

Jan-Feb 2020 Texas Parks & Wildlife Magazine, "Guadalupe Mountains Rise High Above the Desert Floor"

PBS-SEPM NEWSLETTER

February 2021

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Half Way Through
Winter

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Shane J. Prochnow,
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KEY DATES For February 2021 and March 2021

FEBRUARY 2021

- **4: SPE-COSG Luncheon, The Petroleum Club**, 11:30am-1pm, Sudhendu "Kash" Kashikar, Building Knowledge From your Data
- **9: WTGS Luncheon, [Virtual](#)**, 11:30 am-1pm, Andy Roark, A Preview of the Spring 2021 WTGS Field Trip to the Precambrian through Devonian of far West Texas & SE New Mexico
- **16: PBS-SEPM Luncheon, Bush Convention Center & Virtual**, 11:30am-1pm, Shane Prochnow, Machine Learning for Subsurface Applications
- **23: SPWLA-PB Luncheon, [Virtual](#)**, 11:45am-1pm, Jeffrey Miles, Formation Chlorine Measurement From Spectroscopy Enables Water Salinity Interpretation: Theory, Modeling, Applications

MARCH 2021

- **4: SPE-COSG Luncheon, The Petroleum Club**, 11:30am-1pm, Chad Senters, Parenting Strategies for Underperforming Children
- **9: WTGS Luncheon, [Virtual](#)**, 11:30 am-1pm, TBD
- **16: PBS-SEPM Luncheon, Bush Convention Center & Virtual**, 11:30am-1pm, Casey Mitchell, From College Student to Starting an Oil Company: A Journey from Nothing to Success in the Modern Oil Field?
- **23: SPWLA-PB Luncheon, [Virtual](#)**, 11:45am-1pm, Ali Tinni, Electrical Properties of Shales

President's Column

Welcome to the second month of the first year that is NOT 2020. So far, things have not changed much for the better, but at least we seem to be seeing lights on selected horizons. (Those horizons, of course, do NOT include Federal lands.) As we speak, three types of Covid-19 vaccines are being distributed, but if you choose to get the vaccine and if you are in the right "risk class," you don't get much choice. As my family saying goes... "you get what you get and you don't throw a fit."

Speculation was that this winter was going to be long and hard. Remember that first cold snap (40°F) back in August, two snows before the end of December, thicker than average coats on your pets this winter (and on local cattle herds, too, so I hear)? Well, I'm not saying it won't be bad for the next two months, I'm just saying that to date, it is more mild than I was expecting, so don't expect storage volumes to get used up on heating.

In the meantime, your PBS-SEPM Board is doing all it can to make this year great. We are very excited about the spring technical luncheon series. We opened the year with Steve Melzer and had some great interactions after (and a little during) his talk on Carbon Management, Residual Oil Zone, and microbial impacts on reservoirs. This month we switch gears to another popular topic, Digital Geology and will hear Chevron Research Center's opinions, thanks to Shane Prochnow. Next month we pivot again and will have recent college graduate and frequent student volunteer, Casey Mitchell, talk to us about his experiences going from college to independent producer. In April, Dr. Zane Jobe of Colorado School of Mines will talk to us about his latest research on Bone Spring outcrops. Finally, we wrap up the spring with Dr. Carol Hill, author of our most popular book, at our annual meeting. Instead of discussing the Delaware Basin, she will be sharing the results of 22 years of research about outcrops and karst caverns of the Grand Canyon. I hope to see each of you at these events, either in person or online, and I want to thank 2nd VP, Norman Wells, Jr. for running head on the luncheon series, including getting us set up for virtual meetings.

We are also excited for the Residual Oil Zone Core Workshop and Field Trip coming up the weekend after Tax Day. All of the cores are here in Midland now, and leaders Steve Melzer and the Dr. Bobs (Trentham and Lindsay) are reviewing them as we speak. Speaking of cores, I would like to extend a special thank you to Riley Permian for letting us borrow those cores for the workshop on Friday. (You can find the registration form and details for this dual-event later in this newsletter.)

