



## **RMAG December 2022 Luncheon**

### **Title: Quantifying Rock Characteristics in the San Andres Formation that Promote CO<sub>2</sub> Sequestration, Permian Basin, USA**

**Speaker: Mitch Schneider**

#### **Abstract**

The San Andres Formation is a conventional carbonate reservoir on the Central Basin Platform that has been a prolific producer of oil and gas, but vertical and lateral heterogeneity within and between fields make reservoir characterization and thus recovery difficult. Carbon dioxide (CO<sub>2</sub>) flooding has long been used for enhanced oil recovery operations within the San Andres Formation, and some fields unintentionally sequester large volumes of CO<sub>2</sub>. However, the rock characteristics that allow effective CO<sub>2</sub> sequestration (e.g., lateral geological heterogeneity, diagenetic evolution, pore-network dynamics, fluid-rock interactions) are still uncertain. There is a desire to transition these reservoirs into permanent CO<sub>2</sub> sequestration sites due to existing infrastructure and the history of CO<sub>2</sub> injection. Using thin-section data from the Goldsmith Field on the Central Basin Platform, we quantify heterogeneity within pore networks to provide a methodology for ranking these reservoirs into permanent CO<sub>2</sub> sequestration sites. Using field-emission scanning electron microscopy, we document the mineralogy and porosity network at the micron scale to quantify pore dimensions, pore-lining minerals, and pore-network heterogeneity between different facies and stratigraphic intervals of the San Andres Formation. Integration of this data with existing core-plug porosimetry and field-wide production data, we will quantify the CO<sub>2</sub> trapping capability of the San Andres Formation, and thus the viability for a particular field to be converted to a site for CO<sub>2</sub> sequestration. This newly collected data and methodology can help make informed economic decisions on the future utilization of depleted carbonate petroleum reservoirs, not only in the Permian Basin, but globally.

#### **Speaker Bio**

Mr. Schneider has a B.S. in Geology from Grand Valley State University and is currently pursuing an M.S. Degree in Geology and a Graduate Certificate in Data Science from Colorado School of Mines. His thesis project is focused on quantifying rock-fabric characteristics that promote CO<sub>2</sub> sequestration in the San Andres Formation, Permian Basin. His research interests involve the viability of transitioning depleted oil and gas reservoirs to carbon sequestration sites, and how data science can be utilized together with advanced petrography techniques and core description. Mr. Schneider has worked with FourPoint Energy, Orintiv, and multiple consulting firms. Outside of his studies, he enjoys archery and spending time outdoors.