



# SPWLA HOUSTON

Advancing The Science  
Of Formation Evaluation

## 2025 Q3 Technical Talks / Luncheon Meetings

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#### Decoding the “Shaly Sand” Seminal Papers

*By: David Kennedy*

#### NMR Study of Permeability and Kerogen in Organic-Rich Chalk

*By: Philip Singer*

#### Westside

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Houston Parkway North

Houston, TX 77041

#### Asphaltene Clustering in A Black Oil Column Driven by Gas Addition, explained via History Matching of Reservoir Charge.

*By: Tarek S. Mohamed*

#### Automated anomaly detection of multi-metallic tubulars in well integrity logs using signal mode decomposition and physics-informed decision making

*By: Ze Wang*

August 12, 2025

Dear Members of the SPWLA Houston Chapter

And just like that, schools are back in session again. Where did the summer go? With that I mean the months of June and July; summer, the season -and its associated heat and humidity- are still with us (for another two months?). Try to stay cool and remember to hydrate.

Back by popular demand: I am pleased to announce that the 2025 SPWLA Houston Technology Show will be held on Friday December 5, 2025. We are in the early planning stages and there is still a lot to be decided. A first wave of invitations has been sent to potential sponsors and exhibitors. As you're reading this, consider your company to showcase their advances in formation evaluation technologies and interpretation software, to a great representation of the Oil & Gas industry. Keep an eye on our website where we will post updates as they become available.

Some of you may know that I'm wearing two hats for the '25-'26 season and serve as President of the Houston Chapter and President of the SPWLA NMR SIG, both. Which brings me to yet another "Back by popular demand": it is with great pleasure that I invite you to the 2025 NMR SIG Conference held at the Halliburton Main Campus in Houston. This will be a 1½ day conference featuring NMR related formation evaluation concepts and applications, advances in multi-discipline collaboration, and a great opportunity to reconnect with NMR SIG members after the successful 2024 NMR SIG Conference in Rio de Janeiro.

Please consider submitting your abstracts by email before August 29, 2025 to: [NMR@spwla.org](mailto:NMR@spwla.org)

As part of our ongoing efforts to stay connected with you and to make sure that you do not miss out on any updates, events and opportunities, we are refreshing the SPWLA Houston Chapter membership database. You may have seen the announcement on LinkedIn, on our webpage and/or received an email on the same. Please visit <https://forms.microsoft.com/r/A6Xf3f7n0m> and fill out the form, which will take only one minute of your time (if that). If you're not a member of the SPWLA Houston Chapter yet, this is as good a time as any to become a member of SPWLA's largest local chapter.

Ron J.M. Bonnie  
Houston Chapter President.



