

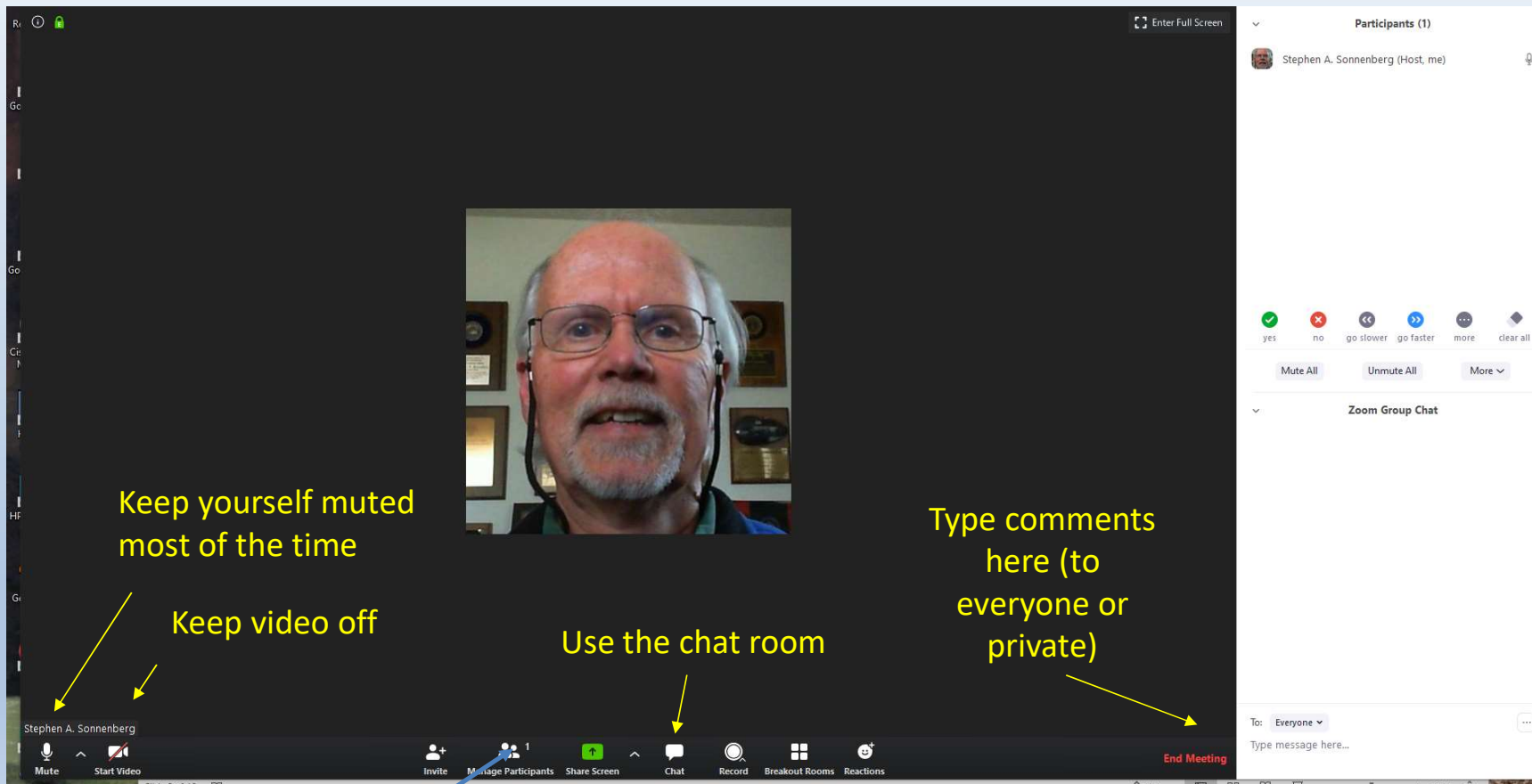


COLORADO SCHOOL OF  
**MINES**  
**MUDTOC**

Steve Sonnenberg  
MUDTOC PI/Director

## **FALL 2021 MEETING**

# Zoom Suggestions



Participant's list

## MUDTOC Advisors, Faculty & Committee Members

- Steve Sonnenberg, PI
- Chris Matson, RC

### Advisors:

- John Curtis
- Jim Emme
- Matt Bauer
- Mike Hendricks
- Bill Zogg

### Recent Committee Members

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

# MUDTOC Research



Mudrock and Tight Oil Characterization Consortium (includes Carrier Bed / Halo Plays)

