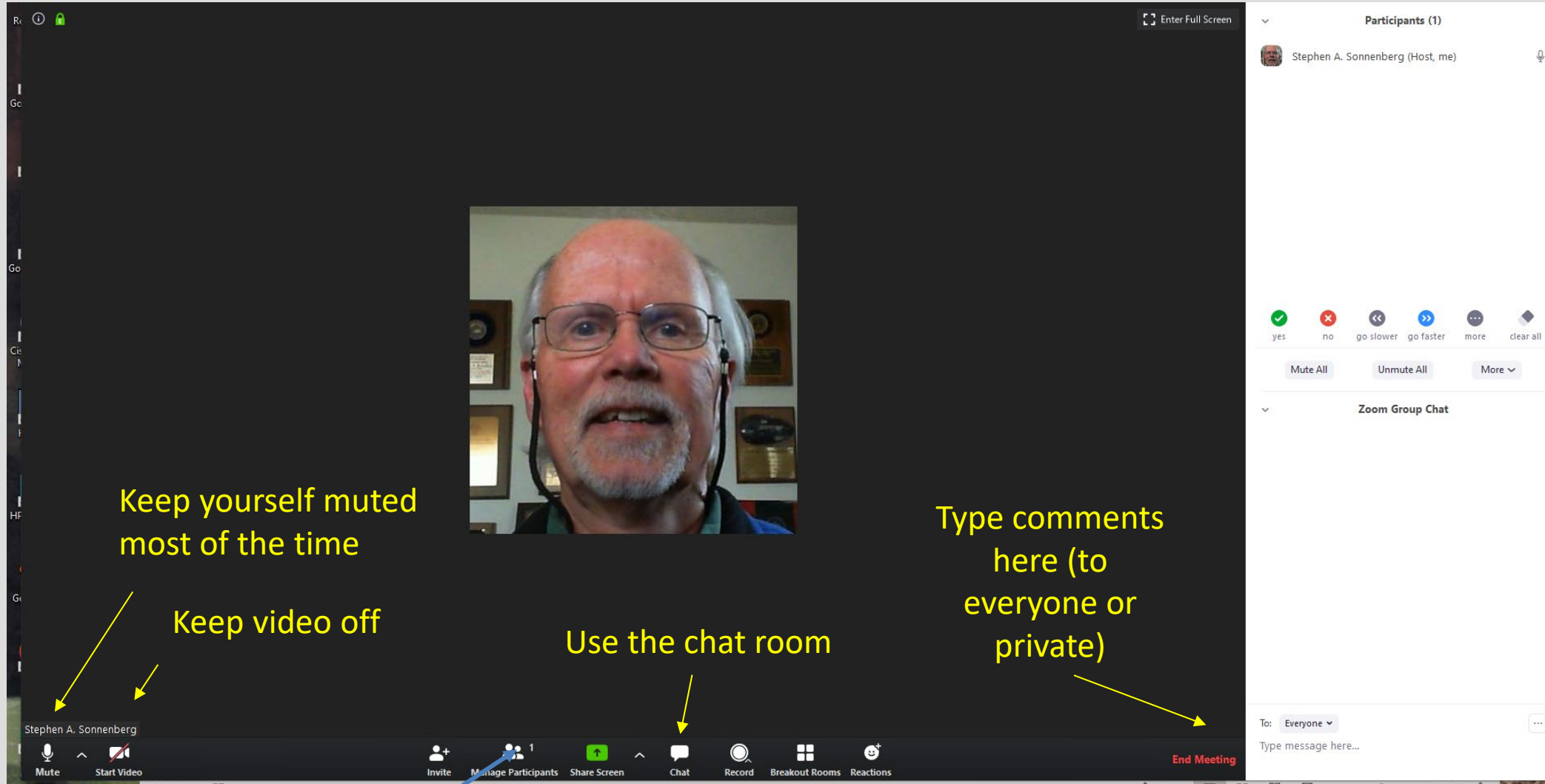


Spring 2024
MUDTOC MEETING
Steve Sonnenberg
PI MUDTOC



Zoom Suggestions



Keep yourself muted most of the time

Keep video off

Use the chat room

Type comments here (to everyone or private)

Participant's list

MUDTOC Advisors, Faculty & Committee Members

- Steve Sonnenberg, PI
- Patrick Sullivan, RC

Advisors:

- John Curtis
- Jim Emme
- Matt Bauer
- Bill Zogg
- Eric Roberts

Recent Committee Members

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

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 + FMI
- Core Scanning
- Carbon & oxygen isotope analysis
- CCUS
- Geothermal

