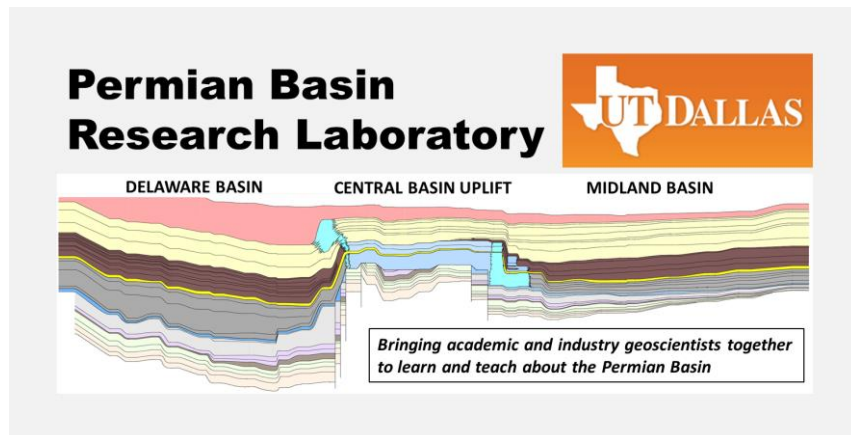


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UT Dallas Permian Basin Research Lab



Co-Directors: Dr. Robert Stern, Professor
Mr. Lowell Waite, Lecturer
Established 2019

Website: <https://labs.utdallas.edu/permianbasinresearch/>
Join Facebook Group "Permian Basin Research Laboratory"

Permian Basin Research Lab:

Mission and Goals

Welcome to the UTD PBRL Newsletter, Spring, 2022!

The Permian Basin Research Lab was officially established in January, 2019, within the Department of Geosciences at the University of Texas at Dallas.

The mission and goals of our Lab are two-fold:

- Advance understanding of all geologic aspects of the Permian Basin through open applied research, **linking academia and industry**
- Educate students interested in industry careers by providing experience with subsurface data sets in the analysis of sedimentary basins and petroleum systems

The focus of our interest includes, but is not limited to, the greater Permian Basin of west Texas and SE New Mexico and surrounding regions, including the Ft. Worth Basin. There is an amazing amount of hydrocarbon resources located between the cities of Dallas and El Paso, and these resources have contributed significantly to the economic development of both Texas and the U.S. We believe our students need to be taught the significance and scope of these resources, as well as the challenges associated with their development.

In addition, the ongoing focus shift to renewable and alternative energy sources brings a whole new scope of issues and challenges to the forefront, and our students need learn about, and be kept abreast of, the latest developments and research.

The Permian Basin Research Lab provides a vehicle to engage and teach our students about all energy resources. We, together with our colleagues, are excited about the direction our lab has taken in just a few short years and look to continue to engage both students and local industry in projects that benefit both!

Sincerely,
Bob and Lowell



Permian Basin Research Lab:

People

Directors

Dr. Robert J. Stern Professor of Geosciences, UT Dallas
Mr. Lowell Waite Lecturer, UT Dallas

Researchers

Dr. Mortaza Pirouz Senior Lecturer, UT Dallas
Dr. Hejun Zhu Assistant Professor, UT Dallas

Affiliated Faculty

Dr. Majie Fan Associate Professor, UT Arlington

Industry Associates

Mr. David Williamson Founder and Manager, Wheelhouse Geoscience
Mr. Tim Reed Pioneer Natural Resources (Retired)

Note: Full bios are available on the Permian Basin Lab website:
<https://labs.utdallas.edu/permianbasinresearch/>

