



Issue 06
November 2016

2016 Editorial Committee

Editors

Matt Boyce

Javier Miranda

Abbie Morgan

Milad Saidian

Haijing Wang

Senior Editor

Jesus M. Salazar

SPWLAYP@SPWLA.ORG

In this edition:

Educating the Next Generation of Formation Evaluation Leaders

By: Colin Schroeder

SPWLA Houston Chapter and SPWLA YP joint networking event

By: Javier Miranda

Coffee Break

By: Abbie Morgan, Milad Saidian
and Javier Miranda

Educating the Next Generation of Formation Evaluation Leaders

Author: Colin Schroeder, Vice President of the Student Chapter of SPWLA at UT Austin

Recently ranked as the #1 program for both undergraduate and graduate petroleum engineering by US News & World Report, the Department of Petroleum and Geosystems Engineering at The University of Texas at Austin (UT Austin) has long been considered a leader in formation evaluation education and research. With the addition of new faculty members and the expansion of laboratory facilities over the past several years, the department is continuing to strengthen and expand on its already strong reputation. In addition to receiving a world-class education, students in the department have the opportunity to collaborate with highly skilled research scientists and faculty members to develop paradigm shifting technologies and techniques that are shaping the future of the industry.

A fundamental goal of UT Austin's Department of Petroleum and Geosystems Engineering is to educate the next generation of petroleum engineers, drilling engineers, petrophysicists, and formation evaluation experts. To accomplish this goal, petrophysics-related course offerings for undergraduate and graduate students in the department range from introductory through advanced. Courses such as Petrophysics and Advanced Petrophysics introduce students to the pore-scale physical properties of reservoir rocks, the measurement techniques that are used to quantify these properties, and how these properties affect behavior at the reservoir scale. Courses such as Fundamentals of Well Logging and Advanced Multi-Well Formation Evaluation provide hands-on experience using modern formation evaluation techniques to perform interpretations and to quantify petrophysical properties. Additional advanced level courses offered by the department include Forward and Inverse Problems in Well Logging, Rock Physics, Reservoir Geomechanics, and Pore-Level Petrophysics.

Beyond the classroom, students and faculty members at UT Austin perform cutting-edge research aimed at solving some of the industry's most technologically challenging problems. Researchers at UT Austin are able to leverage the vast range of expertise and state-of-the-art facilities available at the university to accomplish their research goals. Multi-disciplinary collaboration with UT Austin's Jackson School of Geosciences, regarded as one of the top geoscience programs in the world, and the Bureau of Economic Geology (BEG), home to what is believed to be the largest archive of subsurface rock material in the world, is commonplace for researchers in the Department of Petroleum and Geosystems Engineering. Additionally, research groups in the department benefit from strong relationships with industry affiliates that provide the feedback necessary to ensure that projects are relevant to the most significant challenges currently facing the industry. Research groups in the department with a specific focus on petrophysics and formation evaluation include the Joint Industry Research Consortium on Formation Evaluation, the Energy Applied Geomechanics Laboratory, the Daigle Lab, and the UT Austin Multi-Scale Rock Physics Research Group.

The Joint Industry Research Consortium on Formation Evaluation, led by Dr. Carlos Torres-Verdín, has long been recognized for their successful development of new methods for the combined interpretation of geological information, well logs, production measurements, core measurements, and seismic amplitude data. The group places a particular emphasis on the development of joint interpretation techniques that utilize a multi-physics, multi-scale approach for detecting, diagnosing, and quantifying rock properties that control the storage and production of hydrocarbon reserves. The interactive software platform 3D UTAPWeLS was developed by the consortium for the effective quantitative integration of borehole measurements and for the construction of multi-layer static, dynamic, elastic, and mechanical reservoir models. Recent work performed by the group includes the development of new methods for the design, interpretation, and fast numerical simulation of neutron-induced gamma-ray density measurements, the development of new fluid-substitution procedures for the interpretation of magnetic resonance logs, and the fast simulation of frequency-dispersive sonic logs in high-angle and horizontal wells using 3D sensitivity functions. In addition, the group performs laboratory based nano- and micro-fluidics experiments and collaborates with the Energy Applied Geomechanics Laboratory, led by Dr. Nicolas Espinoza, where mechanical and transport properties of rocks are being studied at in-situ conditions using a triaxial load frame capable of acquiring real-time permeability and ultrasonic measurements with axial loads up to 500,000 lbs. and total radial stresses and pore pressures up to 20,000 psi.

The Daigle Lab, established at UT Austin by Dr. Hugh Daigle in 2013, significantly expanded the petrophysical experimental capabilities available in the department. A primary research focus for the Daigle Lab is the interpretation of NMR measurements in shales. Using the group's benchtop NMR system, research is currently being performed involving simultaneous T1-T2 measurements to investigate fluid distributions in shales and the measurement of

secular relaxation rates to investigate the distribution of paramagnetic relaxation centers in mudrocks. In addition, this system is used for other applications involving fluid typing, the determination of pore size distributions, and the measurement of diffusion coefficients. The Daigle Lab also has ongoing research projects related to the application of percolation and effective medium theories for predicting difficult to measure transport properties and projects examining the evolution of shale pore structures through the processes of thermal maturation and hydraulic fracturing. Finally, earlier this year Dr. Zoya Heidari established the University of Texas at Austin Multi-Scale Rock Physics Research Group. This group's research focuses on developing new rock physics methods for integrating multi-scale formation data. Specific focus is placed on the development of new laboratory measurement, interpretation, and computational techniques for formations with complex rock physics, such as spatially heterogeneous, tight, unconventional (e.g., organic-rich mudrocks), and carbonate formations. Examples of recent achievements in Dr. Heidari's research group include the development of new techniques for the interpretation of electrical conductivity and dielectric permittivity measurements in organic-rich mudrocks to improve reserves evaluation and the quantitative inclusion of rock fabric in the evaluation of formation data to enhance upscaling and assessment of dynamic petrophysical properties. With access to advanced rock physics laboratories and equipment (e.g., NMR with pressure and temperature control modules, network/impedance analyzers and setups for multi-frequency dielectric permittivity measurements, permeameters, mercury injection capillary pressure (MICP), and multi-scale imaging), in addition to the powerful computational facilities available at UT Austin, the group is rapidly establishing itself as a leader in experimental and computational formation evaluation and petrophysics research.