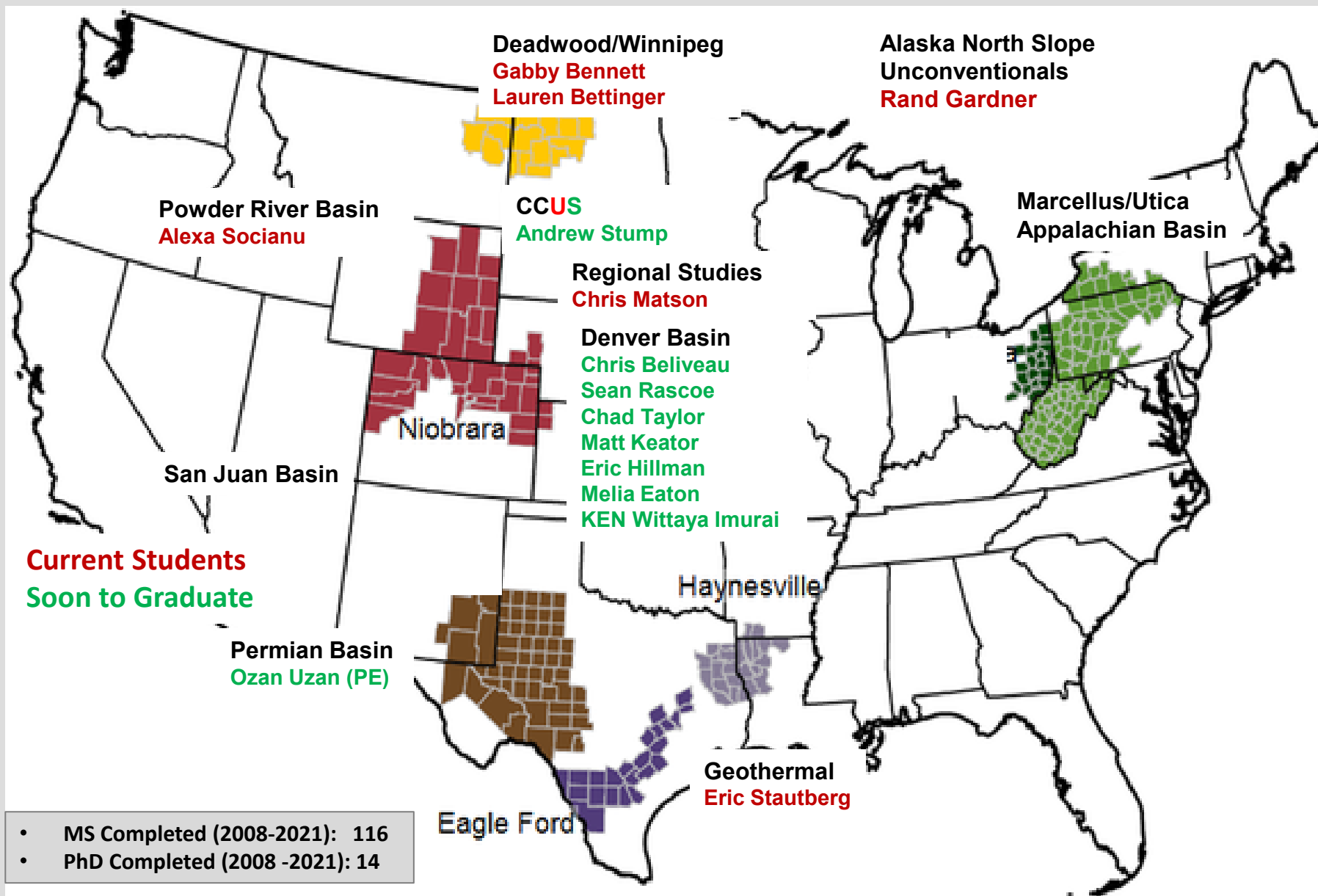
MUDTOC Project Ideas

- 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, FMI logs
- Carrier-Bed Plays (Turner and Codell)
- CCUS Wolfcamp, Niobrara, Muddy Sandstone, Lyons Sandstone
- Lewis Shale, GGRB
- Geothermal Lyons Sandstone, Deadwood Sandstone
- Helium
- Hydrogen
- Critical minerals, lithium etc.

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 & CO₂) ✓

MUDTOC Project Areas



Thank you to our Sponsors!

Sponsoring Member Companies



HELIS OIL & GAS, L.L.C.