- Denver Basin:
  - Skull Creek, Niobrara, Codell
- 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
- Neuquen 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
- Carbon & oxygen isotope analysis
- CCUS
- Geothermal

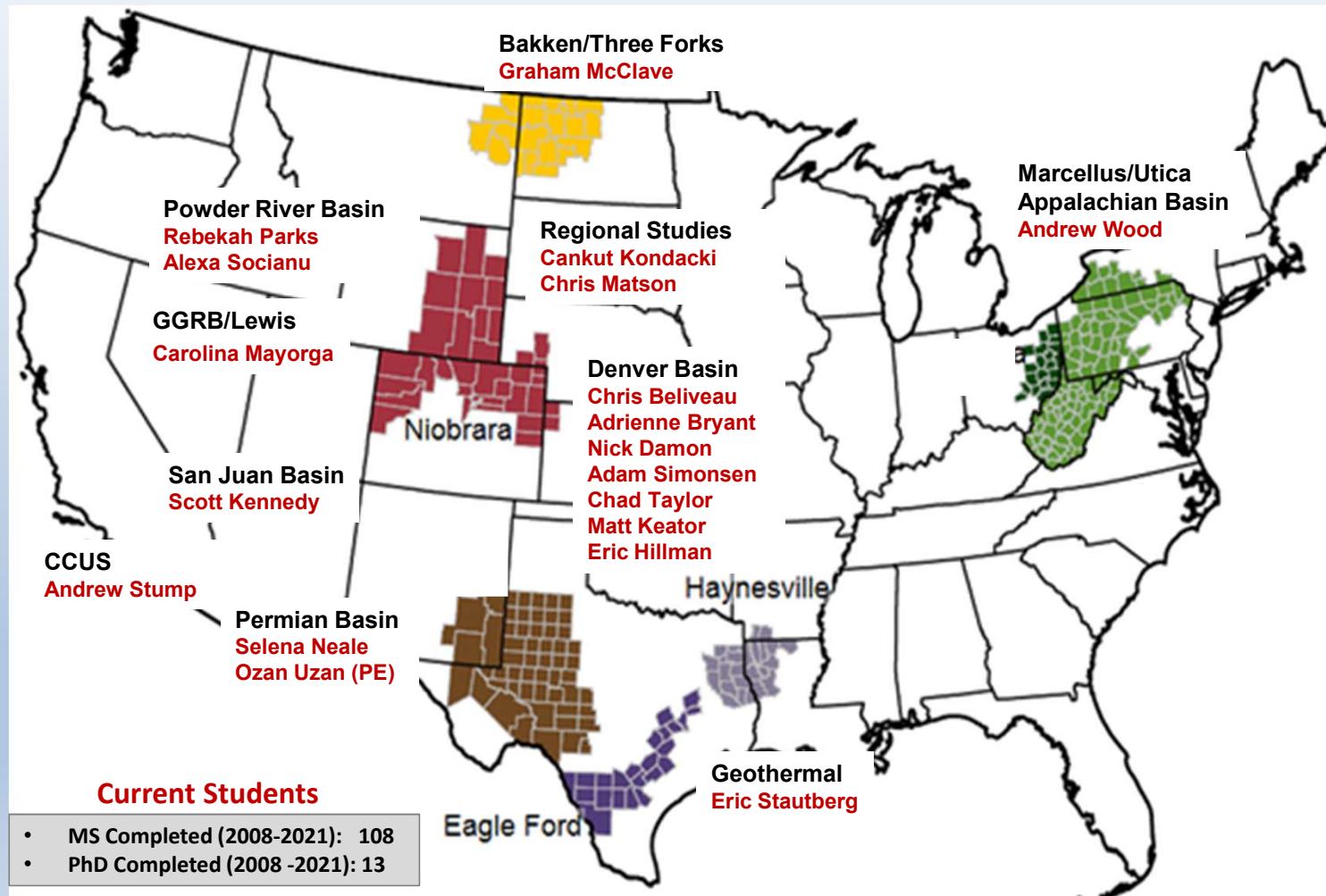
# MUDTOC Project Ideas

- NMR & ECS - Permian, Bakken, Niobrara, Mowry, etc.
- Niobrara & Greenhorn Regional
  - Ash beds, biostratigraphy, OAEs, etc.
- Niobrara Redtail area
- Niobrara Newatt area