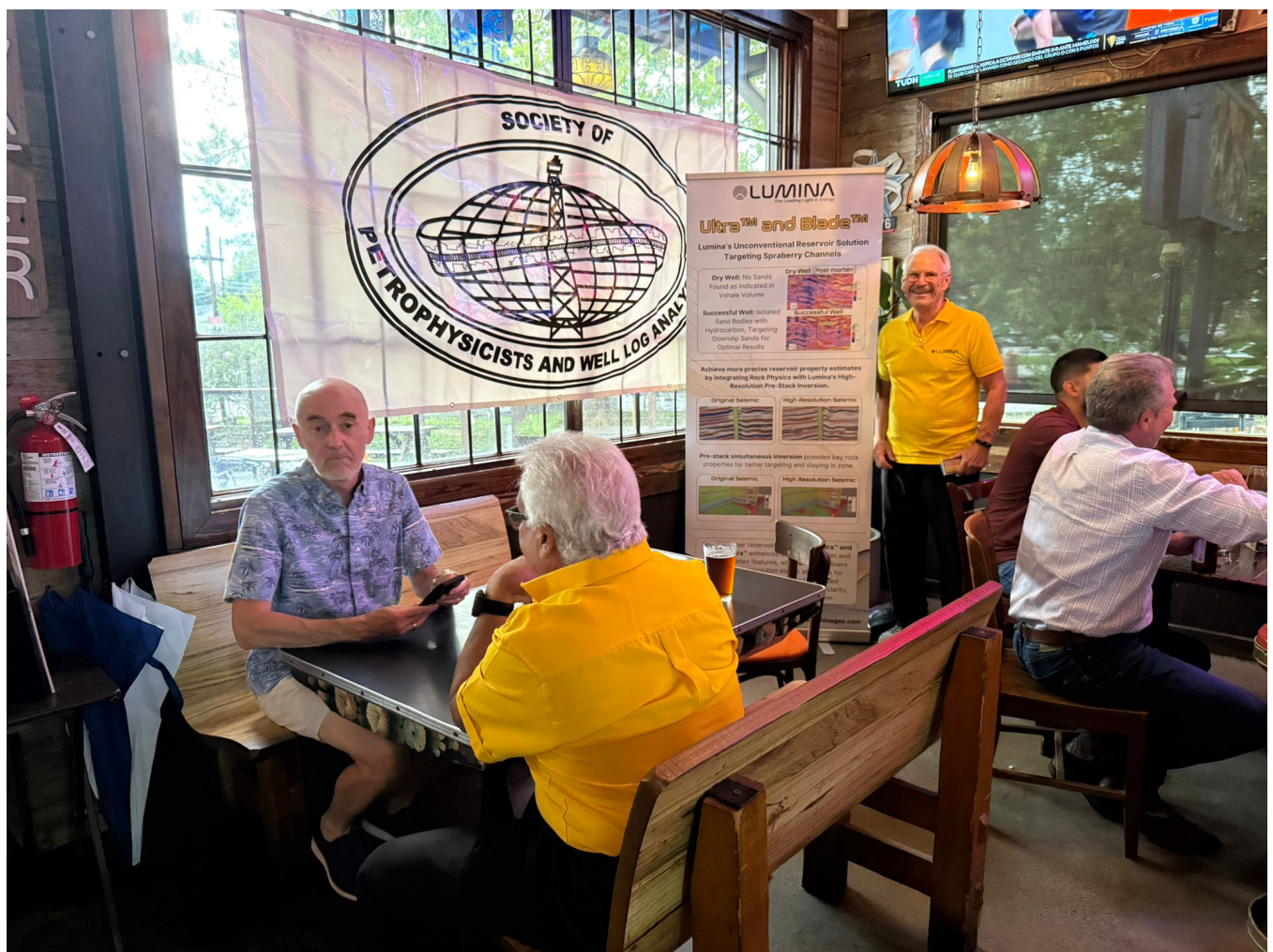
## SPWLA Houston Chapter Networking Event – June 26, 2025

Our monthly networking event on Thursday, June 26, was generously sponsored by Lumina Geophysical; a special thank to Cesar Bolivar who made this happen.

Given that this was in the middle of holiday season, we had a great turnout and a good time was had by all. Great and spirited conversation on a variety of topics. The banner / poster that Lumina had brought was a great discussion starter. Once more, thank you Lumina Geophysical.

Anyone can join us for an evening of networking, conversations, and community! Whether you're a Petrophysicist, Geologist, Geophysicist, Engineer, or Manager, this is a fantastic opportunity to connect with fellow professionals in a relaxed setting. No RSVP needed—just show up and mingle at your leisure. Expect to see familiar faces, including current and past SPWLA international board members and other well-recognized names from our industry. This partly outdoor event offers a casual and welcoming environment to catch up, share ideas, and build lasting connections.

Meet us, last Thursday of each month from 5:00 – 8:00 pm at Cedar Creek Bar & Grill, 1034 West 20th Street, Houston, TX 77008





Wednesday, July 31st, 2025  
11:30 am – 1:00 pm

Baker Hughes, 2001  
Rankin Rd, Houston, TX  
77073

Northside Technical Talk / Luncheon Meeting

## Decoding the “Shaly Sand” Seminal Papers

By: David Kennedy

### Abstract

Many attempts have been made to interpret the log responses of the clay-bearing sandstones that are called “shaly sands”. Two of the most frequently encountered models are those of Waxman and Smits (WS), and the Clavier, Coates, and Dumanoir (CCD) dual-water model. In this article I review both these seminal papers, supplying the background material not present in the original papers, making them more understandable to interested readers. I also point out some logical errors that represent impenetrable walls to understanding unless they are exposed as errors, and the outputs derived by the authors do not follow from the inputs. I show that contrary to its author’s claim that the Waxman-Smits (‘Uni-Water’, UW) model is not a parallel conductivity model, whereas the Clavier-Coates-Dumanoir Dual Water (DW) model is a parallel conductivity model. We also show that for the CCD model that the definitions of its parameters can be made more logically than the choices made by its authors, and that some modifications to its method of interpretation produces more realistic results at low formation brine salinity concentrations.

### Biography

Dave needs little introduction; he has been a member of SPWLA since 1975 and was VP of Publications, first editor of *Petrophysics*, VP of Technology and President.

As a young adult, Dave was an infantry platoon leader in the Vietnam war. Back to civilian life, Dave finished his physics degree at Georgia Tech in 1972. He ended up Schlumberger, where he was introduced to formation evaluation. Skeptical of much he saw, Dave felt petrophysics and formation evaluation might be a field where he could make significant contributions.