We need help in getting the word out to former members and non-members that they can join PBS-SEPM now and have their membership be in good standing all the way through June 1, 2022... that is four months for free. Please check out the membership flyer on page__ for more details.

Finally, I would like to ask you to volunteer. We need candidates for all Board positions for the upcoming elections. Contact a current Board member or email info@pbs-sepm.org to find out more about the duties for each office. If you know someone who you think would make a good Board member, please send us their contact info and we will ask them if they are interested. If you want to be involved at a slightly lower-than-Board position, we also need committee members and committee chairs. Just let us know what area is of most interest, and we can certainly use your help!

I look forward to seeing everyone in a couple of weeks! Stay safe.

Mike Raines

PBS-SEPM President 2020-2021



Volunteer with PBS-SEPM!



If you are interested in volunteering with PBS-SEPM,
below are the Board Positions and Committees

Board Positions

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Core Location
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Professionals Field Trip
Lunch Arrangements
Luncheon Program
Speaker Award
Publications

Please email us at info@pbs-sepm.org to get more details about the position
or committee.

PBS-SEPM Luncheon Talk – February 16, 2021

Shane J. Prochnow
Chevron Technology Center

“Innovative Machine Learning Approach at Unconventional Production Prediction: The Type-Curve Optimizing Geostatistical Array (TOGA)”

Tuesday, February 16, 2021 - [Bush Conventional Center & Virtual](#), 11:30 a.m.

~Will be available virtually through [GoToMeeting](#).~

Abstract

Several years ago, Chevron introduced an innovative data analytic workflow called the Type-Curve Optimizing Geostatistical Array (TOGA) (U.S. Patent No. 62/564357). TOGA ties unconventional reservoir and well completion characteristics to historical production and makes robust predictions of well performance. TOGA is built on a foundational technology that utilizes random forest machine learning geostatistically optimized for use on spatially autocorrelated and clustered sample data. Random forest methods are preferred for unconventional systems because they capture complex, multidimensional and non-linear interactions in noisy databases. The random forest methods are also easy to hyper tune to generalize (not overfit), providing confidence that the correct primary drivers are accounted for in production predictions. TOGA is part of a portfolio of other machine learning and physically-based reservoir engineering tools used by Chevron to reduce uncertainty in reservoir performance prediction and type curve generation.

TOGA is designed to quantify expected recovery across a large expanse of a hydro-carbon producing basin given the historical relationship between many dimensions of production, reservoir properties and completion practices. The method provides the requisite output to construct predicted, synthetic type curves for any location within a basin. The workflow generates performance prediction maps by applying the random forest multivariate relationships to grids of the key reservoir predictor variables. These production prediction maps are stacked to form an array of locations that each have a unique expected production profile through time. These stacked cumulative production predictions are transformed arithmetically into incremental production rates and can be subjected to traditional decline curve analysis to determine b-factors, EUR, and evaluate the spatio-temporal production heterogeneity of a region.

TOGA output may be used to calibrate existing type curve workflows, define reservoir sweet spots, establish reservoir continuity, and predict ultimate recovery for business and economic planning. Data science and machine learning approaches have revolutionized Chevron's understanding of its unconventional interests, especially in the Permian Basin. The Permian's unconventional plays were once thought to be relatively unpredictable, highly variable, and having little connection to reservoir properties. TOGA and other proprietary data analytic technologies have enabled the identification of key reservoir performance drivers for each unconventional target zone under development. These drivers are then used to predict well performance through time, routinely within 70%- 85% confidence, providing a key competitive advantage for Chevron.

Biography

Shane J. Prochnow works at Chevron Technology Center in the Subsurface Innovation Lab as a Digital Geology Advisor. Dr. Prochnow has 15 years of industry experience with ExxonMobil and Chevron. He has a Ph.D, MS, and BS in Geology from Baylor University, and is a former Army National Guard Officer. His research interests include unconventional, reservoir characterization, geostatistics, machine learning, and integrating complex systems.

