



AAPG

Research LAUNCH Program

About You

First Name: Bryan Last name: Turner

Company/University: University of Oklahoma

Check which apply to you: Student Non Student Independent Researcher Professor Corporate Research Other

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Short Bio: (250 words or less)

Bryan is a PhD student at the University of Oklahoma integrating chemostratigraphic approaches to address and refine sequence stratigraphic frameworks. He currently works with Dr. Roger Slatt as part of the Woodford Shale Consortium in the Institute for Reservoir Characterization. Previously, Bryan worked with Dr. Harry Rowe at the University of Texas – Arlington where Bryan developed an interest in combining these two stratigraphic methods.

Bryan has interned with Pioneer Natural Resources and will be interning with Anadarko Petroleum Company. While at Pioneer, Bryan worked with the Permian Basin Regional Subsurface Team.

Before starting his PhD, Bryan completed a MS at Montana State University. His thesis examined high-resolution correlation of lithostratigraphic contacts within a chronostratigraphic framework. During this project, Bryan realized that mudrock stratigraphy poses unique opportunities for analysis and detailed interpretation not presented by most sedimentary rocks.

During his undergraduate education, at Colorado State University, Bryan started off as chemistry major, but switched to geology because he enjoyed the field work. While at CSU, he was advised by Dr. Frank Ethridge and developed an interest in sedimentology and stratigraphy.

In the past, Bryan has worked with the Morrison Natural History Museum, a small teaching museum located in Morrison, CO. While there, he helped instruct museum volunteers about the local geology and provided geologic context to local excavations.

Upon completing his degree, Bryan plans on continuing to work with integrating chemostratigraphic approaches within sequence stratigraphic frameworks to refine mudrock stratigraphy within unconventional reservoirs.

Project Description

1. Name of project: Utilization of Chemostratigraphic Proxies for Generating Sequence Stratigraphic Frameworks in Mudrocks and Shales
2. Brief synopsis/areas of geosciences or engineering (50-75 words)

This research will integrate geochemistry, sedimentary petrology and diagenesis, sedimentology, and stratigraphy. In addition to providing data for sediment source area, secondary alteration, and environmental conditions at the sediment-water interface; chemostratigraphic datasets can be applied to help refine and generate sequence stratigraphic frameworks within apparently homogeneous mudrocks. Recent technological advances allow for practical collection and analysis of detailed chemostratigraphic profiles from outcrop and core samples.

3. Bullet list of 5-7 main outcomes/goals.

- Utilize ED-HHXRF (Energy Dispersive Hand-Held X-Ray Fluorescence) to obtain bulk geochemistry at 2 inch resolution for cored mudrock intervals.
- Integrate the chemostratigraphic data with conventional gamma-ray data in order to tie interpretations to previously established frameworks.
- Refine previously ambiguous successions within sequence stratigraphic frameworks using chemostratigraphy.
- Identify higher frequency sequence stratigraphic cyclicity.
- Interpret localized variation in depositional setting resulting from either environmental or sedimentological conditions.

4. In two or three sentences, describe why your research is important. Please mention who will benefit from your work.

This research will identify high frequency cyclicity in depositional history within a unit that is often considered visually homogenous, allowing for detailed stratigraphic correlations within otherwise ambiguous successions of mudrock. Basin models will benefit from more detailed stratigraphic correlations and from a better understanding of depositional conditions, resulting in higher degrees of confidence for exploration and production within unconventional reservoirs.

5. Timeline with milestones (12 month/18 month)

Time Table	Milestones Projected Date: Event
First 12 Months	<ul style="list-style-type: none"> • May 2014: Present poster at AAPG Launch conference • May 2014: Submit paper to <i>SEG Interpretation</i> journal on preliminary work with the Woodford Shale at the Wyche Quarry <p>If funded</p> <ul style="list-style-type: none"> • June 2014: Secure purchase of Tracer IV-SD from Bruker <ul style="list-style-type: none"> ○ Bruker estimates 4-12 weeks for delivery of instrument • June 2014 – August 2014: Sample collection and core preparation, so samples will be available to scan as soon as the instrument is online. • August, 2014: Instrument setup and instructing additional grad students in the operation of the instrument. • September 2014: Tentatively present preliminary work within research group and at specialized technical conferences. <ul style="list-style-type: none"> ○ Teach graduate level short course at University of Oklahoma on chemostratigraphic methods. • October 2014: Present detailed stratigraphic interpretations at GSA annual meeting 2014. • November 2014 – February 2015: continue analyzing shales for chemostratigraphic analysis. Additional graduate students should be capable of operating the instrument and capable of analyzing and interpreting the resulting data independently. • January 2015: graduate students submit posters to present updated chemostratigraphic interpretations to HGS mudrocks conference. • February 2015 – April 2015: continue analyzing shales for chemostratigraphic analysis. • April 2015: Present regional chemostratigraphic interpretations at AAPG annual meeting 2015.
First 18 Months	<ul style="list-style-type: none"> • May 2015: Prepare regional chemostratigraphic interpretation for the Woodford Shale in Oklahoma, focusing on the Cherokee Platform and Arbuckle Uplift for publication. • May 2015 – August 2015: Sample analysis continues. • September 2015 – December 2015: Prepare interbasinal chemostratigraphic interpretation for the Woodford Shale in Oklahoma, adding the Anadarko Basin and Ardmore Basin to the previous chemostratigraphic framework. • Beyond December 2015: Continue building chemostratigraphic database and add additional formations.