In-Kind Supporting Companies

GEO**MARK**



MUDTOC Research 2010 - 2023

Codell SS

- Adam Anderson
- John Stamer
- Tofer Lewis
- Steve Crouch
- Nick Damon
- Matthew Keator
- Sean Rascoe

Niobrara Regional Studies

- Phylicia Saner
- David Thul
- Lauren Stout
- David Underwood
- Evan Allred
- Julia Wood
- John Stamer
- Michael Harty
- Cankut Kondacki (PhD)

NW Colorado

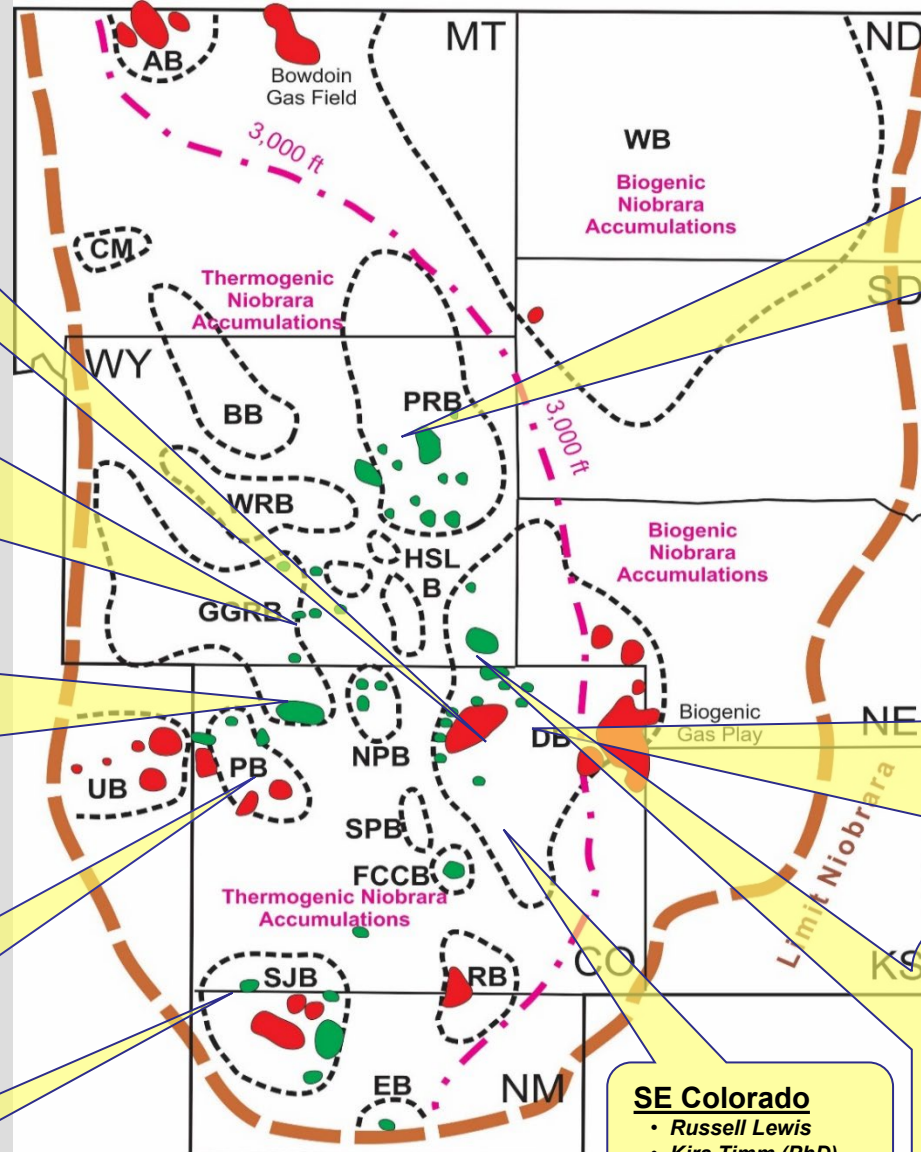
- Jon Charzynski
- Katarzyna Kuzniak
- Vivian Lin
- Kelly Bruchez
- Ben Dellenbach
- Michael Harty III

Piceance Basin

- Kasia Kuzniak
- Martin Krueger
- John Harper
- Marcus Hinricher

San Juan Basin

- Tom Arthur
- Walter Nelson
- Scott Kennedy



Powder River Basin

- James Taylor
- Armagan Kaykun
- Andrew Heger
- Cankut Kondacki
- Courtney Bone
- Brian Hankins
- Corey Milar
- Lisa Reeves
- Rebekah Parks
- Alexa Socianu
- ❖ Drew Stump
- ❖ Patrick Sullivan

