Crisman - Fracturing

17 proposals received from 20 researchers
## Participating Researchers

**Petroleum Engineering PI’s:**

<table>
<thead>
<tr>
<th>Tom Blasingame</th>
<th>Jihoon Kim</th>
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<tr>
<td>Eduardo Gildin</td>
<td>George Moridis</td>
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<tr>
<td>Dan Hill</td>
<td>Nobuo Morita</td>
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<td>Jenn-Tai Liang</td>
<td>Hisham Nasr-El-Din</td>
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<td>John Killough</td>
<td>Kan Wu</td>
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<td>Ding Zhu</td>
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Participating Researchers

Other department PI’s:
Fred Chester (G&G)
Judy Chester (G&G)
Benchuan Duan (G&G)
Mark Everett (G&G)
Joe Kim (ME)
Hiroko Kitajima (G&G)
Andreas Kronenberg (G&G)
Julia Reece (G&G)
Topics in Hydraulic Fracturing

Six major areas identified:

• Modeling of complex fracturing
• Fracture diagnosis
• Evolution of rock and proppant properties
• Fracture conductivity
• Environmental effects
• Proppant transport
Tasks

Modeling of complex fracturing

• Effect of weak bedding planes on fracture height growth
• Coupled geomechanics and fracture mechanics modeling to identify re-fracturing candidates
Tasks

Fracture Diagnosis

• Development of lab-based correlation for fracture flow rate from acoustic measurements
• Modeling of micro-seismic activity with an earthquake model
• Evaluation of controlled source electromagnetic data for fracture geometry measurement
Tasks

Evolution of rock and proppant properties

• Proppant embedment and crushing model
• Long-term mechanical and transport properties of shales exposed to water
Tasks

Fracture conductivity

• Measurement of un-propped and propped fracture conductivity for Eagle Ford and Permian Basin study area samples
• Comparison of conductivity measurements – API conductivity cell versus cylindrical core plugs
Tasks

Environmental Effects

• Modeling of cement failure during hydraulic fracturing
• Modeling of induced seismicity during fracturing or saltwater disposal
Tasks

Proppant transport

• 3-D Modeling of proppant transport in fractures with perpendicular fracture segments
• Evaluation of effect of fibers on proppant transport
Deliverables

Modeling of complex fracturing

• Criteria (rock mechanical properties at layer boundaries) for height barriers
• Guidelines for re-fracture candidate selection
Deliverables

Fracture Diagnosis

• Correlation to interpret fracture flow rate from acoustic amplitude (DAS data)
• Improved interpretation of microseismic measurements
• Feasibility of fracture mapping with electromagnetics
Deliverables

Evolution of rock and proppant properties

• Criteria for long-term proppant embedment and crushing
• Laboratory results for mechanical and transport properties of shales exposed to water
Deliverables

Fracture conductivity

• Measured un-propped and propped fracture conductivity for Eagle Ford and Permian Basin study area samples

• Recommendations for conductivity measurements – API conductivity cell versus cylindrical core plugs
Deliverables

Environmental Effects

• Cement conditions that could lead to cement failure during hydraulic fracturing
• Conditions (nearness to fault, liquid transport) that could cause induced seismicity during fracturing or saltwater disposal
Deliverables

Proppant transport

• Proppant transport at fracture discontinuities
• Laboratory results for proppant transport with fibers added to proppant