

Leveraging AI to Improve Reservoir Performance Predictions

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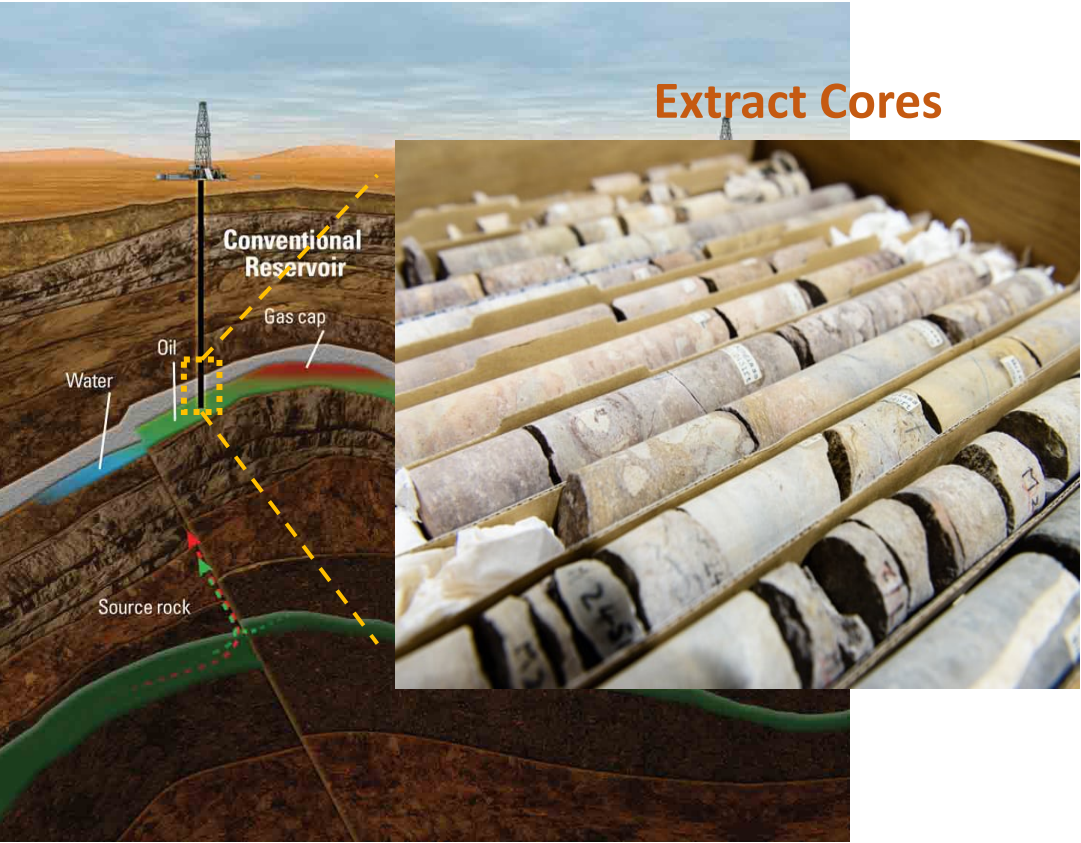
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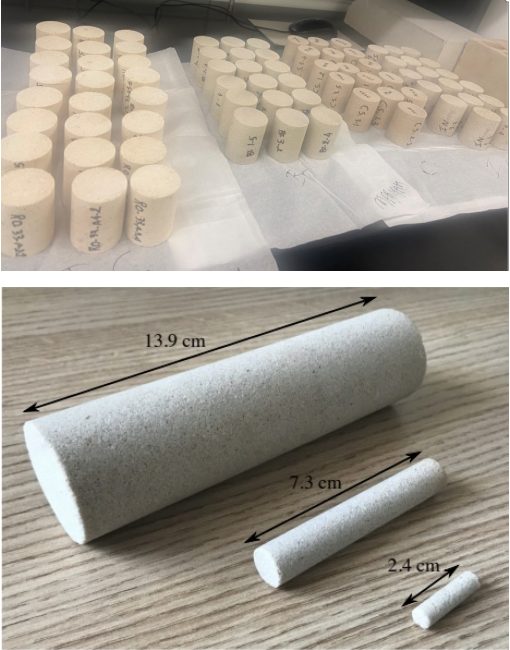
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Pore Space Exploitation