Denver Basin

- Mike Collins
- Melanie Peterson
- Teresa Malesardi
- Alejandra Maldonado
- Elena Finley
- Denton O'Neal
- Nico Kernan
- Kazumi Nakamura (PhD)
- Devin Murray
- Lindsay Hefton
- Hannah Durkee
- Isabel Gary
- David Thul
- Shawn Lopez
- Lauren Stout
- David Underwood
- Caleb Garbus
- Lauren Bane
- Scott Manwaring
- Adam Simonsen
- Adrienne Bryant
- Chad Taylor
- ❖ Chris Beliveau
- ❖ Chris Matson (PhD)
- ❖ Wittaya Imurai
- ❖ Melia Eaton

Denver Basin: Wattenberg

- Craig Kaiser
- Nick Matthies
- Rana ElGhonimy
- Jennie Rietman
- Elvan Aydin
- Daniel Brugioni
- Patrick Sullivan
- Eric Hillman

SE Colorado

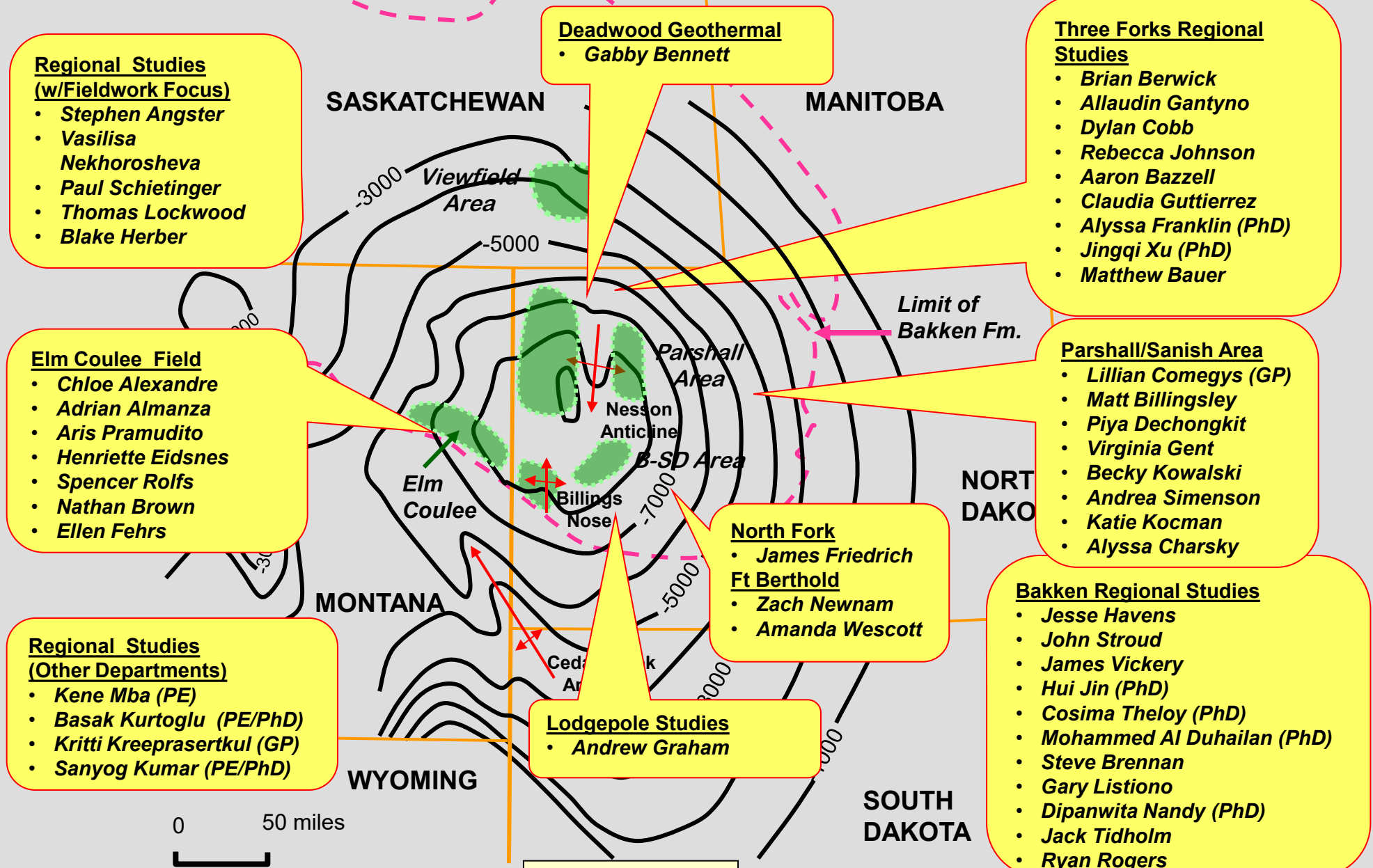
- Russell Lewis
- Kira Timm (PhD)