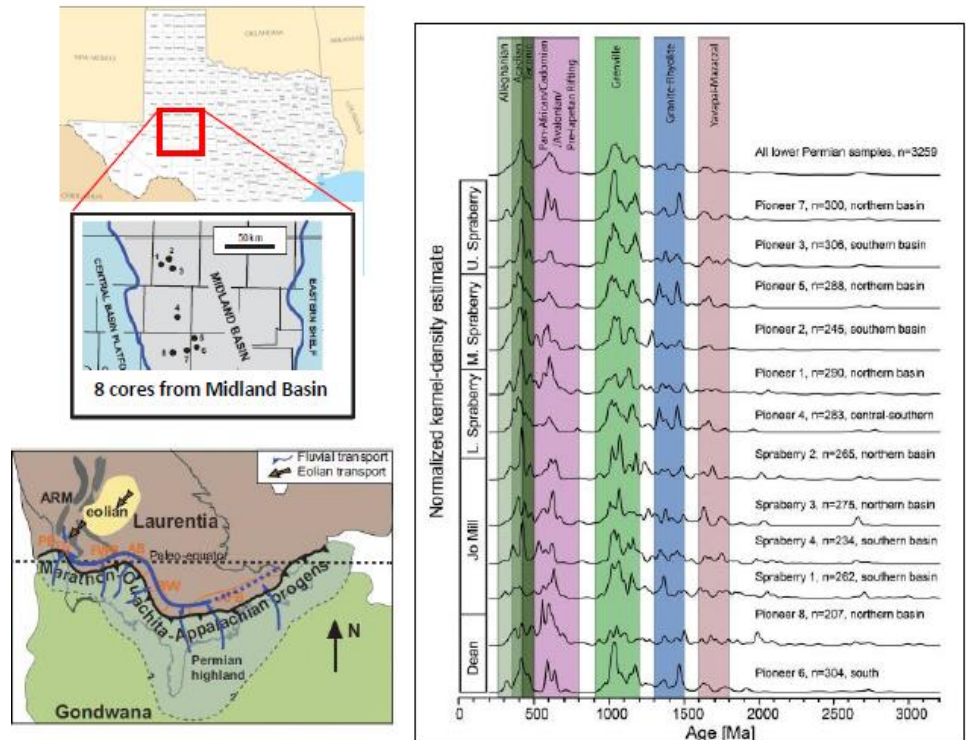
Permian Basin Research Lab: Research

RECENT RESEARCH RESULTS

Recent research within the Lab has focused on analysis of an important set of detrital zircon samples from lower Permian sediments (Dean and Spraberry formations) from the Midland Basin. Zircons are uranium-bearing mineral grains derived from various ancient erosional source lands. Radioactive age-dating of these grains provides absolute ages which help identify a specific sediment provenance.

We were able to recover and analyze over 3,200 individual zircon grains from a total of eight cores within the Midland Basin. Our analyses indicate the zircons are organized into specific age-groups and basement terranes, including from oldest to youngest, 1.4 billion years (Granite-Rhyolite Province), 1.1 billion years (Grenville Province), 600 million years (Gondwana Province), and 400 million years (Appalachian terranes). These results suggest the lower Permian sandstones in the Midland Basin were ultimately derived from a large river system or systems draining ancient distant source lands from the northeast and southeast.

Full results of this work were published in the peer-reviewed journal *International Geology Review* in 2020; a copy is available on the Lab website.



Permian Basin Research Lab:

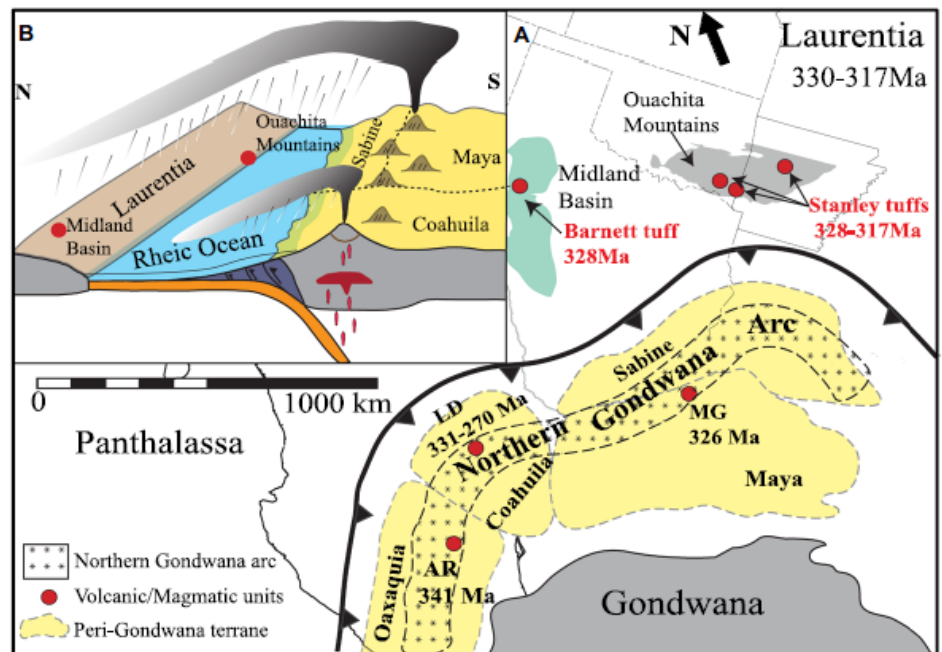
Research (continued)

From the same cores, we were also able to identify several volcanic tuffs (ash beds), also containing detrital zircons. Age dating and mineralogical analysis of these zircons precisely determines the geologic age of the eruption and the likely location of the volcanic arc.

A single, thin (3 cm-thick) tuff in the Midland Basin was identified to be of Early Mississippian/ Barnett shale age, correlative to the thicker Stanley Tuffs in the Ouachita Mtns, both of which are linked to a northern Gondwana continental arc and granitoids from the Maya Block.