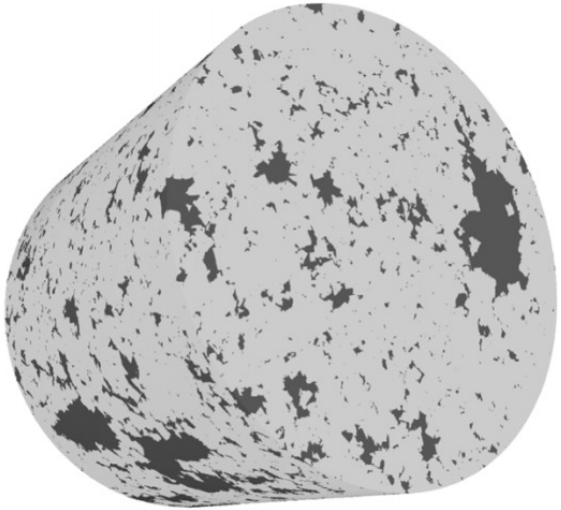
Underground Reservoir



Prepare Core Plugs



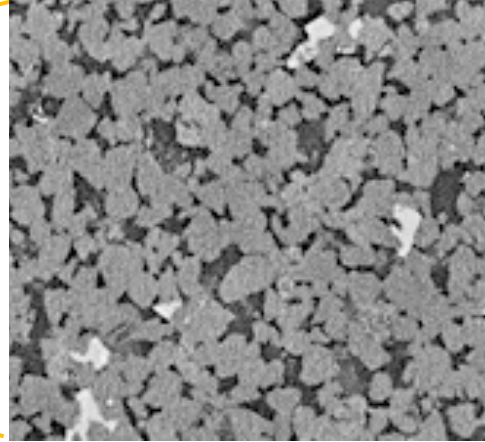
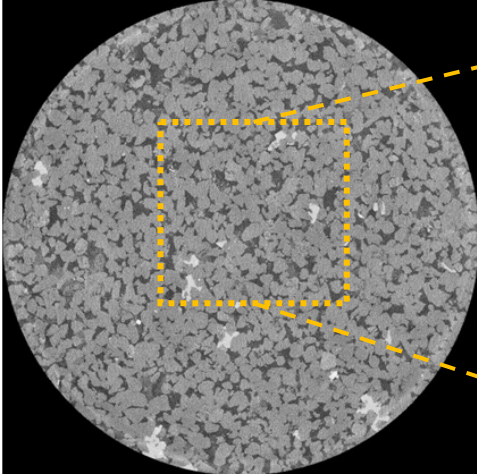
High-resolution Imaging



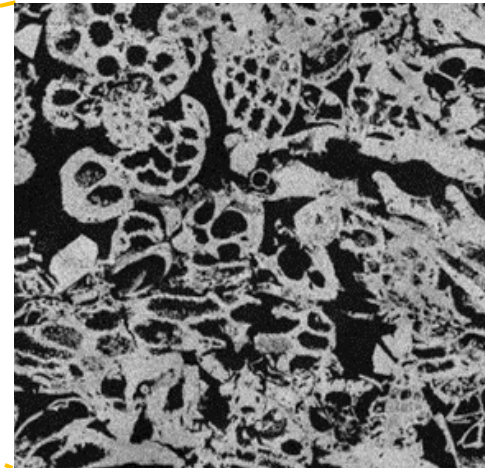
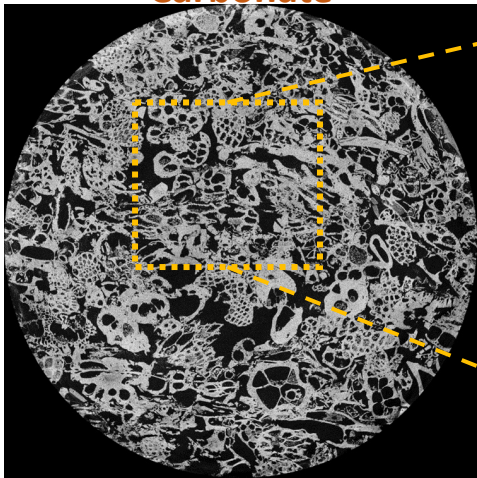
Digital Rock

