The Permian Basin is increasingly important to the Texas and New Mexico economies and US energy independence, but many geoscience faculty and students know little about it. The basin is densely drilled for hydrocarbons but there remains much that we do not know about its formation and evolution. In order to better understand the geologic history of this basin and to inform the next generation of geoscientists, we have established the Permian Basin Research Lab (PBRL) in the Geoscience Department at UTD. The Permian Basin Research Lab is committed to advancing our understanding of all geologic aspects of the Permian Basin. We emphasize teaching and making the results of our work open and available to all interested parties, from the general public to students at all levels to industry and government. Our efforts to date have included teaching a graduate course on the Permian Basin (Fall 2017), engaging graduate students in research about the Permian Basin, organizing workshops designed to stimulate collaborative research (April 2018), and making videos about the Permian Basin. Our research is intended to be shared via presentations at scientific meetings and publications in the peer-reviewed literature. To better ensure that university and industrial geoscientists communicate and understand the expectations of limitations of their respective cultures, the PBRL is co-directed by a UTD professor (Stern) and an experienced industry geoscientist (Waite). We are in the early stages of developing the lab but are interested to recruit associates from industry, academia, and government. There are no fees or other restrictions to become involved, just a willingness to share information and data and an interest to help educate the next generation of geoscientists and inform our community. Please give us your suggestions.

References Cited


Mazzullo, S.J., 1995, Permian Stratigraphy and Facies, Permian Basin (Texas - New Mexico) and Adjoining Areas in the Midcontinent United States, in P.A. Scholle, T.M. Peryt, and D.S. Ulmer-Scholle (eds), The Permian of Northern Pangea: Springer, Berlin, Heidelberg, p. 41-60. doi.org/10.1007/978-3-642-78590-0_3


Website Cited

The Permian Basin is a key aspect of the PBRL. We have three graduate student projects concerning this way:

1. Shi Zheng “GIS of producing fields of the Eastern Shelf” 
2. Eric Walker “The Glasscock Nose” 
3. Katherine Sink “Composition of produced brines” 

We seek more projects from industry and more UTD students to work on these.

A Workshop about the Permian Basin
In Fall 2016 we held an open 1-day workshop at UTD to explore the possibility that a “Great Pennsylvanian River” once flowed into the Midland Basin. Geoscientists from LSU, TCU, WU, TU Freiburg, GFZ Potsdam, U Ky, Ky Geol. Survey, OKSU, UIA, UTA, and Pioneer Natural Resources presented talks on a wide range of topics: “Overview of the Great Penn River”; “Collisional Rivers”; “Mississippian Sediment transport in southern Laurentia”; “Overview of Penn. sediments - Alb. to Pennsylvania”; “Acadian-Variscan-Aleghenian orogen”; “Accuracy of detrital mineral provenance methods”; “Penn. Rivers in the central App. and Illinois Basins”; “Westward migration of a giant synorogenic drainage system in Perm. time”; “Early Pennsylvanian Pottsville Fm. in AL. and Miss.” “Pennsylvania seds/ of Arkoma Basin”; “Muenster-Wichita-Amarillo uplift”; “Penn. subsidence and sed. dispersal in the Ft. Worth basin”; “Permian Basin overview”; and “Penn. sed. patterns and depocenters of the Midland Basin”.

UTD students sat in, listened, and learned.

Research about the Permian Basin
We have research projects underway concerning the source of Spraberry mudstones. Our most mature project concerns the source of sediments that make up the early Permian Spraberry formation. Detrital zircons are an effective way to constrain sources of clastic sediments. We separated detrital zircons from 12 samples and obtained 3259 U-Pb ages and 357 Hf isotopic compositions on these.

The results reveal prominent groups of zircons derived from the Appalachian (500-270 Ma) and Grenville (1250-950 Ma) provinces in eastern Laurentia and the Peri-Gondwana terranes (800-500 Ma) incorporated in the Alleghanian-Ouachita-Marathon orogen. This drainage propagated westward and delivered sediments into the remnant oceanic embayment of the Permian Basin. Primary sediment delivery pathway was assisted by input from the Ancestral Rocky Mountains and wind deflation of fluvial sediments north and east of the basin. Slope failure associated with early Permian deposition in the southeastern margin of the Midland Basin triggered gravity flows leading to submarine fan deposition. This manuscript is being revised for Tectonics.

The Future
We are just getting started building the PBRL. In Jan. 2019 we occupied a lab space in the UTD Geosciences Dept. We know that there is a need for a research center like PBRL, where industry and universities can share research, where we can generate educational materials for undergraduate and graduate education, and which can host annual workshops on the Permian Basin. We recently submitted a proposal for 4 years of support ($567K) to the UTD Office of Research; if funded this will support 2-4 graduate students and 2 postdoctoral scholars. We are looking for partners and projects. We look forward to your comments and suggestions!