

## **FACILITIES AND OTHER RESOURCES**

### **University of Puerto Rico**

In the Department of Agricultural and Biosystems Engineering there are facilities and computers sufficient to offer the extension training workshops. There is laboratory and storage space available for the project. The University of Puerto Rico-Mayaguez (UPRM) campus has a large number of conference rooms that can be reserved free of charge for project activities, extension trainings and Advisory Board meetings.

UPR has seven Agricultural Experiment Stations, which are available for project field work and extension trainings. The stations are located at Mayaguez, Lajas, Isabela, Corozal, Rio Piedras, Gurabo and Fortuna. The UPR Agricultural Experiment Station is an active member of the Southern Association of Experimental Stations. This Association serves as a regional link to the U.S. Department of Agriculture, the U.S. Congress, the National U.S. Association of State Universities and Land Grant Colleges (NASULGC).

### **University of Alabama in Huntsville**

The University of Alabama in Huntsville's (UAH) Atmospheric Science (ATS) Department is devoted to providing high-quality education to Graduate and Undergraduate students. UAH has contributed to international-caliber research, principally in the area of remote sensing with emphases in radiative transfer, severe storms, numerical modeling, ground-based remote sensing, land-surface modeling, microwave radiometry, radar meteorology and other areas not related to the proposed research. Currently, the ATS Department offers Masters and Ph.D. degrees in Atmospheric Science, and undergraduate minor certificates in Atmospheric Science and in Environmental Science. Current Graduate student enrollment is 60. Beginning in summer 2009, the Earth Systems Science (ESS) undergraduate department was developed, for which ~80 students are on the atmospheric science track (towards receiving undergraduate degrees in atmospheric science). Curriculum enhancement in both ATS and ESS courses, along with graduate student mentoring (as outlined in the proposal) will occur within this NSF project. As an integral member of the National Space Science and Technology Center (NSSTC), we experience substantial synergy and interaction with about 200 atmospheric/earth scientists and staff. In addition to the ATS Department, the NSSTC core facility houses earth and space researchers and educators from NASA's Marshall Space Flight Center (MSFC), Alabama's research universities and industry. Additional national and international adjunct faculty and research collaborators broaden the scope of the Department.

UAH and NSSTC offer a unique combination of resources available to investigators, especially for the processing of a wide variety of remotely-sensed satellite data, and is also ideally-suited for the efficient analysis of the suite of GOES, Meteosat Second Generation (MSG), MTSAT, MODIS and other satellite (e.g., TRMM, LandSat-5, -7 and -8, ASTER) data to be used on this project. Access to the MODIS direct broadcast data, GOES and MSG imagery, and archived GOES and MSG data, are available to this projects via data ingest at UAH/MSFC, and ongoing collaboration with the Space Science and Engineering Center's (SSEC) Data Center and the

Cooperative Institute for Meteorological Satellite Studies (CIMSS) at the University of Wisconsin-Madison (UW) by PI Mecikalski.

Within the UAH Atmospheric Science Department, and NSSTC, we produce all the satellite-derived products needed to run the Atmospheric Land EXchange Inverse (ALEXI) modeling system. Land surface information from MODIS, solar insolation derived from GOES, as well as the needed soils database, are available to this project. Collaboration with the USDA and NOAA will provide access to active and passive microwave sensor data (e.g., TRMM Microwave Imager, AMSR-E) and the Ensemble Kalman Filter (EnKF) data assimilation system used for combining thermal infrared and microwave estimated soil moisture information. We will also have access to the NASA Land Information System (LIS) land surface modeling system (LSM) via the collaboration with NOAA, and in-house expertise within the NASA Short-term Prediction Research and Transition (SPoRT) center. Collaboration with USDA provides expertise toward running the DisALEXI algorithm, while Co-I Cam Handyside and Co-I James Cruise provide solid knowledge of the DSSAT crop model to be developed as part of this proposal.

