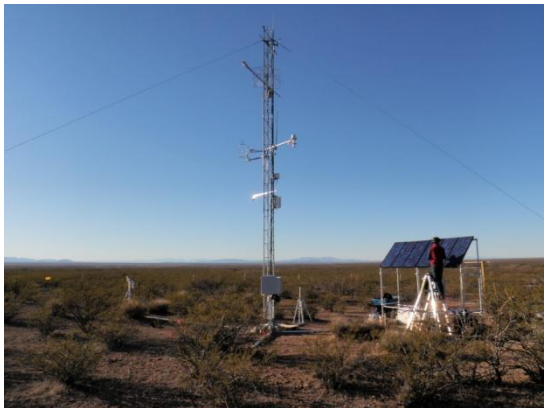
## 2010 Highlight from the Cyber-ShARE Center at the University of Texas at El Paso

Increasingly, environmental scientists need to answer bigger picture questions and link together findings from a wide range of disciplines. This is required, for example, to monitor and understand how climate change may impact our natural environment, how introduced species may alter our nation's river systems or threaten crop species, and to predict how changes to air or water quality policy may impact society. These emerging challenges are driving a paradigm shift in how environmental science is done – datasets collected by hundreds and sometimes thousands of people are being made readily available for analysis, sophisticated sensors for collecting environmental data and telemetering it to computers running models are being installed, and data from satellites and ground observations are being integrated in interesting new ways. Web based information systems that improve policy and decision making and help to share data and information with other scientists, industry, and the general public are also becoming widely available. Clearly, environmental scientists today and in the future will need to work more closely with computer scientists and technologists to collect and analyze trustworthy data and formulate solutions to some of the greatest challenges facing humanity over the next century.

During 2009 the Cyber-ShARE (www.cybershare.utep.edu) researchers and students made substantial advances towards meeting these challenges in the environmental sciences. A tower instrumented with a range of environmental sensors, a robotic tram system and a sensor network have been developed and installed at the Jornada Experimental Range, site of the Jornada Long Term Ecological Research Program and situated in the northern Chihuahuan Desert in southern New Mexico. This instrumentation has been developed according to design protocols and specifications formulated by several large national and international environmental observing networks (e.g. Ameriflux, NEON and SpecNet). The instrumentation measures more than 200 variables including the exchange of energy, water and carbon dioxide across the land-atmosphere boundary and facilitates linking these measurements with observations made from satellites. These measurements will help to understand how desert shrublands are responding to environmental change and how these changes may interact with the climate system. A new software application that utilizes a series of decision algorithms first utilized for managing large space missions was developed for this project. Data are collected up to 10 times per second and are telemetered to servers at UTEP on a near real time basis. Here, testing is underway to screen data and flag or correct erroneous data automatically. It is hoped that with further experimentation in 2010, these newly developed technologies will be implemented at other sites in both the US and around the world.



Aline Jaimes, environmental science Ph.D. student at UTEP's Biological Sciences Green Roof (left) and at the Jornada Experimental Range of the Jornada Long Term Ecological Research Program in the Chihuahuan Desert in southern New Mexico (right).

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