Dave’s name is on six patents as inventor or coinventor and about sixty papers as author or coauthor on a variety of topics covering induction instrument responses and forward modeling, conductivity anisotropy, the theoretical petrophysics of conductivity in reservoir rocks, and most recently shaly sand models.

Throughout his career, Dave worked for operators and service companies and had various roles and assignments with Schlumberger, Arco, Sohio, Lockheed, Mobil, Exxon, Baker-Hughes, Pathfinder, and Southwestern Energy.





Thursday , August 14<sup>th</sup>, 2025  
11:30 am – 1:00 pm

SLB 6350 West Sam  
Houston

Westside Technical Talk / Luncheon Meeting

## Asphaltene Clustering in A Black Oil Column Driven by Gas Addition, explained via History Matching of Reservoir Charge.

By: Tarek

### Abstract

A tilted-sheet, well-connected reservoir in the deepwater Gulf of Mexico/America exhibits bimodal and complex fluid distributions. The acquired measurements of methane isotope, asphaltene concentration, and solution gas-oil ratio (GOR) indicate a diffusional gradient of solution gas and lack of equilibrium in the top half of the oil column, whereas the bottom half of the oil column shows quasi-equilibrium and well-mixed oil. This startling distribution gives rise to an asphaltene clustering trend in the bottom half of the oil column, leading to large oil viscosity and asphaltene gradients toward the base of the oil column. Our objective is to model the fluid mixing dynamics, over geologic time, of separate gas and oil charges and the impact of a significant GOR increase on asphaltene spatial distributions. For the first time, we simultaneously model the development and dynamics of both asphaltene and GOR distributions over geologic time leading to present-day, bimodal measured fluid realizations. Geochemical evaluation of acquired fluid samples shows a significant amount of biogenic gas throughout the entire oil column where methane isotopes indicate that 50% of the solution gas in the bottom half of the oil column is biogenic, and where the biogenic gas fraction increases at the top half of the column. Furthermore, GOR measurements indicate significant variations in solution gas at the top half of the column, increasing by 6000 scf/bbl over 130 ft of height. This gradient is successfully matched with the diffusion equation. On the other hand, the lower half of the column shows a small GOR gradient that is matched locally with the cubic equation of state (EoS). Asphaltene concentrations respond to the high GOR in the top half of the column as asphaltenes are expelled with great efficiency toward the bottom half of the column, forming asphaltene clusters. Asphaltene clusters remain due to both increased asphaltene concentration and increased solution gas. This process gives rise to a light-oil gradient of the asphaltenes in the top half, and a heavy-oil clustering gradient of asphaltenes in the bottom half of the column. Both gradients are not expected in a black-oil reservoir and are matched with corresponding models of Flory-Huggins-Zuo equation of state (FHZ EoS). The puzzling fluid distributions are explained and replicated by forward modeling of fluid mixing dynamic processes over geologic time: history matching of reservoir charge. Compositional reservoir simulation is used to model the addition of methane through a point source into an oil-saturated reservoir, resulting in the development of present-day GOR and asphaltene measurements.

### Biography

**Tarek S. Mohamed (SLB)** is an Interpretation Development Engineer and an Interdisciplinary Subsurface Scientist at SLB, working on various projects spanning reservoir engineering, petrophysics, and geophysics. He co-leads the development of the new direction of forward modeling reservoir fluid geodynamics (RFG) processes over geologic time using reservoir simulation, and history-matching reservoir charge as a new way to predict fluid spatial compositional distributions in untapped regions. Dr. Mohamed co-authored over 20 technical papers accepted by several organizations, including SPWLA, SPE, SEG, AAPG, and ACS, and published in peer-reviewed journals or presented at major energy conferences. His expertise includes reservoir numerical modeling and simulation, petrophysics and formation evaluation, data science and machine learning, reservoir characterization, and well-test analysis. He holds a PhD in Petroleum Engineering from the University of Texas at Austin, an MS in Petroleum Engineering and a Graduate Certificate in Data Science and Analytics from the University of Oklahoma, and a BS in Petroleum Engineering from Suez University. He received several technical awards and recognitions, including the 2025 SPWLA Young Professional Technical Achievement Award, as well as being selected as an SPWLA Global Distinguished Speaker for 2023-2024 and an SPWLA Regional Distinguished Speaker for North America for 2024-2025.