Digital Rock Technologies: Challenges and Opportunities

Sandstone

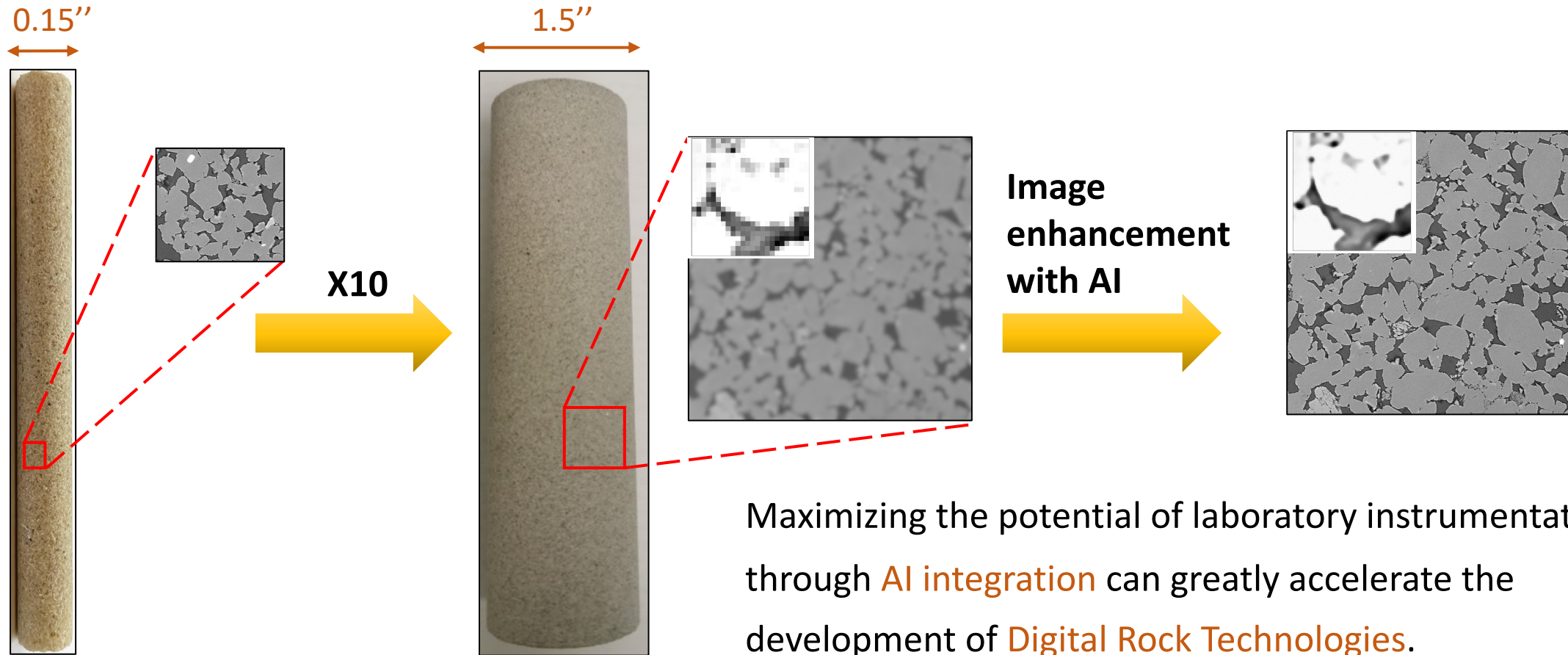


Carbonate

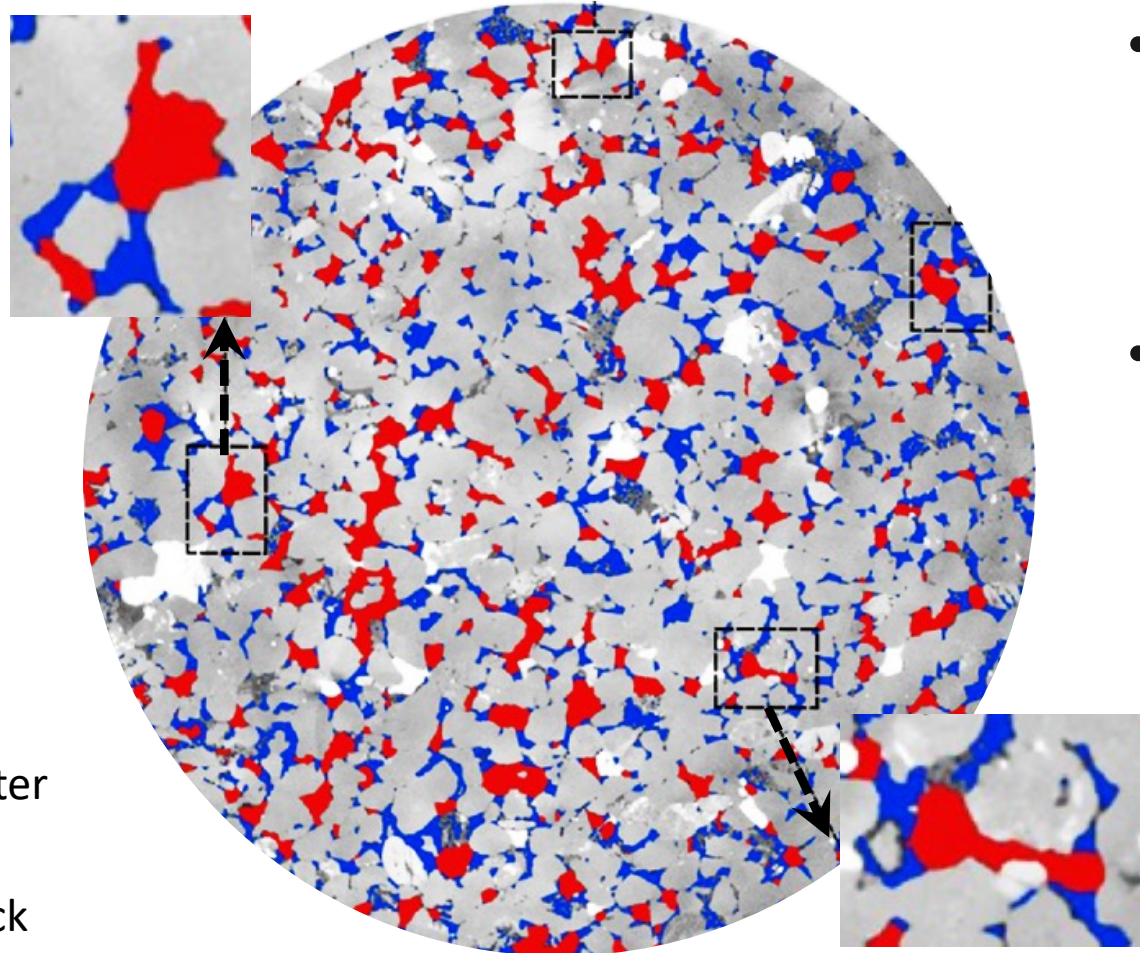


- Rock formations vary substantially from one location to another.
- Such variability presents significant challenges to understanding how fluids move inside the formations, which is essential for optimizing reservoir exploitation performance.
- With the help of big data, AI can be leveraged to uncover complex properties of reservoirs.

