The RFP

The Rock Fracture Project (RFP) is an industrial affiliates program at Stanford University that investigates faulting and fracturing from both a geological and engineering point of view. We apply this knowledge to oil and gas reservoir visualization and characterization and to the prediction of reservoir flow properties.

The RFP Goal

The goal of the Rock Fracture Project is to develop a scientific methodology, based on geological and geomechanical analyses, for predicting the distribution, geometry, and flow properties of subsurface faults and fractures at a reservoir scale from the available geological, wellbore, and seismic data.

The RFP Personnel

PROFESSORS:  
Atila Aydin, Co-Director  
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Nicolas Bellaensen  
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Laboratory Experiment Showing Stress Concentration at Fracture Tips  
Digital Mapping and Analysis with GPS, gOcad, and Poly3D

The Largest Academic Group of its Kind in North America
The Industry Members

The RFP Funding

About half of the funding comes from U.S. government agencies, notably the Basic Energy Sciences Program of the Department of Energy, and the National Science Foundation.

The other half comes from industry in the form of an annual membership fee from each industrial affiliate.

Each dollar provided by an affiliated company is matched by approximately sixty dollars from other sources, providing a leverage ratio of 60-1.

ANADARKO PETROLEUM CORPORATION
Houston, Texas, USA

bp CORPORATION
Houston, Texas, USA

BURLINGTON RESOURCES
Calgary, Alberta, Canada

CHEVRONTEXACO
San Ramon, California, USA

CONOCOPHILLIPS
Houston, Texas, USA

ENI S.p.A AGIP DIVISION
Houston, Texas, USA

EXXONMOBIL UPSTREAM RESEARCH
Houston, Texas, USA

Occidental Oil & Gas
Houston, Texas, USA

REPSOL - YPF
Denver, Colorado, USA

SHELL INTERNATIONAL EXPLORATION AND PRODUCTION
Ruiswijk, The Netherlands

TOTALFINAELF
Paris, France

Worldwide Support from Leaders in the Oil & Gas Industry
Fault-normal and -parallel permeability components obtained from an upscaling procedure with local no-flow boundary conditions and the high-resolution input map (top) for various block sizes. Fault rock (gray) and slip surfaces (black lines) are responsible for decreased fault-normal permeability and increased fault-parallel permeability, respectively.

GPS data and model surface of McKim Limestone. a) Data from 7 sub-units projected onto McKim. Color indicates elevation. b) Surface generated using the Discrete Smooth Interpolation Method in gOcad. Color indicates elevation and preserves location of GPS data points.

Magnitude and direction of maximum principal curvature and direction predicted for a dome and basin structure within the North Sea.
Addressing Industry Needs

Constraining Fault Geometry by Mechanical Analysis

Predicting Subseismic Faults

Predicting sub-seismic faults, Oseberg reservoir, North Sea. Comparison between observed and computed fault density using Poly3D.

Developing Software Tools

Evaluating Fault Seal Potential

Fault structure and shale smear along a normal fault in the Niger Delta representing an unconventional method of evaluating fault seal potential from seismic reflection data.

Structural Expert System for training and reservoir description and characterization.

Developing Innovative Technology for Industry
1. Members provide tangible incentives for attracting highly qualified graduate students into projects leading to careers in the energy industry.

2. The RFP facilitates contact between individual students and company representatives regarding summer employment and permanent employment.

3. Members receive advance copies of reports, publications, workshop volumes, and software developed by the project.

4. Members attend annual workshops which provide the opportunity for continuing education, for reviewing research accomplishments, and for offering suggestions for future research directions.

5. The RFP organizes instructional and research field trips for members to localities of specific interest for building conceptual and predictive models of structural heterogeneities in hydrocarbon reservoirs.

6. The RFP co-directors visit the research centers of member companies for technical talks, exchange of ideas, and consultation.

7. Joint research projects enable members to take advantage of the accumulated knowledge of recent research developments of the RFP.

For further information, contact:

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