## Future Events and Details

SPWLA – Houston Chapter News	Q3 2025
<b>2025 SPWLA Houston Technology Show</b>	
<p>We are in the early planning stages of the Annual SPWLA Houston Technology Show. There's still a lot to be decided, such as venue, but the date has been set for <b>Friday December 5, 2025</b>.</p>	
<p>Your patronage over the years has been critical to the success of this event and we want to invite you to join us and participate again this year.</p>	
<p>The frontrunner location options are Halliburton's Main Campus and University of Houston (downtown) but we are still considering alternatives.</p>	
<p>Please let us know if you know of suitable alternatives or, better yet, if your company is willing to host this event.</p>	
<p>As always, we invite companies to our Technology Show, to showcase their advances in formation evaluation technologies and interpretation software, to a great representation of the Oil &amp; Gas industry. The 2025 SPWLA Houston Technology Show will again include a key-note speech, technical talks, a sumptuous lunch, plenty of time for attendees to interact with exhibitors, and a happy hour social to close the day.</p>	
<p>We hope to be welcoming you as an exhibitor in the 2025 SPWLA Houston Technology Show and look forward to receiving your confirmation of participation at your earliest convenience.</p>	

SPWLA – Houston Chapter News		Q3 2025
<b>Date, August 28<sup>th</sup> 2025</b> <b>11:30 am – 1:00 pm</b>	Baker Hughes 2001 Rankin Rd Houston, TX 77073	<b>Northside Technical Talk / Luncheon Meeting</b>
<b>NMR Study of Permeability and Kerogen in Organic-Rich Chalk</b> <i>By: Dr. Philip Singer (Rice University)</i>		
<b>Abstract</b> <p>Many NMR relaxation and diffusion are exceptional techniques for studying the petrophysics of unconventional formations. In this talk, I present some unique petrophysical insights into Type II-S (i.e., marine origin with high organic-sulfur content) organic-rich chalk, including:</p> <p>(a) Micro/macro pore-size and tortuosity anisotropy from restricted diffusion obtained from D-T2 maps at 2.3 MHz, permeability and permeability anisotropy from the Carman-Kozeny model, and insights into paleo-deposition cycles in the late Cretaceous.</p> <p>(b) Quantification of solids (kerogen, bitumen, clay hydroxyls) and liquids (pore fluids, fluids dissolved in kerogen, clay bound water) using T1-T2 maps with solid-echo at 20 MHz, integration with RockEval data, H/C ratio of kerogen, kerogen swelling ratio, and kerogen nanopore size, all as a function of thermal maturity (i.e., depth).</p>		
<b>Biography</b> <p>Dr. Philip Singer is an Assistant Research Professor at the Department of Chemical and Biomolecular Engineering, Rice University in Houston TX. He joined Rice University in 2015 as a research scientist in the Hirasaki group, then became a faculty member in 2021. He received his master's degree in physics from the University of Oxford in 1997 and earned his doctorate in physics from the Massachusetts Institute of Technology in 2003. He completed his postdoctoral research from the Université Paris-Sud in 2005, after which he worked for 10 years as a research scientist at Schlumberger. His areas of interest are NMR in porous media, hydrogen geostorage, carbon dioxide utilization/geostorage, MD simulations, MRI contrast agents, and NMR in quantum materials.</p>		

Thursday, September 11<sup>th</sup>,  
2025  
11:30 am – 1:00 pm

SLB, 6350 West Sam  
Houston

Westside Technical Talk / Luncheon Meeting

## Automated anomaly detection of multi-metallic tubulars in well integrity logs using signal mode decomposition and physics-informed decision making

By: **Ze Wang (GOWell)**

### Abstract

Anomaly detection using well integrity logs is crucial for multi-metallic tubular wells, as it helps save operators costly repairs and potential well abandonment. However, features such as collars and artifacts often obscure the signals of outer pipes, making anomaly interpretation particularly challenging. To address this issue, an automated anomaly detection method has been developed that effectively separates collars and corrosion signals from complex log results. This approach significantly enhances analysis accuracy and efficiency in wells with multiple tubulars, up to five layers. The anomaly detection method utilizes cased hole logging images obtained from a pulsed eddy current electromagnetic tool as input. It outputs the location information of collars and anomalies, respectively. The method comprises two steps—signal mode decomposition and the decision-making process. A novel approach, hierarchical multiresolution variational mode decomposition (HMVMD), is introduced to extract both anomaly-related and collar-related signals by decomposing the input into a set of frequency-based modes. The decision-making phase employs a decision tree designed based on Bayes' theorem, with the process simplified by Markovian modeling. Prior knowledge of cased hole completion is incorporated into the design to further refine results. Field trials in operational wells have been conducted to evaluate the proposed method. By distinguishing the thickness-related signal from raw data, previously obscured anomalies became interpretable. The method excels at denoising the data, effectively reducing noise interference by enhancing signal-to-noise ratio (SNR) up to 29 dB. It saves 90% of the time that log analysts spend manually differentiating collars, traditionally requiring several hours, thereby significantly optimizing the interpretation efficiency. In a five-pipe scenario, the results demonstrate detection accuracy rates of approximately 99% for the inner three pipes. It maintains accuracy rates over 90% and 75% on the fourth and fifth pipes, respectively, where the SNR is low, and the outer-pipe signal is masked by the inner layers. In addition, it maintains high accuracy under complex well scenarios, such as those involving completion equipment and eccentricity. This new approach offers interpretation specialists an efficient and accurate anomaly analysis tool for multi-metallic tubulars.