Shane has been a Reservoir Characterization Advisor for all Chevron Unconventional Business Units, a Development Geologist for Chevron's Mid Continent Asset Development Group. And a Geologic Advisor for the Applied Reservoir Management Team Completions Optimization Group.



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- *Annual Core Workshops*
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Permian Basin Section-SEPM ROZ Core Workshop & Field Trip



Friday April 16 (8 AM-2 PM), Bush Convention Center, Midland, Texas
Saturday-Sunday April 17th-18th, 2021 – Field Trip, New Mexico

Registration Form

PBS-SEPM is Hosting a Two-Part Residual Oil Zone (ROZ) Core Workshop and Field Trip

The ROZ Core Workshop will begin at 8 AM in the Ballroom at the Bush Convention Center. Light pastry options will be available for breakfast. We will have a total of 5 cores available:

- Goldsmith San Andres Unit #1-335A (Main Pay), XTO, Ector - Goldsmith San Andres Unit # 1-9-WC (ROZ), XTO, Ector
- Goldsmith-Landreth San Andres Unit 190, Kinder Morgan, Ector - Hanford San Andres Unit #501, Faskin, Gaines
- Shafter Silver District, Ross Mine Formation, Marfa Basin (*Faults, Hydrothermal Silver, and Oil*), Pecos (2 Cores)
- Cleveland # A-601, Riley Permian, Yoakum - Miss Kitty # 669-704, Riley Permian, Yoakum

Lunch at the Bush Convention Center will be included. The workshop will end at 2 PM. Field trip attendees will board SUVs to head to the Stevens Hotel in Carlsbad, New Mexico. Friday evening will include a group dinner along with an overview of the outcrop stops. Saturday begins at 6 AM (MT) with breakfast at the hotel and a 7 AM departure to Laurel Canyon west of Carlsbad. Box Lunch is provided (both days). Saturday stops end at Stone Canyon. Everyone is free to decide their individual plans for dinner. Sunday morning's schedule is identical to Saturday, with stops starting at Cloudcroft, then moving to Northern Ruidoso before heading east. Sunday's stops will include the present day lower San Andres recharge area west of Roswell, which has well developed karst. The trip will end with a return to Midland, arriving around 6 PM at the Bush Center.

If you are interested in sponsoring this event, either for the food, supplies, transportation, or student sponsorship, please send an email to info@pbs-sepm.org with your name, company, contact information, and amount you would like to contribute.

If you are interested in driving one of the 5 SUVs on this trip, please send an email to info@pbs-sepm.org with a copy of your Driver's License, Insurance Information, and a few notes of previous experience driving off road in SUVs.

Field trip attendance is limited to 35 registrants, on a first-come, first-served basis.

The Core Workshop and Field Trip give you a chance to see:

- The ROZ interval (and its oil saturation variations with depth)
- Lower San Andres Limestones below the ROZ
- Pay Zones in the Horizontal San Andres Play*
- San Andres meteoric water recharge area
- Impact of Meteoric water-sweep (on fluids and rock)
- Maturity enhancements in clastics exposed to volcanics
- Diagenesis related to volcanic hydrothermal waters
- Stratigraphic and depositional styles of the San Andres
- Karst/ collapse breccia in San Andres in outcrops
- Two newly slabbed silver mine cores, never before described

* Yoakum is the most active area, with 250 wells since 2014, producing 300,000 BOPD. Riley's cores are in the heart of the play.