Research 2010 – 2021

• Completed Theses

❖ In Progress

MUDTOC Research 2009 - 2023



VACA MUERTA RESEARCH TITLES/(OR DRAFT PROPOSAL TITLE)

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 Student in Geology

Josefina D'Hiriart: PRMS Geology/GE

Jessica Franklin: MS Geology/GE

Sebastian Ramiro: MS, Geology/GE

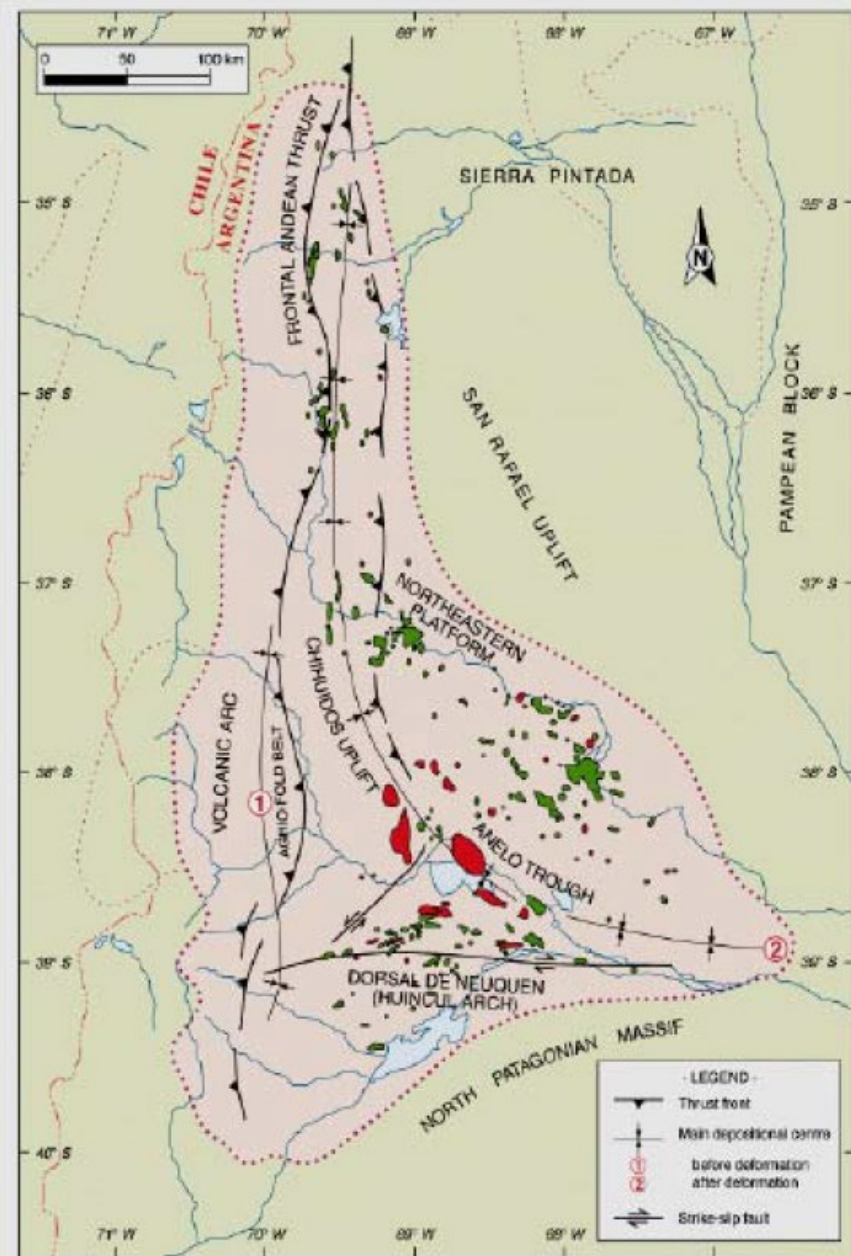
Dina Hegazy: MS PE

Darkhan Maulimgazy: MS, PE

Pablo Benitez: PRMS, Geology

Kyla Bishop: MS GP

Pedro Biscayart: PRMS Geology



Source: Americas Petrogas