With so many opportunities and resources available for students pursuing petrophysics and formation evaluation related careers, it is no surprise that the Student Chapter of SPWLA at UT Austin is continuing to expand. The chapter's leadership team, composed of graduate students performing research in the groups described above and advised by Professor Torres-Verdin (Academic Advisor) and Mr. Javier Miranda (Industrial Advisor), has been actively working to increase SPWLA's presence both in the department and around campus. The chapter is looking forward to upcoming events including monthly meetings that will feature technical presentations by SPWLA Distinguished Speakers and the SPWLA Student Paper Contest at UT Austin, which will take place early next year.



New students in the Department of Petroleum and Geosystems Engineering at The University of Texas at Austin attending the 2016 First-year Student Fall Retreat (Photo courtesy of the Department of Petroleum and Geosystems Engineering at The University of Texas at Austin).



Principle Investigator for the Joint Industry Research Consortium on Formation Evaluation, Dr. Carlos Torres-Verdín, and recent Ph.D. graduate, Shaina Kelly, preparing a research paper for publication (Photo courtesy of the Department of Petroleum and Geosystems Engineering at The University of Texas at Austin).



Dr. Hugh Daigle, Principle Investigator for the Daigle Lab, pictured here in the group's laboratory at The University of Texas at Austin (Photo courtesy of the Department of Petroleum and Geosystems Engineering at The University of Texas at Austin).



Dr. Zoya Heidari, Principle Investigator for the University of Texas at Austin Multi-Scale Rock Physics Research Group, preparing a sample for measurement using the group's temperature- and pressure-controlled 2 MHz nuclear magnetic resonance (NMR) spectrometer (Photo courtesy of the Department of Petroleum and Geosystems Engineering at The University of Texas at Austin).



Principle Investigator for the Energy Applied Geomechanics Laboratory, Dr. Nicolas Espinoza (right), and Ph.D. student, Matthew Ramos (left), acquiring real-time ultrasonic measurements at reservoir conditions using the group's state-of-the-art triaxial load frame (Photo courtesy of the Department of Petroleum and Geosystems Engineering at The University of Texas at Austin).

SPWLA Houston Chapter and SPWLA YP joint networking event

October 27, 2016 • By Javier Miranda



The Society of Petrophysicists and Well Log Analysts (SPWLA) Houston Chapter and Young Professionals (YP) Group recently joined forces to organize a networking and coaching event in a known place near midtown Houston, Texas, USA. We had Jennifer Ayers, a life coach, as our invited speaker for the event. SPWLA members attended, networked and learned about their strengths to succeed in the current challenging industry environment with Jennifer Ayers, life coach with Your Breakaway Coaching. She gave a talk and discussed with our members key strategies to understand their values and strengths and what the pathways to experiencing success are.

Jennifer's talk was followed by an active participation of several SPWLA members who enthusiastically exchanged ideas and networked with their peers. The event had a great attendance from several people who joined from different operating, service and consulting companies.

Did you miss this event? We hope to have these networking events more regularly. What do you think? Feel free to join us next time and bring a colleague or teammate from your office. As usually, there is no need to RSVP, no charge and you come at leisure. We provide a great environment to meet other SPWLA and SPWLA YP members and network with your fellow petrophysics enthusiasts. You also have the opportunity to meet SPWLA board members or colleagues involved in different SPWLA activities such as the Petrophysics Journal and The Bridge Newsletter. All ages are welcome!





Haiku of the Month:

Taking core is key.
Too bad whole ones cost so much.
Sidewalls have to do

Send your answers to the following questions to our email address at SPWLAYP@SPWLA.ORG or use SPWLA social media. We will print some of our favorite responses in the next issue:

- 1) What are the top three countries you would like to visit?
- 2) What are your three favorite sounds?

Thanks to all who answered last issue's questions of the month. The following are some of the answers we received:

What is the smell that most reminds you of home?

Adam Haecker: Lasagna

Antony Holmes: Fresh cut grass

Milad Saidian: Fresh Baked Bread

Which three people, living or dead, would you most want to have dinner with?

Adam Haecker: Nikola Tesla, Julius Ceasar, Neil Degrasse Tyson in that order.

Antony Holmes: Leonardo da Vinci, Ben Franklin, Albert Einstein

Milad Saidian: Cyrus the Great, Thomas Edison, George Washington

SPWLA 2017 ANNUAL SYMPOSIUM

The 2017 international symposium will be held in Oklahoma City, USA. The SPWLA Board of Directors invites you to join us in Oklahoma City, USA, June 17-21, 2017 to see recent innovations and discoveries at the 58th Annual Symposium. The technical program includes papers on all aspects of petrophysics and formation evaluation.



For more information visit: WWW.SPWLA.ORG

Contact us: SPWLAYP@SPWLA.ORG

We encourage you to contact us with any suggestions for improving our group and/or if interested in participating in our activities.

**GO AHEAD,
SEND US
A MESSAGE!**



Send us your articles, stories, fun moments, photos, etc. to be published in The Bridge.