- 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
- Lewis Shale, GGRB
- 3D Seismic Powder River Basin
- Geothermal

# Advisory Board Suggestions

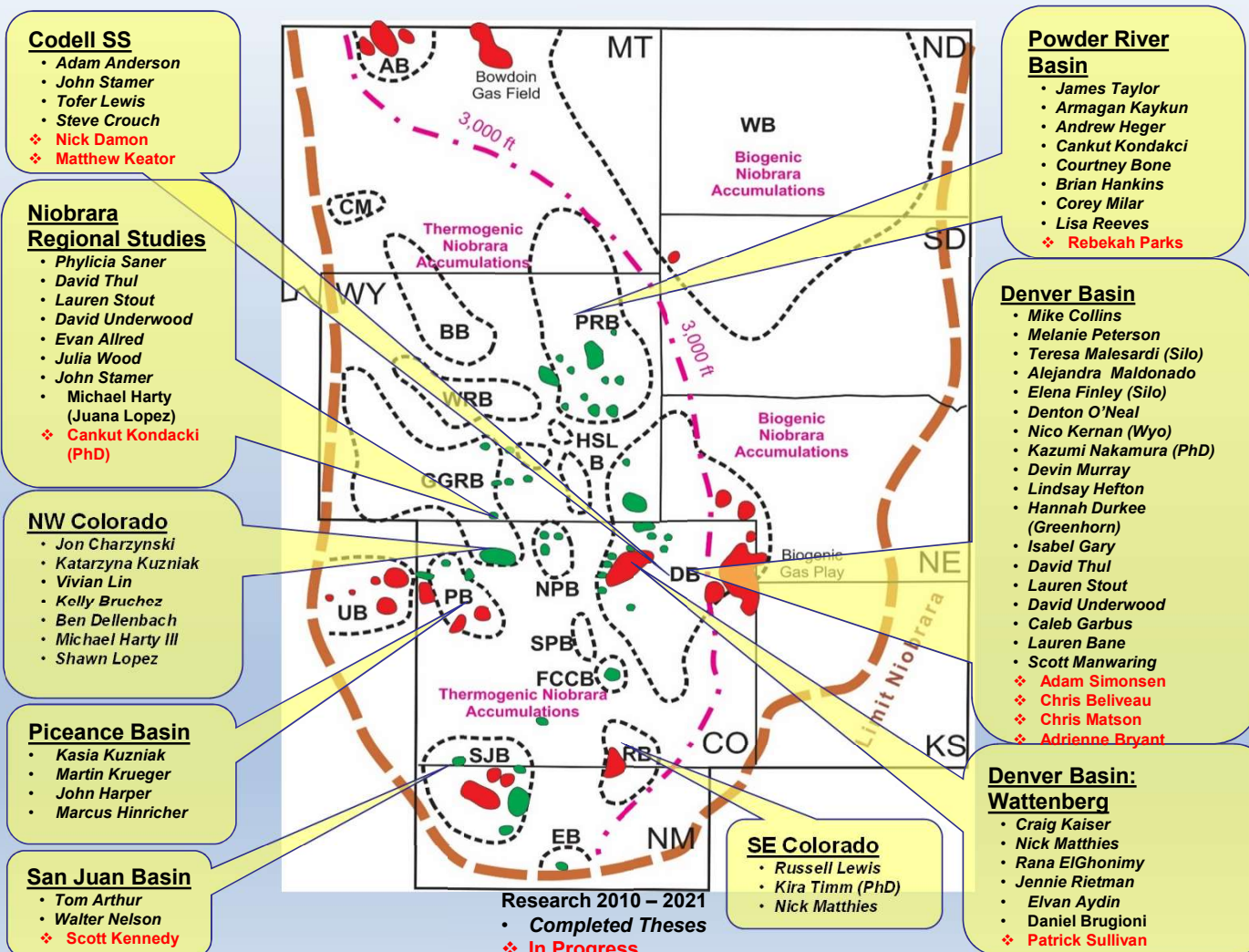
- Silo area Codell study
- Wettability studies
- Fluid & rock interactions
- OAE II & III
- PRB & DJB – burial history & maturity studies northern part of basin
- Regional stratigraphic study Frontier to Turner
- Austin Chalk study
- Geothermal studies
- CCUS (HC gas & CO<sub>2</sub>)