6. Funding amount needed to achieve first basic goals within 12 months. Please provide a brief summary overview of your budget. List costs of 5-10 main items.

Item	Rate	Total Amount Allocated
Travel to Field Sites (~120 - 1600 miles/round trip)	\$0.56/mile (GSA.gov 2014 rate) (~24 trips)	\$5627.20 (funding secured)
Thin sections (~50 thin sections)	\$13.75/section (National Petrographic)	\$687.50 (funding secured)
Gamma Ray Scintillator	Available from Roger Slatt (OU)	\$0.00
Handheld XRF Bruker Tracer IV-SD	Includes: XRF unit, vacuum pump, stand, laptop with analytical software.	\$48,577.50 (~\$24, 000 secured)
Traditional XRF Analysis (~11 samples for confirmation)	~\$50.00/sample (ActLabs)	\$550.00 (funding secured)
XRD Analysis (~50 samples for bulk and clay mineralogy)	~\$50/sample-bulk mineralogy ~\$50/sample-clay mineralogy (Prograding Rock Services)	\$5000.00
Total:		\$60,442.20
Total Requested:		\$29,577.50

Justification: The only item that needs further funding is the Bruker Tracer IV-SD. This project has already shown successful application of chemostratigraphy to stratigraphic correlation of mudrocks. The preliminary work has already been completed thanks to a trial loan of the Handheld XRF from Bruker Analytical and the work has been presented at the GSA annual meeting (2013), an OGS technical conference (2013), and at the HGS mudrocks conference (2014). Partial funding has been secured through grants from the Oklahoma Geological Foundation, the Colorado Scientific Society, and the Woodford Shale Consortium at the University of Oklahoma.

7. In the process of gaining background knowledge in the field of your proposed research, who did you find to be the top two or three researchers? What are the main concepts that are being explored? Please briefly describe.

Three main researchers:

- Nicolas Tribovillard
- Harry Rowe
- Nicholas Harris.

Main concepts being explored:

- The advantages, limitations, caveats, and utility of various elemental proxies (Tribovillard; Rowe; Harris).
- How to accurately compare geochemical measurements from multiple formations (Tribovillard).
- HHXRF can reliably be used to collect quantitative chemostratigraphic data (Rowe).
- Using chemostratigraphy to correlate stratigraphically ambiguous successions (Harris).
- Building sequence stratigraphic interpretations from chemostratigraphic profiles (This project).

8. Please provide a photo of yourself and a photo related to your proposed project. It will be very helpful in publicizing your project and potentially securing funding.

(See attached)

9. Who will benefit?

Aside from the direct research applications (question 4), the future students in our program will benefit from having the instrument available for them to perform these analyses themselves and incorporate these chemostratigraphic data into their own research. This will add a valuable skill for future employers either in industry, government surveys, or in academia.

AAPG Research LAUNCH supporters receive

The opportunity to work directly with you and receive reports, information, and findings, depending on the level of support.

The Deal

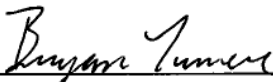
The researcher agrees to:

- ❖ Develop a brief public presentation on the research to be made available to AAPG
- ❖ Create an annotated bibliography and review of the scientific literature to be made available
- ❖ Present research findings on project at an AAPG Forum, GTW, or Research Symposium
- ❖ Write a detailed report on the results of your research to be made available to LAUNCH supporters
- ❖ Write a extended abstract on the results of your research to be made available to AAPG

Thank you for submitting your research proposal to the AAPG Research LAUNCH Program. Your proposal will be reviewed and upon acceptance you will be contacted by AAPG Education/Research. If your proposal is accepted, we will publicize your proposal and encourage funders to contact you directly. AAPG does not guarantee funds nor have any connection with the success or failure of the endeavor. The goal is to support scientific research in petroleum geosciences and engineering and to launch the next generation of geological advances.

