

**FALL 2022 MEETING**

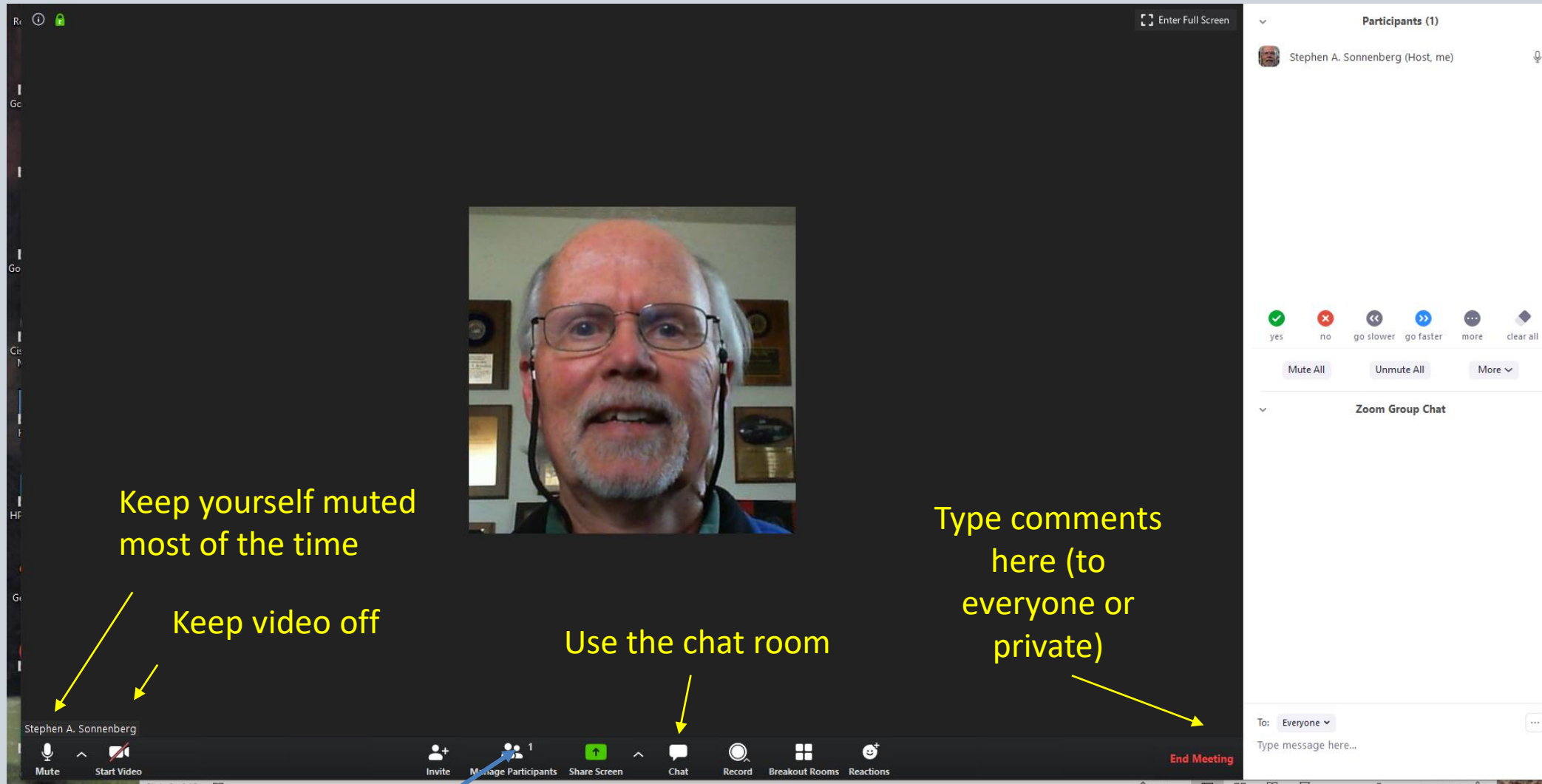
**Steve Sonnenberg  
PI, MUDTOC**



**COLORADO SCHOOL OF  
MINES<sup>®</sup>  
MUDTOC**



# Zoom Suggestions



Participant's list

# MUDTOC Advisors, Faculty & Committee Members



- Steve Sonnenberg, PI
- Chris Matson, RC

## Advisors:

- John Curtis
- Jim Emme
- Matt Bauer
- Ben Burke
- Al Lacazette
- Bill Zogg

## Recent Committee Members

- Marsha French
- Donna Anderson
- Mary Carr
- Zane Jobe
- James Hagadorn
- Hossein Kazemi
- Jennifer Miskimins
- John Kaszuba, UW
- Keith Shanley
- Jeff May
- Ali Tura

# MUDTOC Research

Mudrock and Tight Oil Characterization Consortium (includes Carrier Bed / Halo Plays; also includes Geothermal, CCUS)

- Denver Basin:
  - Skull Creek, Niobrara, Codell
  - Fracture characterization
- Powder River Basin:
  - Mowry, Niobrara, Frontier/Turner, Shannon
- Permian Basin (Midland & Delaware):
  - Wolfcamp
  - Avalon, Bone Springs
- Appalachian Basin:
  - Marcellus
  - Utica
- Williston Basin:
  - Bakken Petroleum System (Bakken & Three Forks)
- GGRB
  - Lewis Shale
- San Juan Basin:
  - Niobrara & Semilla SS
- Neuquén Basin
  - Vaca Muerta
- CCUS: Niobrara, Bakken
- Geothermal: Rockies and Gulf Coast

# MUDTOC Characterization

- Outcrop & Core descriptions
- Basin Modeling
- 3D seismic
- Petrographic thin sections
- FE SEM, EDS, EDS mineral maps
- QEMSCAN
- XRD
- XRF + mineral models
- SRA
- Bambino
- MICP, Nitrogen adsorption, water (kerosene) immersion, etc.
- TinyPerm3 & other permeability measurements
- Petrophysics + NMR + ECS
- Core Scanning
- Image log analysis
- Carbon & oxygen isotope analysis
- CCUS
- Geothermal