# MUDTOC Project Areas

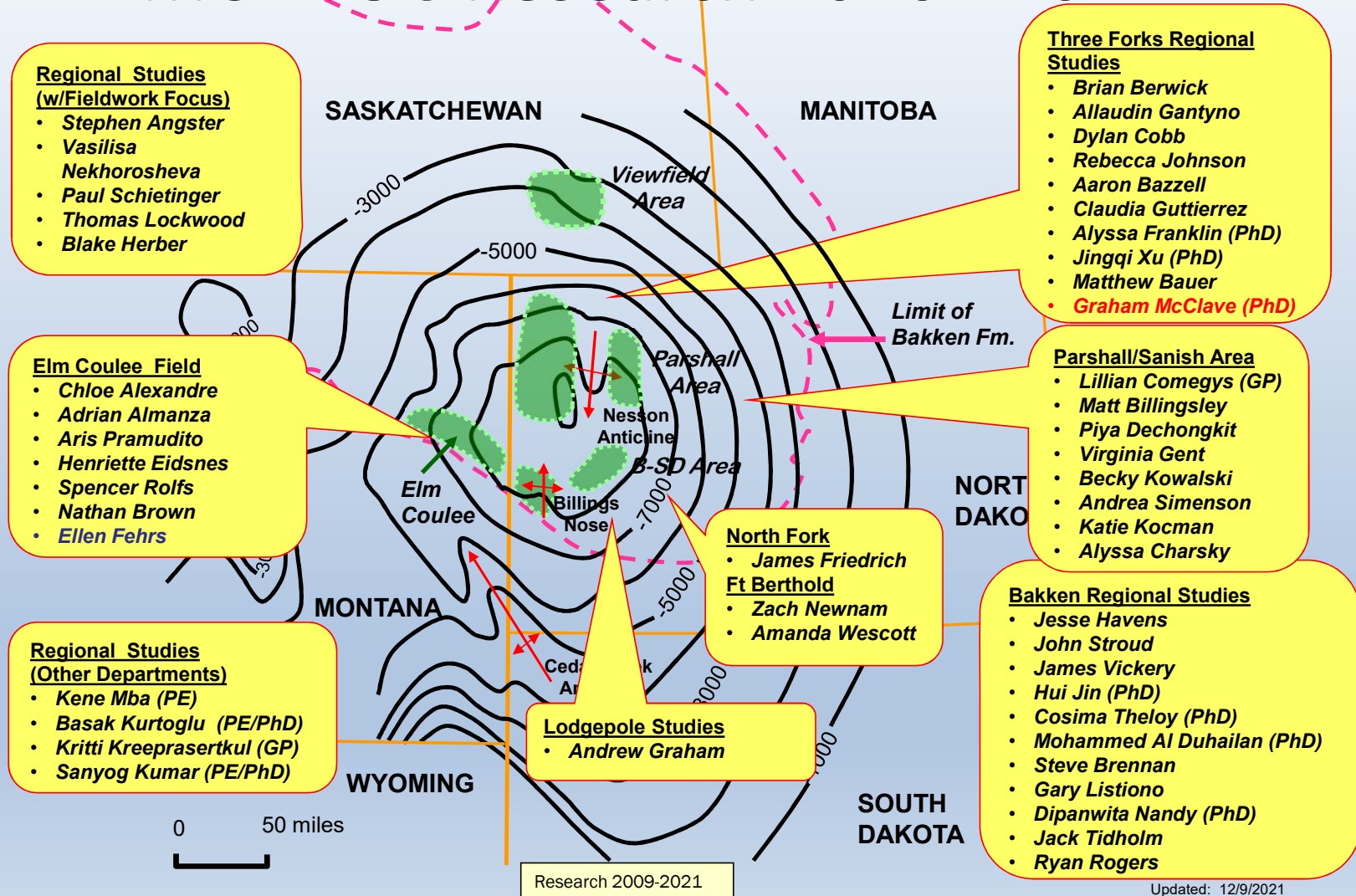




# MUDTOC Research 2010 - 2021

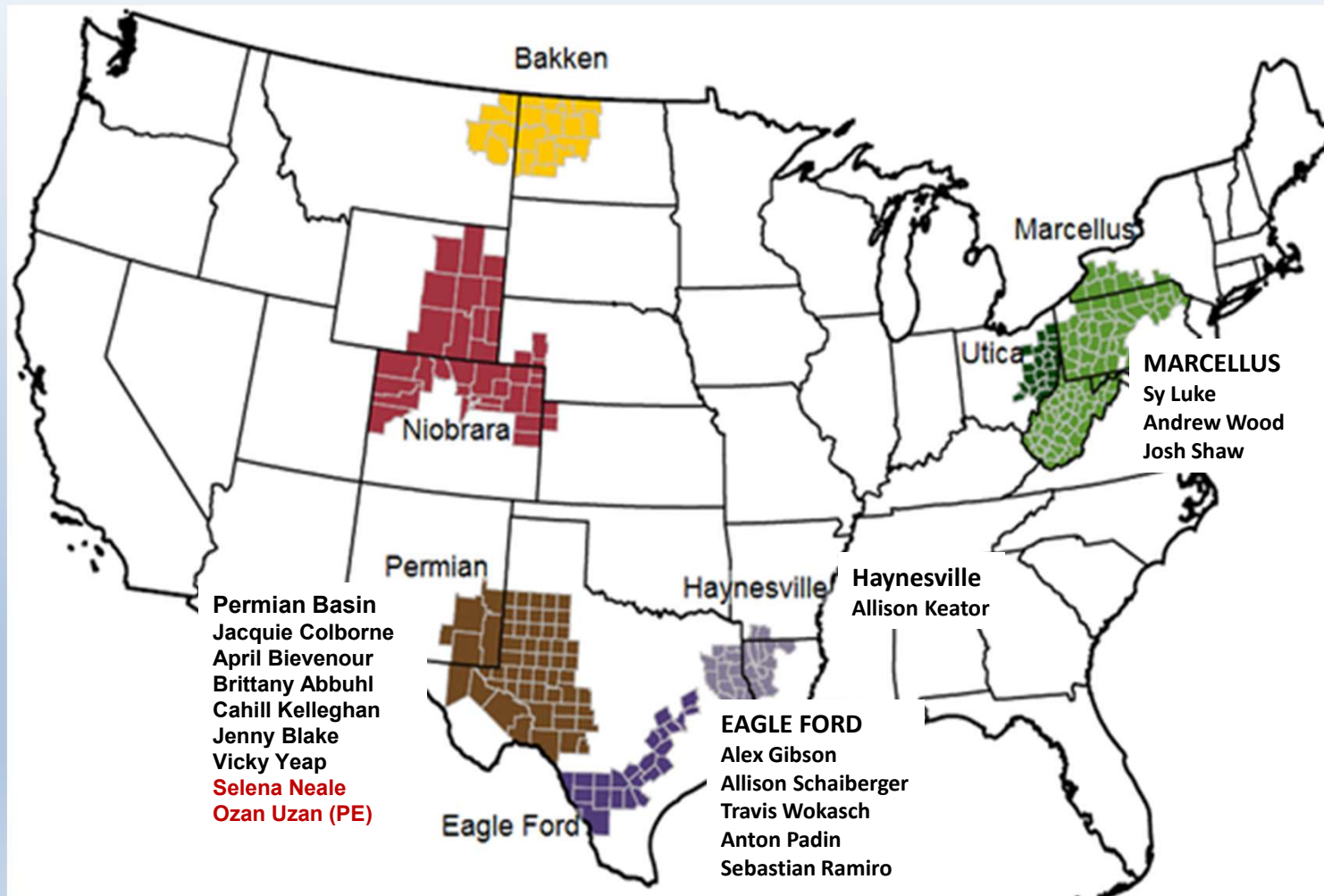


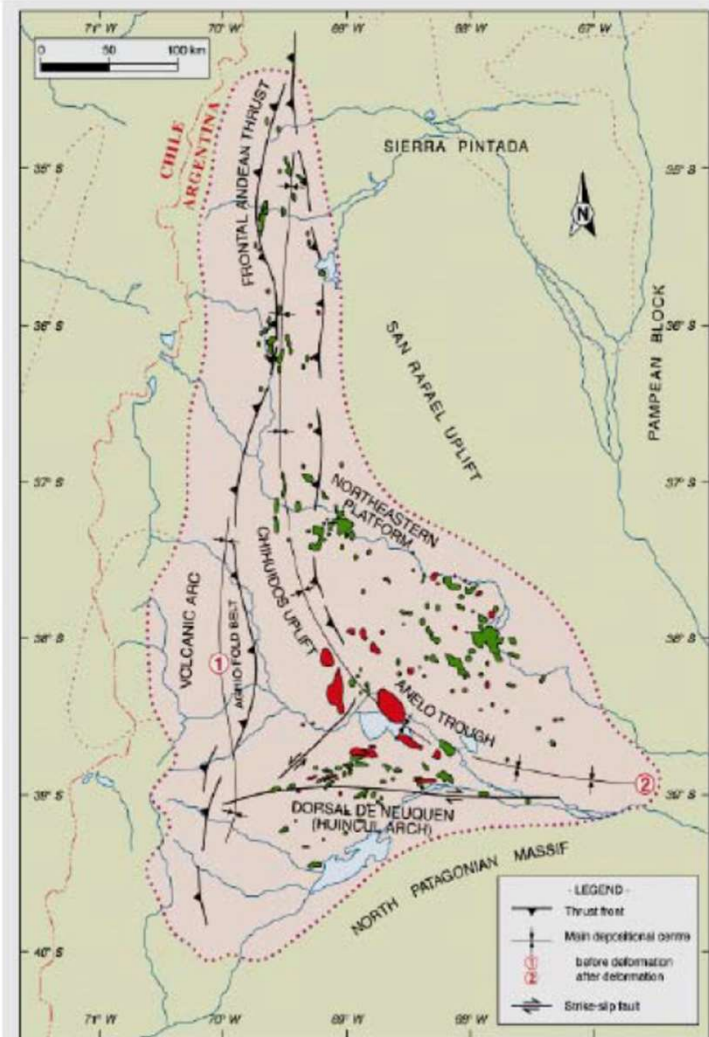
# MUDTOC Research 2010 - 2021



# Research Topics

## EAGLE FORD, HAYNESVILLE, MARCELLUS RESEARCH





Source: Americas Petrogas

## VACA MUERTA RESEARCH

Max Willis: MS, PE

Talgat Kosset: MS, PE

Anton Padin: PhD, PE

Matt Herzog: MS, PE

Eider Hernandez-Bilbao: PhD, Geology/GE

Ted Kernan: MS, Geology/GE

Josefina D'Hiriart: PRMS Geology/GE

Jessica Franklin: MS Geology/GE

Sebastian Ramiro: MS, Geology/GE

Dina Hegazy: MS PE

Darkhan Maulimgazy: MS, PE

Pablo Benitez: PRMS, Geology/GE

Kyla Bishop: MS GP

Pedro Biscayart: PRMS Geology/GE



# MUDTOC Consortium Sponsors

## Fall 2021



### Sponsoring Member Companies



### In-Kind Supporting Companies

GEO MARK



Mike Johnson & Associates



**PRA**  
Platte River Associates, Inc.

Schlumberger