Registration Fees

Core and Field Trip:	PBS-SEPM Members \$425 ()	Non-Members \$460 ()	** Students \$325 ()
Workshop Only:	PBS-SEPM Members \$250 ()	Non-Members \$285 ()	** Students \$125 ()
Field Trip Only:	PBS-SEPM Members \$350 ()	Non-Members \$385 ()	** Students \$200 ()

Name: _____

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Make checks payable to PBS-SEPM & send order form to: PBS-SEPM, 2900 Front St., Midland, Texas 79701

To purchase online, go to <https://www.pbs-sepm.org/events-1/roz-core-workshop-and-fieldtrip> and pay by card

** - Student rate is limited to full time students who are not employed full time



PBS-SEPM
Young Professional & Intern Field Trip
Save the Date
June 4th - 6th, 2021



Designed for Engineers, Geologists, and Landmen

A three day long multi-disciplined field trip in the **Guadalupe Mountains** for geology, engineering and land young professionals, interns, and new hires.

The intention is to educate participants in combining outcrop data with industry exploration and production techniques in a multi-disciplined environment.

- Participants will have opportunity to observe world-class outcrops of shelf to basin deposits that are direct analogues to producing fields in the Permian Basin.
- Lectures covering geology of west Texas, carbonates, sequence stratigraphy, quick and simple log and engineering calculations and land practices.
- Classroom exercises on general land practices, sequence stratigraphy, log correlation, water saturation determination, seismic interpretation and production analysis.

Participants will leave Midland, TX on Friday, June 4, and travel to Carlsbad, NM, where they will stay at the Stevens Inn for both Friday and Saturday night. In the evening of Sunday, June 6, all will return to Midland, TX.

~More information to come as well as our registration flyer. Also, reach out to [Robert Campbell](#) for questions.~



PBS-SEPM Publications



PBS-SEPM PUBLICATION HIGHLIGHT



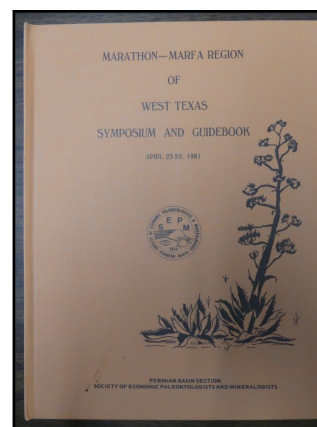
“Marathon—Marfa Region of West Texas”

1981

[\\$7.00 Members](#) [\\$8.75 Non-Members](#)

Section I: Technical Papers covering regional setting, structural problems, oil-gas potential, stratigraphy, lithofacies, volcanics, and geothermal indicators with authors: Dennis Foley, Bruce Pearson, Walter Ammon, G.R. Keller, Glen Luff, G.E. Moore, G.V. Mendenhall, W.L. Saultz, Charles Ross, Romeo Flores, Terry McMillan, John Cys, S.J. Mazzullo, G.E. Watters, Don Parker, Franklin Daughtery, J.M. Hoffer, R.A. Kopp, and Tommy R. Woodward.

Section II: Road Logs Day 1 – Day 2



Entire PBS-SEPM publication library (1955 – 2007)

There is a fully searchable Table of Contents—find a topic or author just by typing in the word(s). All publications are in Adobe PDF with all major articles being bookmarked, and all the figures are linked in the text for quick reference. Those areas that are off limits to geologists like the Glass Mountains or Sierra Diablos have been written up in these publications. Numerous out-of-print publications and figures and/or plates not published in the original guidebooks are now available in this library.

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DVD III - Core Workshops (82, 83, 85, 98) & Special Publications (A, 88-28, 96-39, 84)