Using AI to Massively Enlarge the Size of Digital Twins



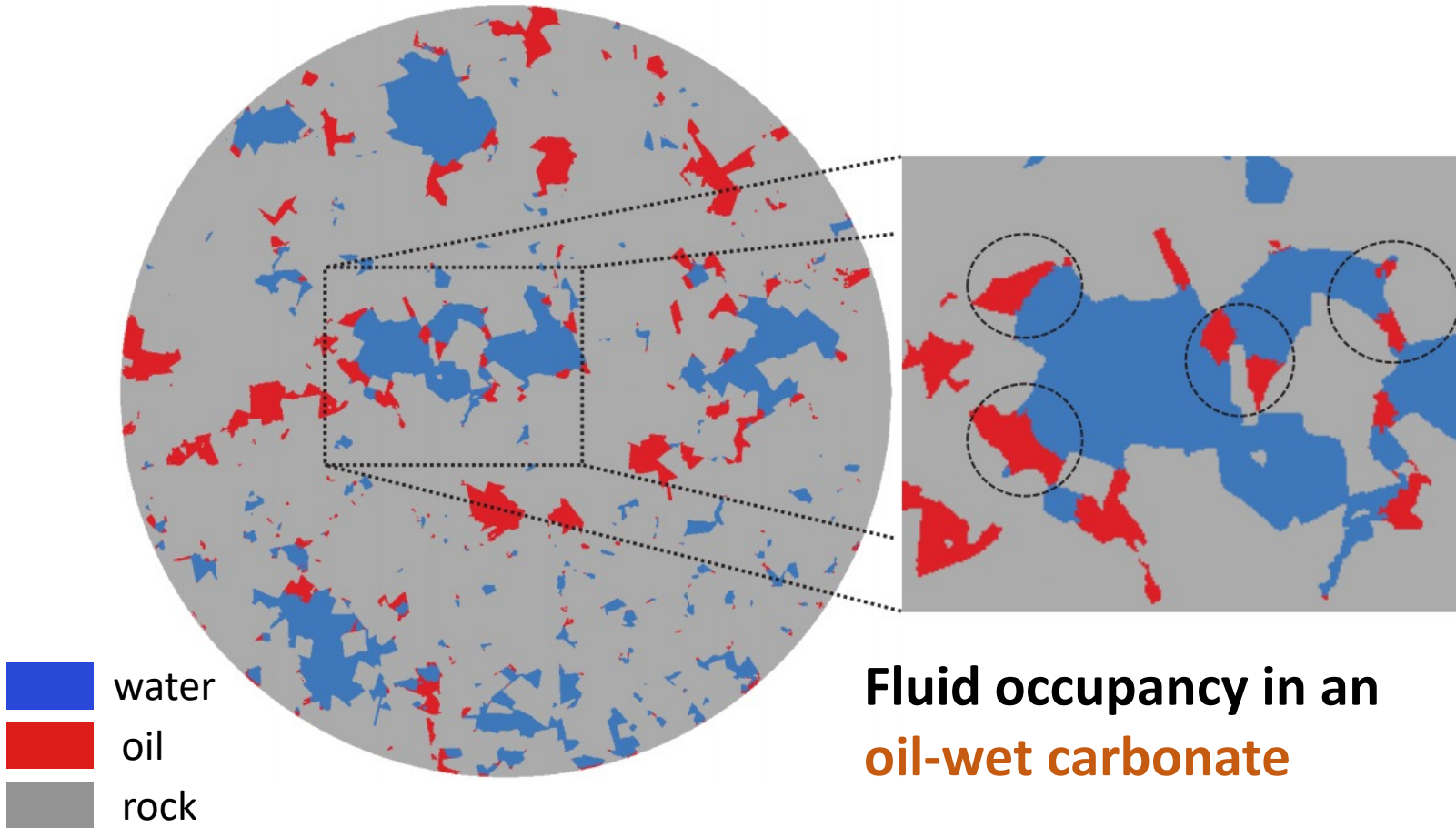
Using AI to Detect Fluid Occupancy Patterns in Complex Reservoir Rocks



- Understanding fluid occupancy patterns is crucial for predicting flow properties of rock samples.
- These patterns are not random but instead intricately governed by the unique properties of the rock and fluids and flow conditions.