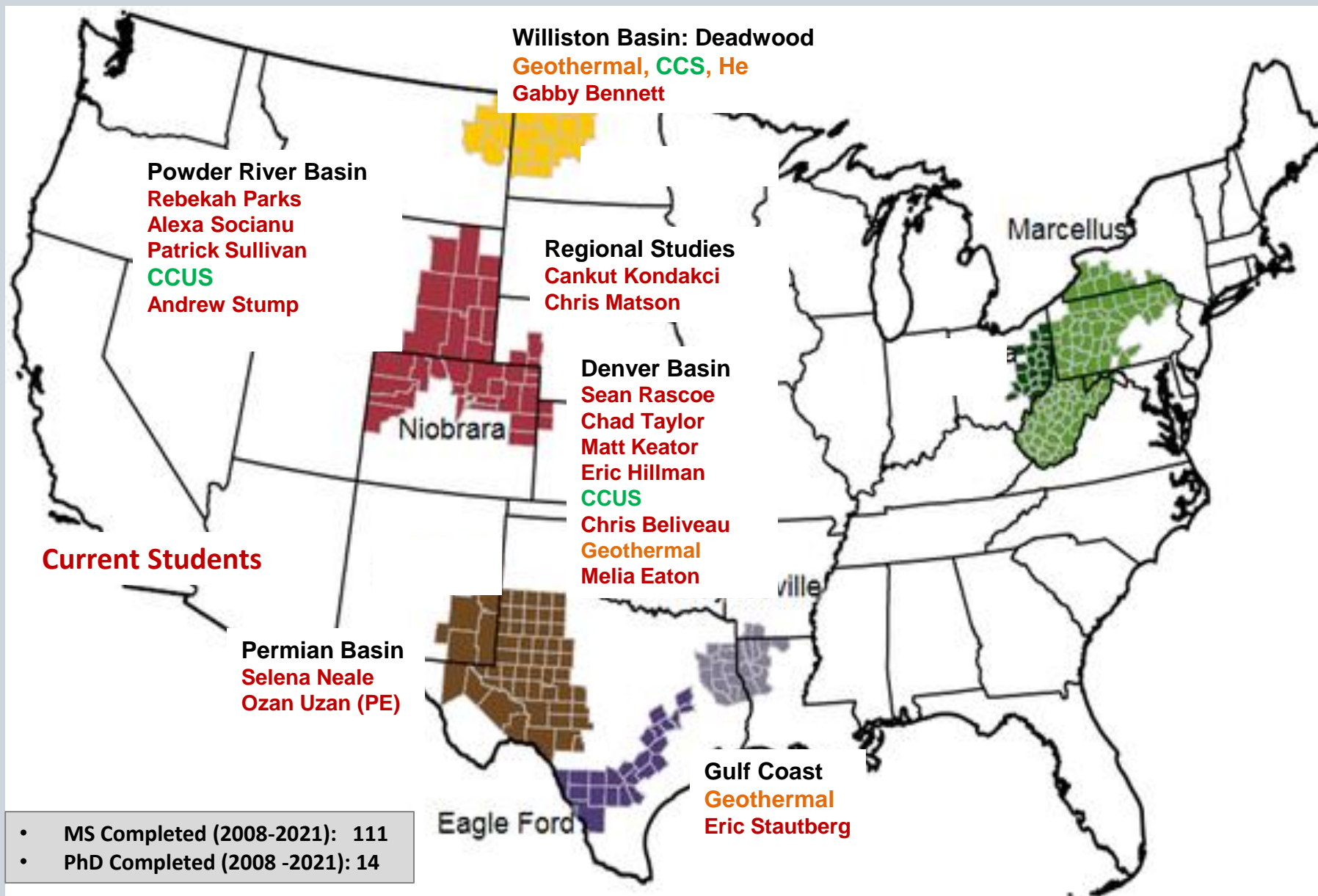
# MUDTOC Project Ideas

- NMR & ECS - Permian, Bakken, Niobrara, Mowry, etc.
- Niobrara & Greenhorn Regional
  - Ash beds, biostratigraphy, OAEs, etc.
- Niobrara Redtail area
- Niobrara Newatt area
- Niobrara/Codell Postle Wattenberg area
- Codell Redtail area
- Codell Silo area
- Pyrobitumen in Niobrara (Wattenberg)
- Denver basin-Skull Creek
- Biogenic/authigenic silica-Bakken, Mowry
- Three Forks Deposition model, Petrophysics, Dolomite, etc.
- Basin Modeling: Permian
  - Pressure & Temperature Anomalies
- Permian continued
  - Comparison of Wolfcamp from gas, gas-condensate, oil windows
  - Water occurrences in Wolfcamp
  - Machine Learning
- Faults & fractures
- Carrier-Bed Plays
- CCUS Wolfcamp, Niobrara
- CCUS Niobrara
- CCUS Bell Creek Muddy Sandstone
- Lewis Shale, GGRB
- Geothermal Gulf Coast & Deadwood Fm.

# Advisory Board Suggestions

- Silo area Codell study ✓
- Wettability studies ✓
- Fluid & rock interactions ✓
- OAE II & III ✓
- PRB & DJB – burial history & maturity studies northern part of basin
- Regional stratigraphic study Frontier to Turner ✓
- Austin Chalk study
- Geothermal studies ✓
- CCUS (HC gas & CO<sub>2</sub>) ✓

# MUDTOC Project Areas





# Thank you to our Sponsors!

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## In-Kind Supporting Companies



Mike Johnson & Associates





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