UAH has interacted with NWS personnel on severe storms research for about one decade. The emergence of the Huntsville WFO (HUN; January 14, 2003) has presented opportunities for frequent, productive collaboration among UAH faculty, scientists and students, NASA scientists, and NWS personnel. In conjunction with the NWS WFO development, NASA formed the SPoRT center. The mission of the SPoRT center is to incorporate NASA Earth science technology and research into the NWS operational environment. The primary SPoRT goal is to improve short-term forecasts by transitioning NASA assets and capabilities via scientific research, into the operational community (i.e. the NWS). Some specific NASA tools include real-time total lightning information from lightning mapping array (LMA) networks, primarily, the North Alabama LMA, high-resolution supplemental model data, and an array of data sets and products from NOAA and NASA owned satellites. The HUN office has been designed to include a “Collaboration Area” to house experimental data displays and facilitate real-time interaction between NWS and NSSTC scientists. The HUN office is just down the hall from all principal personnel supported by this proposal. UAH has interacted with NWS personnel on severe storms research for about one decade. This collaboration has taken the form of collaborative research, formal interaction with NWS WFO’s motivated two funded COMET projects, and graduate student mentoring.

A complete regional scale analysis and prediction system is available at UAH that has evolved around the incorporation of satellite-derived products to ultimately improve numerical weather prediction, in particular, the NOAA RAP (and the accompanying GSI data assimilation system) model, the Weather Research and Forecasting (WRF) model (and 3DVAR system) community model, and the CSU RAMS and University of Wisconsin–Nonhydrostatic Modeling System (UW-NMS) cloud-resolving models. These systems, and the expertise to operate them, are available to the data processing and verification components of this project. Information in the form of global forecast and analysis products (from GFS, ECMWF and NOGAPS analysis systems) are also readily available.

The NSSTC staff consists of scientists, engineers, computer programmers, and support staff who provide the highest level of expertise and professionalism. Access to the NCEP, the National Severe Storm Laboratory (NSSL), and NCAR are available via both computer links and in-house

personnel. In addition, other members of the faculty and staff of the UAH ATS are available for consultation on this project.

### **University of Florida Facilities**

The University of Florida (UF) has thirteen off-campus Institute of Food and Agricultural Sciences (IFAS) Research and Education Centers. These centers are located throughout the state and provide research, extension, and teaching expertise as well as facilities for field and laboratory projects. Gainesville is the primary campus of the UF which also has property for field research activities. Faculty on this project are assigned to the Agricultural and Biological Engineering Department (Kati Migliaccio; ABE [www.abe.ufl.edu](http://www.abe.ufl.edu); Tropical REC Homestead, FL) and the Agricultural Education and Communication Department (Laura Warner; AEC <http://aec.ifas.ufl.edu/>; Gainesville Campus, FL). The RECs coordinate closely with extension offices and stakeholders in their respective regions. Conference facilities at the RECs, Gainesville, and extension offices are available at no cost to the project. Each campus has a pool of state cars that may be used for project activities for a gas and maintenance fees.

Agricultural field research is conducted at RECs throughout the year and is assessable to UF faculty. RECs provide a venue for collecting calibration data throughout the state on different crops to be used in assessing the performance of the tools developed from this project. RECs generally also maintain a complete weather station (Florida Automated Weather Network), security, and trained personnel to assist with these projects at minimum costs.

Technical, laboratory, and field resources at all RECs and Gainesville are available for UF faculty. UF provides fiber infrastructure for internet services (including wireless) which provides the necessary connection for developing and testing web tools/apps. Each department and center also maintains an IT person for assisting with any connectivity issues. UF smartirrigation ([smartirrigationapps.org](http://smartirrigationapps.org)) apps currently operate using AgroClimate's linux server configured with a MySQL database system where specific databases and tables were designed and implemented to serve the various apps. All computers are protected with high-grade surge protection and information is daily saved on remote servers or clouds.

Throughout Florida, UF is a leader in agricultural education through their network of extension offices and centers. Extension agents and specialists collaborate to education clientele through well-recognized extension programming that is conducted at the county and state level. UF has established programs focused on training-the-trainer (or in-service trainings) as well as training for agricultural producers and other clientele.