In addition, analyses of numerous tuffs of early Permian age from Midland Basin Block indicate two separate N. Gondwana arcs.

This work was done as part of a PhD. Project by Hepeng Tian of UT Arlington, under direction of Dr. Majie Fan. Results of analysis of the Mississippian tuff was published in the peer-review journal *Geology* in 2022, and results of the lower Permian tuff study are currently in-progress.



Permian Basin Research Lab:

Teaching and Training

TEACHING AND TRAINING

Teaching and training are a constant focus of the Lab. We currently offer several graduate-level courses at UTD focused on energy-related topics. These include:

- Geology of the Permian Basin (Waite and Pirouz)
- Petroleum Geology (Waite)
- Paleo Earth Systems (Waite)
- Carbonate Depositional Systems (Waite)
- Sustainable Energy (Stern)

The Geology of the Permian course was modified slightly and offered separately to the staff of two oil companies (Endeavor Resources, Midland, TX, and EOG Resources, Ft. Worth, TX). These were presented by Lowell Waite as a series of nine lectures (webinars) over the course of 18 to 27 weeks (one session every 2 – 3 weeks). These lectures are available on our website.

In addition, we have met one-on-one with representatives of several other local oil companies to discuss various plays and topics and participated in a privately held core workshop. We are always happy to share whatever knowledge we might have to help local industry!

Over the past couple of years, Lowell has also given several invited talks to local geologic groups. These include:

- Roswell Geologic Society (Wolfcamp – Spraberry; October 8, 2019)
- Dallas SIPES (Wolf. – Spraberry; October 15, 2019)
- Abilene Geologic Society (Wolf. – Spraberry; May 20, 2021)
- Permian Basin Section-SEPM (Wolf. – Sprayberry; Sept. 21, 2021)
- Ft. Worth Geologic Society (Wolf. – Spraberry; March 8, 2022)
- North Texas Geologic Society (Wolf. – Spraberry; scheduled for April 21, 2022)
- Abilene Geologic Society (Horseshoe Atoll; scheduled for May, 19, 2022)

**Permian Basin
Research Lab:
Student Projects**

STUDENT PROJECTS

Graduate students are the lifeblood of our Lab. We are proud to mentor and work with a number of top-quality UTD graduate students. To date, we have guided four M.S. students to completion, and are currently working with five additional students. In 2021, Nathan Kalldin completed a report on US cratonic basins and Rebecca Kleinman completed a geologic survey of a proposed high-level nuclear waste repository site in Andrews Co., TX. (Rebecca's report is available on our website, listed as PBRL Occasional Publication #1).

Ongoing student projects include the following:

- San Andres carbonate reservoirs, Northwest Shelf (Kevin Hiss)
- Claytonville Canyon Reef Field, Fisher Co., TX (Alex Gonzalez)
- L. Strawn (Caddo) carbonates, NE Nolan Co., TX (Aldwin Vazquez)
- Producing trend analysis, NW Nolan Co., TX (Robert Yao)
- Austin Chalk facies, Maverick Basin, south TX (Alec Veasey)



Left to right: M.S. Candidates Aldwin Vazquez, Robert Yao, and Alec Veasey

We wish to thank those companies who have graciously donated core and well data to our Lab! We currently have additional data sets waiting for future students.

**Permian Basin
Research Lab:
Recent News**

RECENT NEWS

- We wish to thank both Endeavor Energy Resources, L.P., Midland, TX., and Silver Hill Energy Partners, L.P., Dallas, TX, for their generous monetary gifts to the Lab this year. Because of this support, we were able to purchase a number of raster well logs, and provide two of our students, Aldwin Vazquez-Olmeda and Alec Veasey, with research scholarships in the amount of \$2,000 each.
- We are extremely pleased and excited to announce that we have been selected by Enverus to participate in their University Liaison Program. Participation in the program will provide our students with access to Enverus products including their latest Prism desktop application and provide dedicated training for students.
- We have recently initiated a detailed analytics study of producing reservoirs of the western margin of the Eastern Shelf with Dr. Yuxiang (Shawn) Zhang of Core Geologic
- We are currently in the process of starting additional research projects with other local geoscientists...stay tuned for details!



COMETS GIVING DAYS 2022
#COMETOGETHERUTD

Comets Giving Day is an annual fund-raising event at UT Dallas. This is a chance for individuals to contribute to the future of UTD by directly supporting our students. We wish thank all those individuals who graciously donated funds to the UTD Geoscience Department, and to the Permian Basin Research Lab, during past Comet Giving Days

Comet's Giving Day this year will be held on April 6 and 7, 2022. Your donation can be targets to several funds within the UTD Department of Geosciences, including a Permian Basin Research Lab Fund. Even a small donation makes a difference for our students! We thank you for your consideration this year.

Information on the program, including how to donate, may be found here: <https://givingday.utdallas.edu/>