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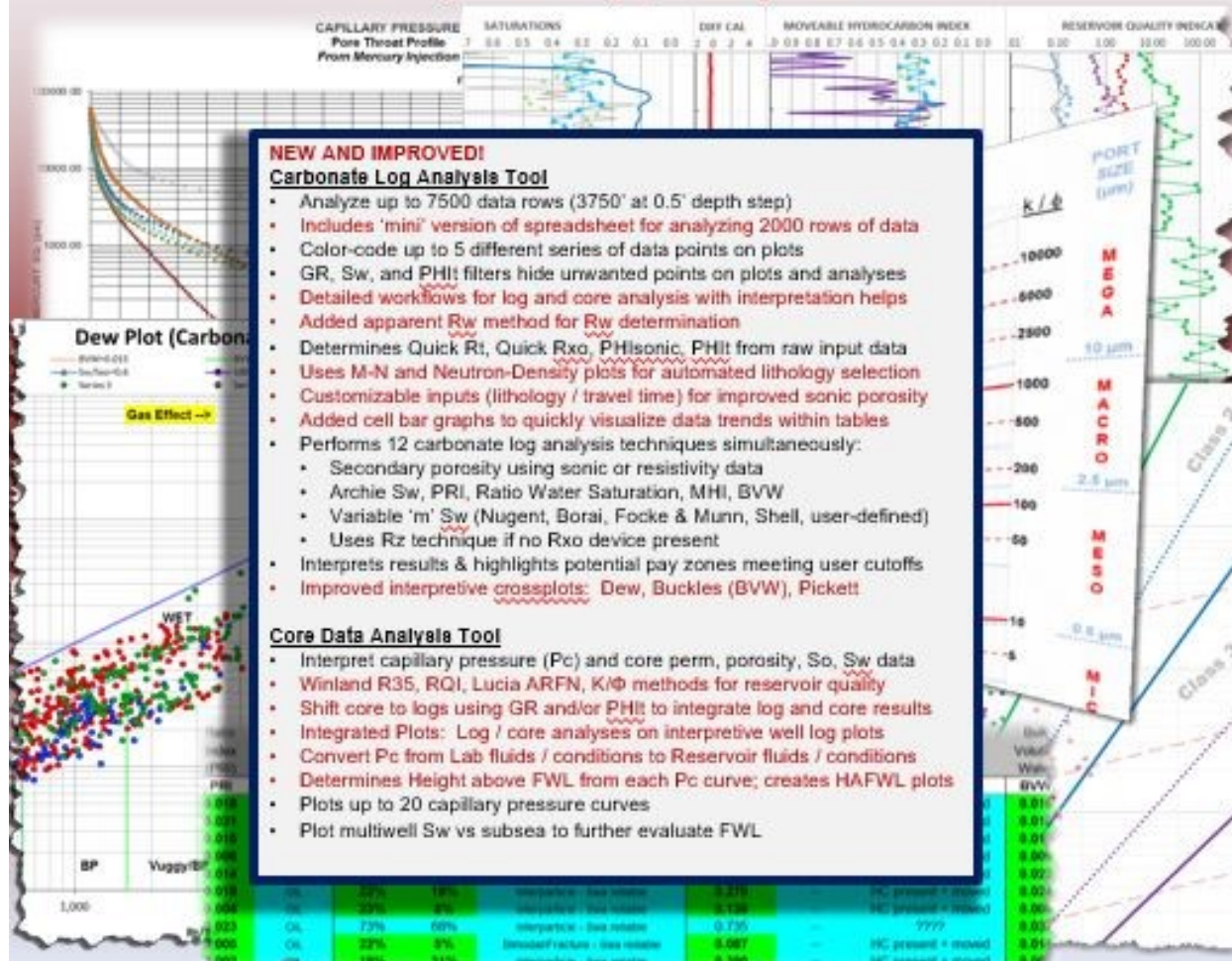
For additional information contact: PBS-SEPM office (432) 279-1360 or info@pbs-sepm.org.



Carbonate Log & Core Analysis Spreadsheet v. 5.0 By Cory L. Hoffman, Ph.D.

Major Upgrade (January 2020)! [Designed for Microsoft Excel 2013]

Carbonate Log analysis draws heavily upon teachings of George Asquith
Core Data analysis draws heavily upon teachings of Dan Hartmann



We would like to thank, [Fox Pest Control](#), a local Midland-Odessa Company, who have decided to sponsor with PBS-SEPM. They like to sponsor local organizations that are making a difference in their service area.