**Fluid occupancy in a
water-wet sandstone**

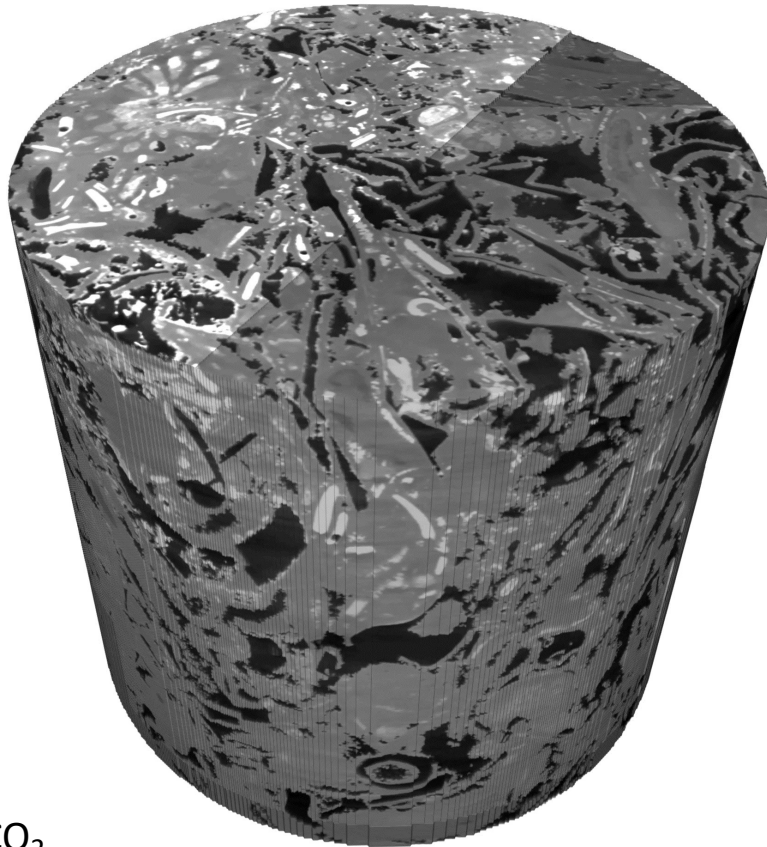
Using AI to Detect Fluid Occupancy Patterns in Complex Reservoir Rocks (Cont'd)



- COIFPM generates valuable experimental data, allowing **in-situ** observations of fluid occupancy patterns in reservoir rocks.
- Well-trained AI models can predict these patterns across various rock types and under different flow conditions.

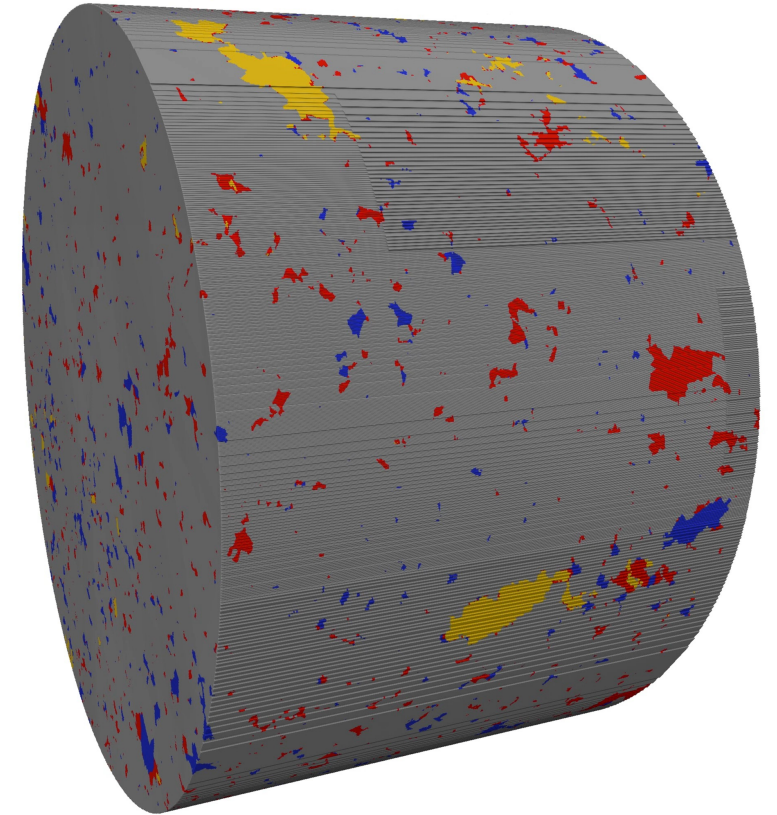
CO₂ Geo-storage: AI-driven Predictions of Trapping Capacity

