentioned here because they will both benefit from the Department’s membership in UCAR, and help to extend the existing research in atmospheric science outside of the Department of Geosciences.

**Progress in the Atmospheric Sciences**

Research in UCAR-related sciences in our program spans the fields of synoptic and mesoscale meteorology, tropical meteorology, applied climatology, and hydrometeorology. Over the past five years (since 2011) these efforts were funded at a total level of approximately $2,500,000 by agencies including the National Oceanic and Atmospheric Administration (NOAA), the National Aeronautics and Space Administration (NASA), the National Science Foundation (NSF), and the Department of Defense (DoD). Over the same time period, faculty have published roughly 50 refereed publications that focus on topics related to the atmospheric sciences. Membership in scientific societies includes the American Meteorological Society (AMS), the American Geophysical Union (AGU), the National Weather Association (NWA), the Association of American Geographers (AAG), the International Society of Biometeorology (ISB), and the American Association of State Climatologists (AASC). Major projects that faculty have been involved in that relate to the atmospheric sciences include the Third U.S. National Climate Assessment (2011-2014), VORTEX-SE, and the SHOUT4Rivers project. Also since 2011, two books were published by faculty members: Lab manual for Physical Geography: The Global Environment, Oxford University Press, New York, 159 pp. and Sherman-Morris, K., C. L. Wax, and M. E. Brown (2012), Mississippi Weather and Climate, Jackson, MS, University Press of Mississippi.

**Participation in UCAR Activities**

Dr. Kim Wood attended the 2011 UCAR Annual Meeting as a graduate student to learn more about UCAR. During that trip, Dr. Wood also visited COMET to better understand the resources that existed for online instruction. In addition, Dr. Wood attended the 2014 UCAR Annual Meeting as an early career faculty guest. Dr. Sherman-Morris currently serves on the COMET advisory board (2013-present), during which time she participated in COMET’s last strategic planning process, including examining different revenue models to make the program more financially sound. The advisory board was guided through a series of steps to study the best ways to market, expand and charge for COMET’s products, and included several virtual meetings and one meeting in Boulder.

Many courses in the on-line Applied Meteorology Program (AMP) are heavily reliant on COMET modules, as well as COMET’s tropical meteorology textbook. This relationship between COMET and MSU was established in 2008 when Dr. Jamie Dyer worked at COMET as a visiting scientist to find ways to merge COMET materials with the AMP for mutual benefit. Dr. Dyer now serves on COMET’s Dynamic Meteorology education panel.
With regards to research, several faculty members in the Department of Geoscience rely on the Research Data Archive (RDA) hosted by UCAR (http://rda.ucar.edu). Specifically, Drs. Wood, Dyer, and Mercer routinely use datasets from the RDA for and diagnostics of atmospheric patterns and processes, as well as for initial/boundary condition data for synoptic and mesoscale simulations using the Weather Research and Forecasting (WRF) model.

**Recommendation and Assessment of the Evaluation Committee**

Our assessment is that Mississippi State faculty and students will benefit from UCAR membership by broadening opportunities for faculty and student research in the atmospheric and related sciences that are core to the modern mission of the National Center for Atmospheric Research (NCAR). As a member of UCAR, we believe that Mississippi State can contribute a strong commitment to multi-disciplinary and inter-disciplinary atmospheric and environmental sciences research. Likewise we believe that UCAR and NCAR will benefit from Mississippi State’s broad portfolio of Atmospheric and related science and services.