2006 Horton (Hydrology) Research Grant Recipients

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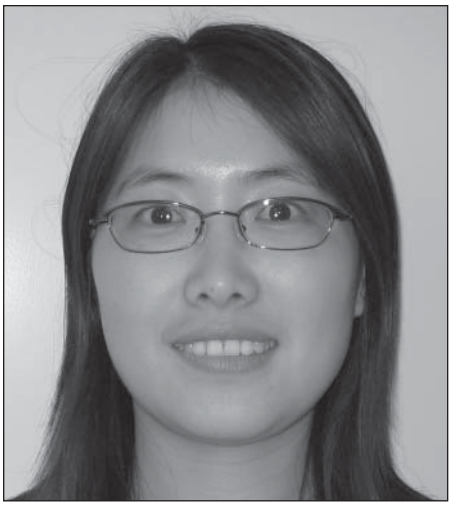
The 2006 Horton (Hydrology) Research Grant Committee selected two recipients, Xingyuan Chen and Carl Legleiter. The research grant, which is separate from the Horton Award, supports projects in hydrology and water resources by doctoral candidates at institutions of higher learning.

Carl Legleiter



Xingyuan Chen

The grant's objective is to foster graduate student research leading to the completion of doctoral dissertations. Both recipients were formally awarded at the 2006 AGU Fall Meeting, in San Francisco, California.

Xingyuan Chen received her B.E. in hydraulic engineering from Tsinghua University in Beijing in 2000, and a M.Phil. in civil engineering from the Hong Kong University of Science and Technology in 2002. She is currently working toward a Ph.D. in civil and environmental engineering under the supervision of Yoram Rubin and Dennis Baldocchi at the University of California, Berkeley. Chen's research interests include land-atmospheric interaction at the stand scale and inverse modeling. Her dissertation is entitled "Study of water dynamics in the soil-plant-atmospheric continuum in a water-controlled ecosystem."

Legleiter received his B.S. degrees in Earth sciences and statistics from Montana State University in 2002, and earned an M. A. in geography from the University of California, Santa Barbara in 2004. He is currently working toward a Ph.D. in geography under the supervision of Tom Dunne at the University of California, Santa Barbara. Legleiter's research interests include river morpho-dynamics, remote sensing, and geostatistics. His dissertation is entitled "Characterizing the spatial structure of river morphology and hydraulics: Remote mapping and geostatistical modeling of a dynamic fluvial system."

MEETINGS

Achieving Satellite Instrument Calibration for Climate Change

Workshop on Achieving Satellite Instrument Calibration for Climate Change (ASIC³), Lansdowne, Va., 16–18 May 2006

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For the most part, satellite observations of climate are not presently sufficiently accurate to establish a climate record that is indisputable and hence capable of determining whether and at what rate the climate is changing. Furthermore, they are insufficient for establishing a baseline for testing long-term trend predictions of climate models. Satellite observations do provide a clear picture of the relatively large signals associated with interannual climate variations such as El Niño–Southern Oscillation (ENSO), and they have also been used to diagnose gross inadequacies of climate models, such as their cloud generation schemes. However, satellite contributions to measuring long-term change have been limited and, at times, controversial, as in the case of differing atmospheric temperature trends derived from the U.S. National Oceanic and Atmospheric Administration's (NOAA) microwave radiometers.

Measuring long-term global climate change from space must be addressed from the fundamental physics of metrology, as practiced at the U.S. National Institute of Standards and Technology (NIST). The climate signals we are trying to detect are small, for example, temperature trends of only a few tenths of a degree Celsius per decade or ozone changes as little as 1% per decade. Current satellite systems are not up to the task. Sensors and onboard calibration sources degrade in orbit, long-term data sets must be stitched together from a series of overlapping satellite observations, orbital drift introduces artifacts into long-term time series, and insufficient attention is paid to meeting the high-accuracy, high-stability instrument requirements for monitoring global climate change.

The ASIC³ workshop brought together experts in satellite instrument calibration, metrology scientists from the U.S. and U.K. national standards institutes, remote sensing specialists, and climate data analysts. Topics included a review of the requirements for measuring global climate change, calibration status for current instruments, and concepts and methodologies for achieving calibration of global climate change measurements.

Two overarching recommendations were developed during the workshop. The first calls for a set of satellite benchmark missions to create irrefutable records and calibrate other satellite sensors. This is a new paradigm for achieving satellite instrument calibration for measuring long-term global climate change. The basic concept is to place in space a series of highly accurate benchmark instruments to measure with high spectral resolution the energy reflected and emitted by the Earth. These instruments would not only provide reliable long-term records in their own right, but would also serve as a reference standard in space to calibrate other environmental satellite sensors.

The second recommendation calls for the establishment of a U.S. National Center for Calibration (NCC) that could be organized by NOAA, NASA, and NIST. The NCC would bring together NOAA's expertise in operational missions and calibration/intercalibration of operational instruments, NIST's leader-