University of Wyoming | Multidisciplinary Advanced Stimulation Laboratory (MASL)

Enhancing Primary Oil Recovery in Wyoming and Beyond

University of Wyoming Research Excellence Highlight

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Why This Matters to Wyoming

Wyoming's Opportunity

- Wyoming holds **world-class unconventional energy resources**
- Primary recovery is the most **cost-effective** and **lowest-risk phase**
- Small improvements in early recovery leads to **large economic impact**

The Challenge

- Wyoming formations underperform peers in Texas & North Dakota
- Need science-based optimization, not trial-and-error

Multidisciplinary Advanced Stimulation Laboratory (MASL)

Flagship UW Facility for Primary Recovery Innovation

- **Strategic Collaboration**

  Department of Energy & Petroleum Engineering + School of Energy Resources

- **Major Investment**

  $3 million investment in cutting-edge equipment and staff support

- **Modern Research Facility**

  5,000 sq. ft. of laboratory space with adjacent offices

- **Location**

  Science Initiative Building, University of Wyoming

UNIVERSITY OF WYOMING | Multidisciplinary Advanced Stimulation Laboratory (MASL)

MASL Grand Opening

Energy Day — October 10, 2025

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What Sets MASL Apart

- Integrates **rocks**, **fluids**, and **stress** in one place
- Produces **high-quality experimental data** that informs decisions
- Designed for **industry collaboration** and **workforce training**
- Direct alignment with **Wyoming operators** and **state priorities**

MASL Research Pillars

1. **Primary Recovery Optimization**

   Fluids, wettability, fractures, and early-time production

2. **Reservoir Characterization**

   Mineralogy, pore structure, heterogeneity, core-to-log integration

3. **Geomechanics**

   Rock mechanical behavior

4. **Innovative & Completion Integrity**

   Reducing damage before production even starts

These experimental pillars generate the data foundation for advanced digital analysis and decision support.

SEDI: Digital Innovation That Amplifies MASL

Subsurface Energy and Digital Innovation Center of Excellence

What is SEDI

- SER-supported digital initiative for subsurface energy systems
- AI-enabled modeling, digital twins, and blockchain for secure data
- Scales laboratory insights to field and basin levels

How SEDI Supports MASL

- Converts MASL experiments into predictive digital models
- Links lab measurements to field-scale decisions
- Reduces uncertainty in stimulation, fractures, and early production

MASL provides the physical truth; SEDI ensures that truth scales.

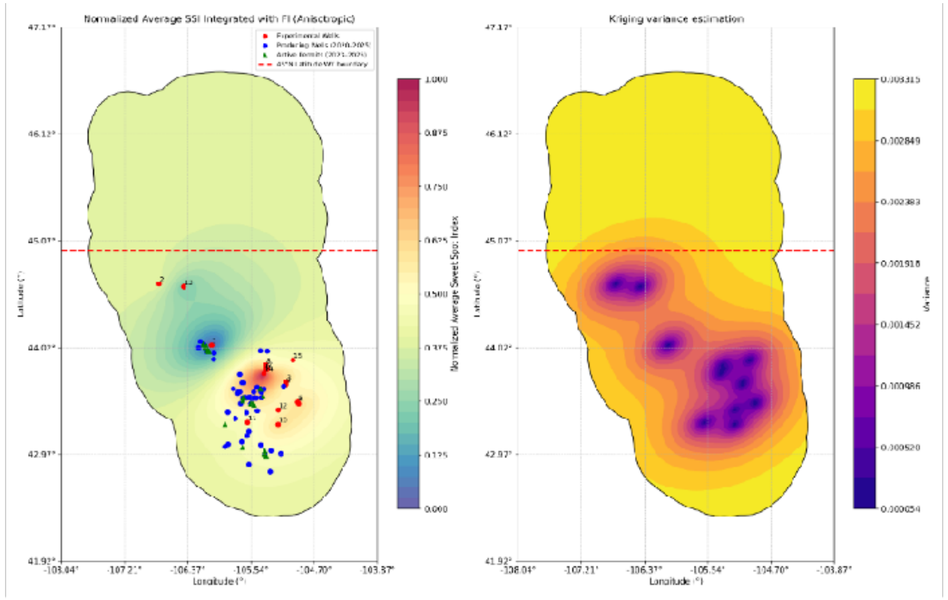
Direct Benefits to Wyoming

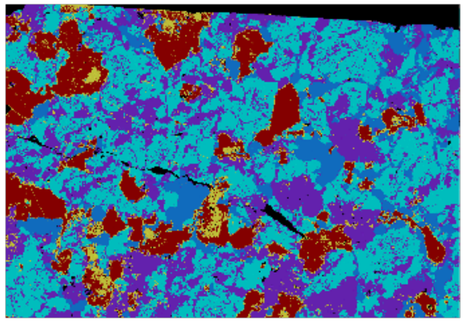
- Improved recovery → higher royalty and tax revenue
- Reduced development risk → more sustained drilling
- Wyoming-specific science (Mowry, PRB, Williston)
- Supports responsible, lower-footprint energy development

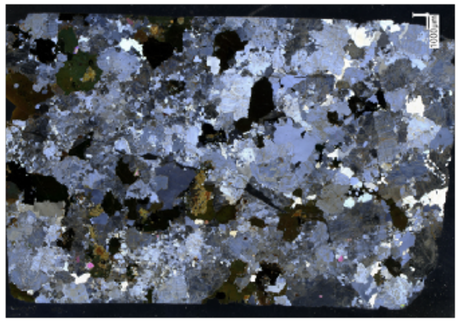
Training the Next Generation

- Graduate and undergraduate students trained on real industry problems
- Hands-on experience with advanced labs and digital tools
- Graduates prepared for:
  - ✳ Wyoming operators
  - ✳ National energy companies
  - ✳ Energy transition technologies

MASL Supports Multiple Energy Priorities







Feldspar (k)
Quartz with inclusions
Allanite
Quartz
Clinozoisite
Background

High REEs =(Host minerals)

- Oil & gas primary recovery
- Rare Earth Minerals (REE) screening and evaluation
- Geothermal energy systems
- Geological hydrogen resources
- Carbon storage and subsurface integrity

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Institutional Value

- Elevates UW’s national reputation in energy research
- Strengthens industry partnerships and federal funding
- Strengthens UW’s role as a trusted technical advisor for Wyoming
- Enables coordinated growth of physical and digital research infrastructure

Closing Message

- **Wyoming's resources deserve Wyoming-led solutions**
- MASL positions UW at the center of that solution
- Focused on impact, partnerships, and people