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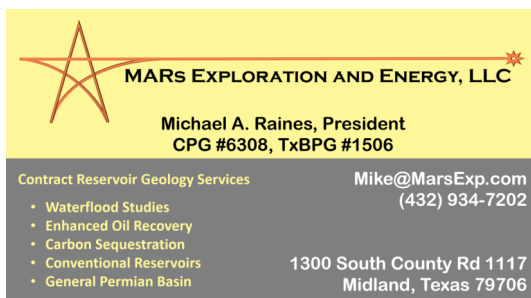
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Your card will be in every newsletter and on the PBS-SEPM Website for one year from August to May.

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Sponsorship Information (2020-2021)

Our non-profit society relies entirely upon the efforts of dedicated volunteers to serve the geological community—primarily through educational events. The PBS-SEPM hosts luncheon lectures, core workshops and field trips that are led by experts in their chosen areas of the geosciences. If you would like to sponsor the PBS-SEPM in anyway, we have various levels of commitment you can choose from.

Platinum: \$1500+: Company Logo for 2 years on YPFT field trip, core workshops, luncheon slides, newsletters, website, or new publications (from date of donation)

Gold: \$1000: Company logo for 1 year on the YPFT field trip (which includes guidebooks and other paraphernalia-stickers, pens/pencils, rite in the rain books), luncheon slides, newsletter, and website

Silver: \$700: Logo on the core workshop / one day field trip (which includes guidebooks), luncheon slides, newsletter, and website

Bronze: \$400: Will get their logo on all PBS-SEPM luncheons, newsletters, and the website.

Aluminum: \$250: Will get logo on all luncheons slides, and table tent for one luncheon date.

If you are interested in a sponsorship opportunity, please call PBS-SEPM for more details at (432) 279-1360 or e-mail info@pbs-sepm.org.

PBS-SEPM Executive Board (2020-2021)

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If you are interested in a sponsorship opportunity, please call PBS-SEPM for more details at (432) 279-1360 or e-mail info@pbs-sepm.org.

Do you have an idea for an interesting luncheon talk? Have a core workshop you'd like to present? Have some suggestions on how PBS-SEPM can better serve the geologic community? Send us an e-mail to share your idea, your PBS-SEPM Executive Board wants to hear from you!

PBS-SEPM is the Permian Basin Section of SEPM—the Society for Sedimentary Geology. However, you do not need to be a SEPM member or a geologist to join PBS-SEPM.

PBS-SEPM prides itself on its success in providing high caliber speakers as well as exceptional core workshops and field trips. PBS-SEPM also provides scholarships to graduating high school students in western Texas and New Mexico. These scholarships are on occasion, offered to college students that have declared their desire to pursue a degree in the geosciences. Through continued support from the industry, PBS-SEPM can continue to provide excellent educational opportunities for the oil and gas industry.

If you would like to join PBS-SEPM, you may visit our website to learn more about us, download a membership form, and learn how to get involved.

Scholarship and Distinguished Speaker Events (2020-2021)

Wendell J. Stewart Fund: so named for the famous sequence stratigrapher, was initially funded by the family, and then later through PBS-SEPM members who have contributed over the years. In the past, the scholarship was established to award high school students intending to pursue a college education in the geoscience field (declared major), and had evolved to include college students actively pursuing a geology degree when there were no other qualified candidates. Funding for this scholarship has waxed and waned over the years with the changes of the petroleum industry and because this scholarship is set up in such a manner that only the interest can be used to distribute funds, most scholarships in the last 30 years have been awarded through the PBS-SEPM main budget and not the scholarship fund.

We are proud to announce that we had two receivers for the Wendell J. Stewart Scholarship Fund in May 2020: Vanessa Armendariz, an undergraduate petroleum geologist at UTPB, and Heather Dudley, a paleontology graduate student at Sul Ross.

Robert Read Distinguished Lecturer Fund: was founded to honor a bright, young geologist who had been an active member of both PBS-SEPM and WTGS and was tragically killed by a drunk driver. Donations from various members of both societies contributed to a membership donation fund that both encourages our continuing education efforts by helping offset the cost of bringing in a distinguished lecturer, usually in geosciences, but not required.