News Release

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$2.15 Million National Science Foundation Grant Awarded to University of Texas at Austin and Four Other Universities

$2.15 million NSF grant awarded to The University of Texas at Austin and four other U.S. universities for a cooperative project to investigate the data challenges of the instrumented oil field of the future.

The National Science Foundation Information Technology Research Program has awarded $2.15 million to Mary Wheeler, Clint Dawson, and Malgorzata Peszynska of the Texas Institute for Computational and Applied Mathematics (TICAM), Mrinal K. Sen and Paul Stoffa of The University of Texas Institute for Geophysics (UTIG), for their research project entitled, Data Intense Challenge: The Instrumented Oil Field of the Future. The three-year study, which will start in September 2001, also involves computer scientists and applied mathematicians from Ohio State University, Rutgers University, the University of Maryland, and the University of Chicago.

The purpose of the study is to advance computational technologies that will allow industry to create a new generation of data-driven, interactive strategies for subsurface characterization and hydrocarbon reservoir management for the instrumented oil field of the future.

"Although the instrumented oil field doesn't yet exist, it is a concept that we expect to become a reality within the decade because of advances in seismic monitoring and engineering production technology, " explains UTIG's Mrinal Sen. The instrumented oil field envisioned for the future will consist of permanently installed sensor arrays at the Earth's surface, or on the seafloor, and in boreholes for near-real-time hydrocarbon reservoir imaging. Using data from these sensors and computer-enhanced fluid-flow images, reservoir

managers will be able to monitor and control wells to optimize production.

The research team-comprising experienced geophysicists, engineers with backgrounds in reservoir simulation, applied mathematicians, and computer scientists-will tackle the significant challenge of making the large volume of data that the instrumented oil field will yield understandable. "We will develop a range of tools to assist scientists and engineers to analyze and interpret this data in near-real-time," said the project leader, Mary Wheeler of TICAM. Specifically, the team will focus on the use of parallel computational systems for obtaining reservoir models using diverse data types including seismics, well-logs, petrophysics, reservoir history and fluid flow data. The researchers will also improve analytical techniques to permit rapid visualization of the large volume of time-lapse image data.

"We believe that our research is vital to the development of the instrumented oil field and will help provide more efficient, cost-effective and environmentally safer production of oil reservoirs, resulting in enormous strategic and economic benefits," added Dr. Wheeler. The instrumented oil field will reduce the financial cost in high-risk environments such as deepwater reservoirs, optimize early field development and facilities costs, increase recoverable reserves in reservoirs that cannot currently be monitored with available seismic technology, and reduce seismic acquisition, processing, and decision timing-costs.

The Center for Subsurface Modeling in Texas Institute for Computational and Applied Mathematics (TICAM) is an interdisciplinary research unit that serves both the College of Engineering and the College of Natural Sciences bringing together faculty with expertise in mathematical modeling and computer simulation to form interdisciplinary teams to tackle major research problems in subsurface and surface flows. The Center has a distributed parallel computing laboratory and it investigates high-performance numerical algorithms and parallel processing tools to model the behavior of fluids in permeable geologic formations such as petroleum and natural gas reservoirs and groundwater aquifers and aquitards, and in shallow water such as bays and estuaries.

The University of Texas Institute for Geophysics (UTIG) is an organized research unit within the UT System. Its 28 research scientists investigate the dynamic geophysical processes that influence Earth's structure and climate. They also develop new mathematical models, data processing and imaging techniques that are relevant to natural resource exploration and the assessment of geologic hazards. Recognized as a leading academic research group in geophysics, UTIG research is carried out all over the world and includes large-scale, multi-investigator, multi-institutional field programs. Most notable among UTIG's international collaborations is a long-standing involvement in scientific ocean drilling through the Deep Sea Drilling Project, the Ocean Drilling Program, and the planned Integrated Ocean Drilling Program.

Investigators

The University of Texas at Austin
Mary Wheeler (Project Leader)

Clint Dawson
Malgorzata Peszynska
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