**Colorado School of Mines**
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**Web site: http://www.mines.edu/Research/**

# *Center for Wave Phenomena (CWP)*

With sponsorship for its research by 28 companies in the worldwide oil exploration industry, this interdisciplinary program, including faculty and students from the Geophysics and Mathematical and Computer Sciences departments, is engaged in a coordinated and integrated program of research in inverse problems and problems of seismic data processing and inversion. Its methods have applications to seismic exploration, global seismology, ocean sound-speed profiling, and nondestructive testing and evaluation, among other areas. Extensive use is made of analytical techniques, especially asymptotic methods and computational techniques. Methodology is developed through computer implementation, based on the philosophy that the ultimate test of an inverse method is its application to field or experimental data. Thus, the group starts from a physical problem, develops a mathematical model that adequately represents the physics, derives an approximate solution technique, generates a computer code to implement the method, tests on synthetic data, and, finally, tests on field data.

### *Background:*

- Established in 1984
- Led by six professors - five in geophysics, one in mathematics
- Current annual budget of $1,500,000

### *Areas of Expertise:*

- Seismic exploration research, computational seismology
- Applied mathematics
- Imaging technology

### *Sponsoring Organizations:*

- Consortium of 28 domestic and foreign oil companies and exploration service companies
- Office of Naval Research: Mathematics Branch
- Office of Naval Research: Ocean Acoustics Branch
- U.S. Army Research Office
- U. S. Department of Energy
- National Science Foundation

### *Method of Technology Transfer:*

- Two annual project review meetings
- Annual project review report
- Publication of scientific reports
- Computer code to implement methods in scientific reports
- M.S. and Ph.D. graduates employed by sponsors
- ***Web site: http://www.cwp.mines.edu/***

### *Spin-offs / Contributions:*

- Interdisciplinary education and research (mathematics and geophysics)
- Research program thrust is beneficial to oil company interests; students blend well into valued industry/academic employment positions
- Improved subsurface imaging and earth-parameter estimation is of value to geophysicists involved in exploration for energy resources as well as for geophysicists concerned with engineering and environmental problems both on land and in the seabed

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