OKLAHOMA NASA EPSCoR
Technical Report For NCC5-171
University of Oklahoma acct # 125-4489
Submitted by: Dr. Victoria Duca Snowden

PRINCIPAL INVESTIGATOR:	Mark Morrissey
ELEMENT OR CLUSTER:	**Element 1** -*Verification of Rain Measurements Using the Oklahoma Mesonetwork*
INSTITUTION:	University of Oklahoma
PRINCIPAL INVESTIGATOR:	Claude Duchon
CO-INVESTIGATOR:	Baxter Vieux
ELEMENT OR CLUSTER:	**Element 2** - *Estimating Surface Water and Energy Fluxes Using Models and Observations from Radar and the Oklahoma Mesonet*
INSTITUTION:	University of Oklahoma
PRINCIPAL INVESTIGATOR:	Scott Greene
ELEMENT OR CLUSTER:	**Element 3** - *Merging of Mesonet and Remotely Sensed Data to Model Land Fluxes of Moisture and Energy*
INSTITUTION:	University of Oklahoma
PRINCIPAL INVESTIGATOR:	Ronald L. Elliott
CO-INVESTIGATOR:	Stephen J. Stadler
ELEMENT OR CLUSTER:	**Element 4** - *Quantifying Evapotranspiration and Soil Moisture: Surface-based Approaches for Calibration/ Validation of Satellite-based Estimates*
INSTITUTION:	Oklahoma State University

PRINCIPAL INVESTIGATOR: Melany Dickens
ELEMENT OR CLUSTER: **Element 5** - *Modeling Regional-Scale Dynamics Through Integration of Mesonet and Remotely Sensed*

INSTITUTION: University of Oklahoma

PRINCIPAL INVESTIGATOR: Scott Acton
ELEMENT OR CLUSTER: **Element 6** - *Multi-resolution Segmentation via Fusion of Mesonet Data and Remotely Sensed Imagery*

INSTITUTION: Oklahoma State University

PRINCIPAL INVESTIGATOR: May Yuan
ELEMENT OR CLUSTER: **Element 7** - *Development of a Hydrological Geographic Information System Based on the Oklahoma Mesonet*

INSTITUTION: University of Oklahoma

PRINCIPAL INVESTIGATOR: David A. Waits
ELEMENT OR CLUSTER: **Element 8** - *Integrating Mesonet Data To Create a Decision Support System for Agricultural*

INSTITUTION: University of Oklahoma

PRINCIPAL INVESTIGATOR: Steve Marks
CO-INVESTIGATOR: Jack Vitek
ELEMENT OR CLUSTER: **Element 9** - *Education Outreach of the Environmental System - Students Contributions to Data Collection And Interpretation*

INSTITUTION: Oklahoma State University

The mission of Oklahoma EPSCoR is to make Oklahoma researchers more successful in competing for research funding. Specific goals, objectives, and strategies were developed for each federal EPSCoR program, based on federal and state needs. A theme of stimulating collaboration among campuses and building on common research strengths is a strong component of the Oklahoma EPSCoR strategic plan. It extends also to our relationships with the federal agencies, and wherever possible, Oklahoma EPSCoR projects are developed collaboratively with federal research laboratories and program offices. Overall, Oklahoma EPSCoR seeks to capitalize on unique research capabilities and opportunities.

The NASA EPSCoR Program in Oklahoma was developed through this grant as a joint effort between Oklahoma EPSCoR and the NASA Oklahoma Space Grant Consortium (OSGC). The major goal of the Oklahoma NASA EPSCoR Plan established in 1996 is *to develop an academic research enterprise directed towards a long-term, self-sustaining, nationally competitive capability in areas of mutual self-interest to NASA and Oklahoma.* Our final technical summary pie chart demonstrates the strong successes we have achieved during this period as a result of the award.

Oklahoma's NASA EPSCoR developed a wide range of research and applications projects with economic impact for the state using the Oklahoma Mesonet. Mesonet is our statewide network of environmental observing stations that telecommunicate five-minute averages of multiple data type to a single site. Oklahoma's EPSCoR cluster project included an educational component that involved research, undergraduate, and minority campuses across the state in a K-12 outreach program.

The single-investigator project of our EPSCoR dealt with efficient structural optimization for improved multi-disciplinary design optimization (MDO). This project proved to be of great interest to NASA, as evidenced by the existence of a MDO branch and coordinator at NASA Langley research Center (LaRC.) The economic impact potential of this area is high for a wide range of industrial application in the state.