Salt precipitation during CO₂ storage in saline aquifers



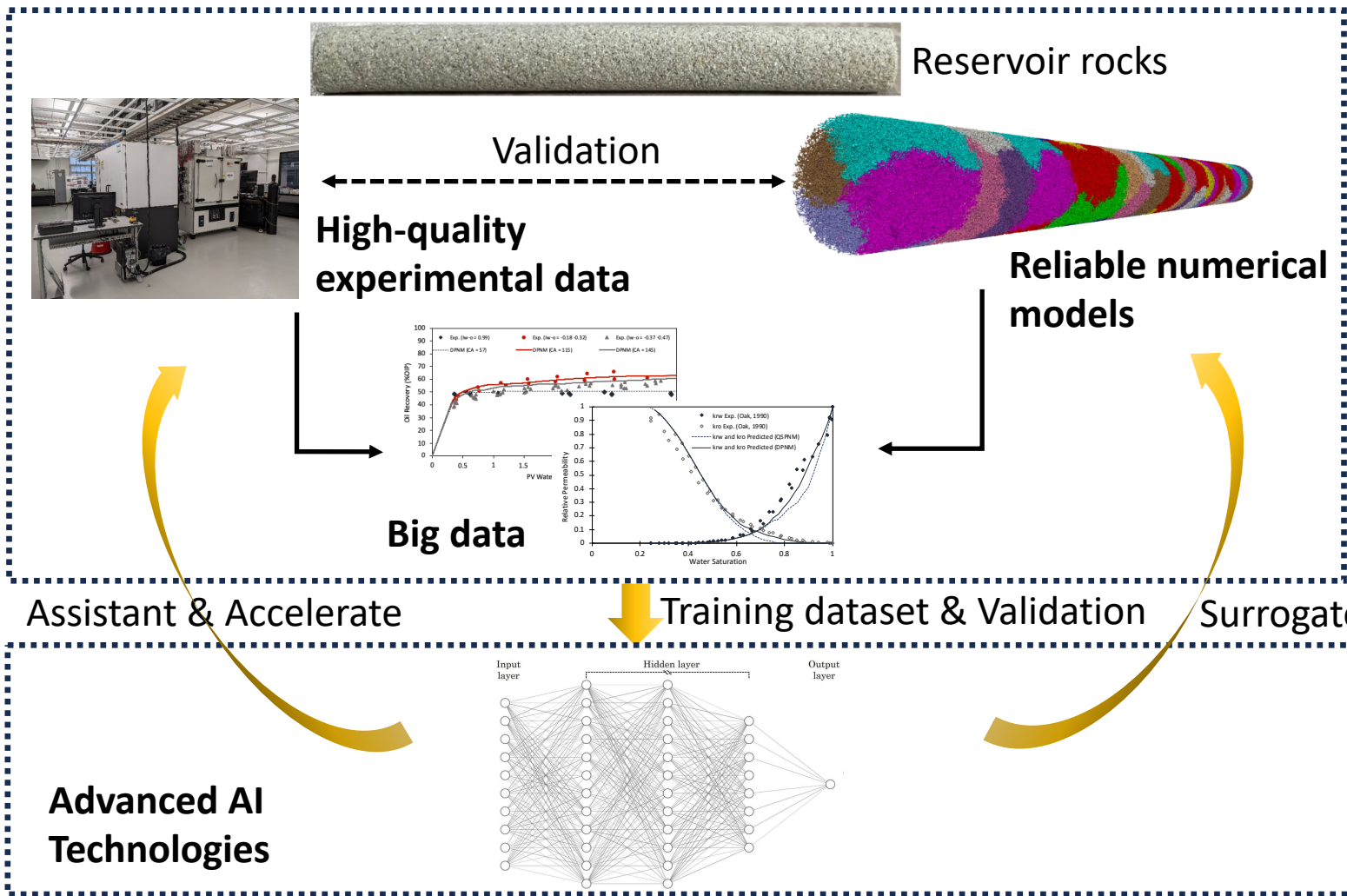
- Salt
- Rock Matrix
- Supercritical CO₂

CO₂ injection into oil-wet carbonate



- Oil
- Brine
- CO₂
- Rock Matrix

AI-Assisted Digital Reservoirs



Better-informed reservoir management leads to reduced costs and increased efficiencies and profit margins