Bryan Turner _____ 4/8/2014 _____
 Research Candidate (print) Date

_____ _____
 AAPG Education/Research (print) Date

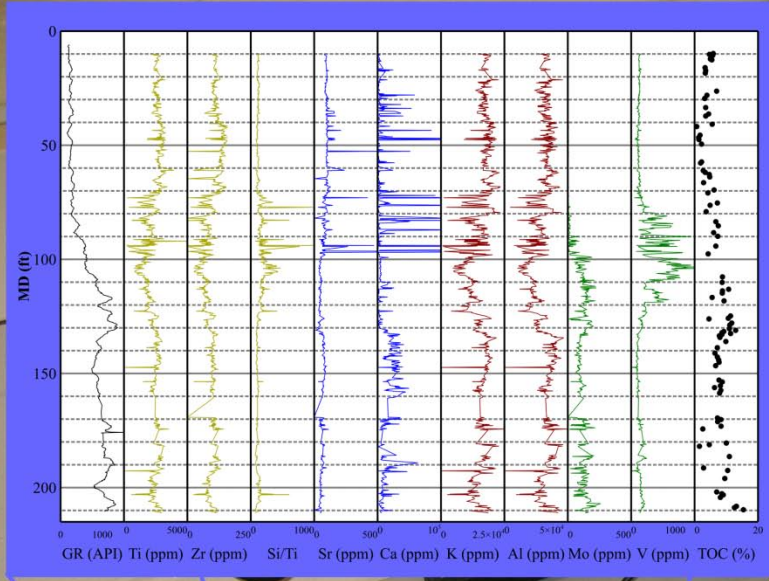
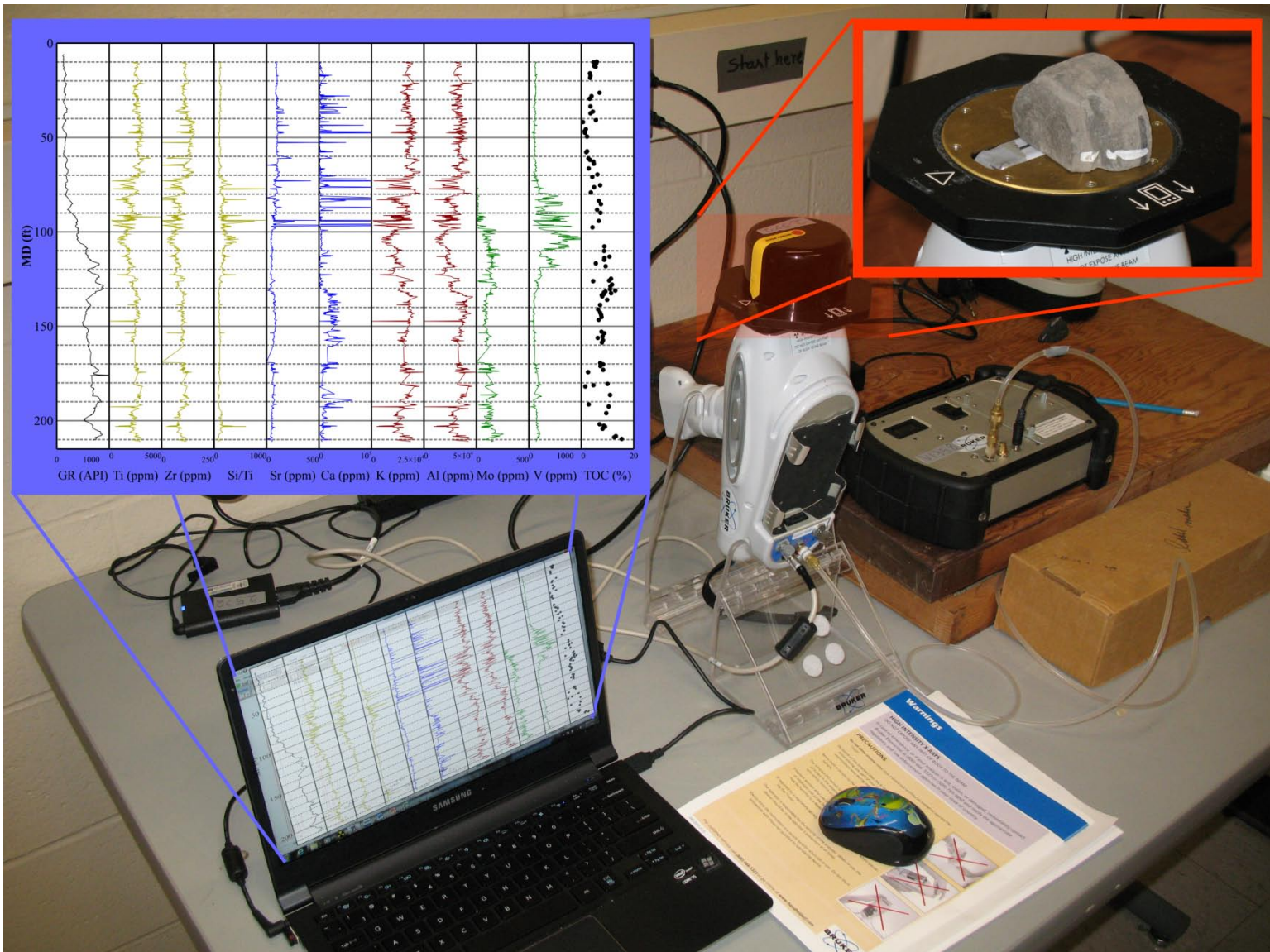
 _____ 4/8/2014 _____
 Research Candidate (sign) Date

_____ _____
 AAPG Education/Research (sign) Date

AAPG Education/Research

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Start here



Warnings