### Biography

Ze Wang is a research scientist at GOWell, specializing in cased hole well integrity and production logging. His research interests include algorithm development, data-driven solutions, signal processing, and numerical simulation for oil and gas applications. He also has research experience in unconventional reservoirs and carbon utilization and storage. Dr. Wang previously worked as a post-doctoral scholar at Missouri University of Science and Technology, USA. He holds PhD and MS degrees in petroleum engineering from Missouri University of Science and Technology and a BS degree in petroleum engineering from China University of Petroleum, China.



## **SPWLA 2025 NMR SIG Conference**

# **REACHING FULL POLARIZATION IN A 2025 NMR CONFERENCE**

**Dates:** Oct. 23-24, 2025

**Location:** Halliburton Main Campus, Houston, TX  
3000 N. Sam Houston Parkway E., Houston 77032  
This SIG Conference will be an in-person meeting

The Executive Board of the NMR SIG has the pleasure of inviting you to its 2025 Conference at the Halliburton Main Campus in Houston.

This will be a 1½ day conference featuring NMR related formation evaluation concepts and applications, advances in multi-discipline collaboration, and a great opportunity to reconnect with NMR SIG members after the great 2024 NMR SIG Conference in Rio de Janeiro.

**Please submit your abstracts by email before August 29, 2025 to:**  
[\*\*NMR@spwla.org\*\*](mailto:NMR@spwla.org)

We request that abstracts are limited to a 300-word maximum. The abstracts selected for oral presentation, will have 15 minutes presentation time, followed by 5 minutes for discussions.

The list of potential NMR-related topics for the conference includes:

- **Reservoir Characterization in Conventionals & Unconventionals**
- **NMR on Cores & Fluids – Integration with Well Logs**
- **<sup>13</sup>C and <sup>23</sup>Na NMR for Non-Hydrogen Applications**
- **Academia and NMR – Education & Beyond**
- **NMR Applications for New Energy Sources**

## SPWLA 2025 NMR SIG Conference

The topical conference will be an “off-the-record” forum with no publication or recording (pictures or videos) of any material presented. We encourage presenters and participants to share case studies, conceptual innovations, new methodologies and latest technologies. Company logos are allowed on title slides only for author affiliation. Commercialism during presentations is not permitted. All participants and presenters are required to register for the Conference and satisfy the registration fee.

### **Conference registration fee:**

\$150 USD for industry professionals and \$75 USD for students. Breakfasts, lunches, refreshments, and break-time snacks are included. An offsite, evening Social event is planned at the end of the first day of the NMR SIG Conference but is not included in the registration price. Registration details will be communicated soon.

### **Sponsorship:**

Two levels of sponsorship are available.  
\$750 Gold level sponsorship includes 2 registration passes.  
\$500 Silver level sponsorship includes 1 registration pass.  
Both Sponsorship levels include a large digital screen for each sponsor to use and display at during the conference.

### **Co-Chairs:**

Ron Bonnie (NMR SIG President / SPWLA Houston Chapter President),  
Stacey Althaus (Aramco Americas), Ron Balliet (Halliburton)

### **SIG Committee:**

Ron Bonnie (NMR SIG President), Stacey Althaus (Aramco Americas),  
Radu Coman (Baker Hughes), Nate Bachman (SLB), Kris Farmer (CoreLab),  
Tianmin Jiang (ConocoPhillips), Abraham Simanjuntak (Nippon Oil),  
Boqin Sun (Chevron), Matthias Appel (Shell), Jesus Salazar (ConocoPhillips),  
Mike Dick (GIT), James Howard (DigiM), Zoya Heidari (UT), Mike Myers (UH),  
Ron Balliet (Halliburton).

Appreciation of support goes to the SPWLA and NMR Sig Executive Boards.