The Oklahoma NASA EPSCoR program complimented other state EPSCoR programs based on Mesonet. Through NASA EPSCoR, we have been able to develop a strong infrastructure with a broad range of collaborative efforts including linkages with the major research community. These include *Goddard Space Flight Center, Ames Research Center, Global Hydrology and Climate Center, Langley Research Center, Kennedy Space Flight Center, Jet Propulsion Laboratory, Marshall Space Flight Center, NASA/MTPE Centers of Excellence in Remote Sensing, NASA Stennis,* and *The National Institute of Health.* Oklahoma NASA EPSCoR researchers also developed collaborations with federal agencies *(i.e., National Science Foundation, Department of Energy, USDA Agricultural Research Center, the Army Research Office, NOAA Climate and Global Change Program, and the Federal Aviation Administration)* sectors of education *(i.e., Oklahoma State Regents Summer Youth Academies)*, within the state *(i.e., the Oklahoma Department of Education the State EPSCoR Office, and the Oklahoma State Regents for Higher Education.)*

We did not produce any patents, patent applications, or invention disclosures. Until 1999, Oklahoma State Law severely limited university scientists from engaging in technology transfer. Even with this obstacle, NASA EPSCoR researchers were proactive in establishing collaborations with business and industry *(i.e.. Lucent Technologies, Data cube, KIN Consulting, Visimatix, CMS Technetronics, Nomadic. Inc. and SVS)*. However, Oklahoma's universities took a major step forward in the fall of 1998 toward moving research results into the marketplace. In the November 1998 general ballot, Oklahomans voted on a

referendum for a constitutional challenge that allowed universities and their researchers to participate in technology transfer. Amendments 680 and 681 removed constitutional barriers to Oklahoma's public universities and faculty from participating and benefiting from their transfer of intellectual property to the marketplace.

Concurrent with this, the Oklahoma State Legislature appropriated funds to establish Technology Transfer Offices on the University of Oklahoma and Oklahoma State University campuses. These offices enable faculty to effectively transfer the knowledge they gain from their research to commercial ventures. Within the context of their reports, principal investigators of the nine cluster elements describe any Space Grant collaborations they have initiated from the EPSCoR side. Oklahoma Space Grant enhanced NASA EPSCoR's infrastructure by also initiating activities that helped promote the development and maintenance of research capability through establishment of research collaborations and funds for graduate assistants. A total of ten graduate students (2 females and 8 males), *not* supported by NASA EPSCoR funds, received Space Grant funding for work with research ties to NASA EPSCoR. Three NASA EPSCoR faculty received Space Grant funding for travel to develop collaborations related to the project's activities.

EPSCoR funding from NASA has served as a major catalyst for better cooperation between the state's research institutions while simultaneously involving the OSGC historically minority institutions (Langston University and Cameron University) in research activities. With **over 13 million dollars in funded proposals,** the results speak for themselves. The chart on the next page more fully outlines our successes in all categories.

I believe the Oklahoma NASA EPSCoR researchers have exceeded nearly all objectives of our original proposal within the five-year grant period.

NASA Experimental Program to Stimulate Competitive Research (EPSCoR) 1996-02 Results

Oklahoma NASA EPSCoR
NASA Investment $500,000 Per Year

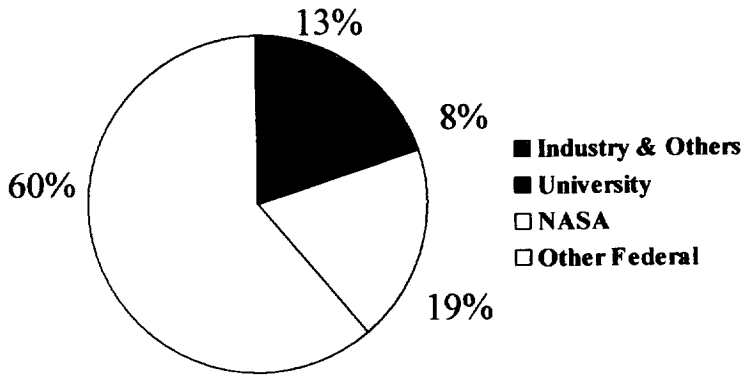
ACCOMPLISHMENTS

Grants and Awards

$13.4M*

(does not include matching funds)

Source of Awards



PARTICIPANTS

4 Institutions
10 research clusters
43 faculty
19 post docs
124 graduate students
78 undergraduate students
67 collaborations with NASA
37 collaborations with industry
103 collaborations with others

PUBLICATIONS

151 refereed papers
378 papers in progress, abstracts, other