

Dr. W. Scott Meddaugh

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Professional Experience

As of August 2013 – The Robert L. Bolin Distinguished Professor of Petroleum Geology (Tenured) at Midwestern State University in Wichita Falls, Texas. Prior - Over 32 years of prior petroleum related subsurface technical experience with Chevron and its predecessor companies. Focus areas included reservoir characterization and modeling (static and dynamic), subsurface uncertainty assessment, geostatistics, and high-end technical software development and deployment. Also, several years of supervisory and technical project management experience, including international major capital projects. Experienced college instructor (campus and online), technical short course instructor and course developer in the areas of petroleum geology, reservoir characterization geostatistics, uncertainty assessment, reservoir modeling, and reservoir forecasting. Society of Petroleum Engineers (SPE) Distinguished Speaker 2015 and 2018.

Midwestern State University, August 2013 - Present

Robert L. Bolin Distinguished Professor of Petroleum Geology (August 2013). Responsible for teaching introductory and upper level courses in the geosciences as well as the Robert L. Bolin Petroleum Research Laboratory. Secured industry standard software for use at the university from IHS Markit (Petra, Eclipse and related software for reservoir characterization, simulation modeling) and Schlumberger (Petrel Suite) with in-kind donation value to date exceeding \$20 million.

Responsible for the following courses:

- Physical Geology – Undergraduate Campus and Online
- Solid Earth and Exploration Geophysics (Undergraduate and Graduate)
- Introduction to Mineral and Energy Deposits (Undergraduate and Graduate)
- Petroleum Geology (Undergraduate and Graduate)
- Applied Petroleum Geology (co-listed as Formation Evaluation and Reservoir Engineering in the McCoy School of Engineering; Undergraduate and Graduate)
- Geostatistics and Reservoir Modeling (Graduate Only Course)
- Advanced Formation Evaluation (Graduate Only Course)
- Play Analysis and Unconventional Reservoirs (Graduate Only Course)
- Honors Seminar in Climate, Climate Change, and Meteorology (Honors and High-GPA Students)

Current research interests include:

- Impact of geostatistics, reservoir modeling, heterogeneity, uncertainty, and human bias on reservoir performance forecasts, particularly for conventional oil and gas reservoirs and on unconventional shale gas and shale oil.
- Efficient incorporation of uncertainty in reservoir modeling, performance forecasting, and reservoir development decisions.
- Improved methods of accounting for historical production data uncertainty (e.g. allocation factors, low frequency well tests, “missing” data particularly for mature fields) particularly as it influences decline curve-based assessments and dynamic model history matching.
- Application of chemostratigraphy (core-based or cuttings-based) and stable isotopes as a reservoir characterization tool for carbonate reservoirs and for possible use as “sweet-spot” predictor (productivity and/or fracture susceptibility) for unconventional shale gas and shale oil plays.
- Appropriate scale for characterization of permeability used in geostatistical reservoir models; particularly carbonate reservoirs where large permeability multipliers are typically needed during history matching.
- Interaction of reservoir rock and fluid with injected steam – impact of continuous injection and single vs. multiple cycle, cyclic steam stimulation (CSS) in non-clastic reservoirs. Application of reactive transport modeling (RTM) to understand the mineralogical and fluid changes induced by the injected steam as well as the impact steam injection on porosity and permeability.

Saudi Arabian Chevron (SAC, Houston, TX), 2009-2013

Subsurface Team Leader and Technical Advisor responsible for all subsurface aspects of full field steamflood development planning for the Wafra First and Second Eocene reservoirs, Partitioned Zone (PZ), Saudi Arabia and Kuwait. If sanctioned, this EOR project would have been a multi-billion dollar, multi-decade development project that targets the more than 10 billion barrels remaining oil in these two reservoirs. Specific focus areas included reservoir characterization, static modeling, dynamic modeling, uncertainty assessment, drilling, completions, decision analysis, and economic modeling. Provided technical supervision for 18 senior level reservoir geologists and petroleum engineers. Responsible for an annual technical budget in excess of \$24 million.

Chevron Energy Technology Company (ETC, Houston, TX), 1992-2009

Consultant, Senior Staff Geologist, Earth Sciences focused on high-end reservoir characterization and geostatistical modeling as an operating company project consultant and as a technical service provider. Applied research of the effect of vertical and areal up-scaling of stochastic earth models on fluid flow results from dynamic simulators as well as using design of experiments to better assess of the uncertainty in volumetric calculations. Primary developer and instructor of several courses available to the company, affiliates/partners, and public including:

- Five-day internal company course in geostatistics
- Three-day internal company course in reservoir modeling and uncertainty analysis
- Five day internal company course in applied reservoir modeling
- Two-day public course on geostatistics, reservoir modeling, and uncertainty analysis.

Personally led over 140 internal technical courses worldwide in geostatistics, reservoir characterization, and uncertainty analysis; with over 1800 attendees, the majority from within Chevron but also significant attendees from Saudi Aramco, Kuwait Oil Company, other national oil companies (e.g. Venezuela, China, Angola), and the U.S. Department of Energy. Also presented a two-day public short course at the 2008 EAGE-sponsored GEO2008 (Bahrain) meeting titled Geostatistics, Reservoir Modeling, and Uncertainty Analysis.

Specific reservoir characterization and modeling projects include the Partitioned Zone (Saudi Arabia and Kuwait) reservoirs at Wafra, South Um Gudair, South Fuwaris, and Humma fields, the Elk Hills (California) equity project, and various projects including major reservoirs in Saudi Arabia (e.g. Ghawar), Kuwait (e.g. Burgan, Raudahtain, Sabariyah), Venezuela, West Africa, Australia, Canada, and the US (Texas, New Mexico, Wyoming, Louisiana, Colorado, and California). Projects involved advanced reservoir characterization and high-end earth modeling as well as seismic attribute integration. Member of several acquisition evaluation teams for reservoirs in Russia and the Middle East. Served as review team member for corporate subsurface technical reviews of several international major capital projects. Consultant to Saudi Aramco and the Kuwait Oil Company for geostatistics-based reservoir modeling. Served as a mentor in the area of reservoir model building and uncertainty analysis for Chevron staff. Extensive worldwide experience in both carbonate and clastic reservoirs.

Served as ETC Technology Manager for the Middle East and North Africa business units in 2000-2001.

Chevron Exploration and Production Services Company (CEPS, Houston, TX), 1987-1992

Supervisor responsible for interactive, workstation-based reservoir management software development including modules for reservoir characterization and 3D-reservoir modeling (including geostatistics-based software), formation evaluation, reservoir simulation pre- and post-processing, and production engineering. Supervised a ten person group responsible for software installation, training, and support. Provided technical training at company, affiliate, and licensee offices worldwide including offices in the United States, Canada, Australia (Perth and Brisbane), United Kingdom (London and Aberdeen), Indonesia (Rumbai and Duri), and Saudi Arabia, and Kuwait. Responsible for all affiliate and external software licensing. Responsible for an annual budget in excess of \$12 million.

Chevron Oil Field Research Company and Gulf Research and Development Company, (COFRC, La Habra, CA and Pittsburgh, PA), 1981-1987

Senior Research Geologist responsible for the development of workstation-based reservoir characterization and modeling applications. Software released for company-wide use included PROGRESS - a 3D-reservoir modeling, reservoir characterization, mapping, cross section, and well log processing software suite. Provided technical support for reservoir modeling and flow simulation projects at COFRC, including a Light-Oil Steam Flood pilot project in California. Designed and led five-day company internal course titled "Reservoir Simulation for Geologists". **Research Geologist** focused on basic research on the geology, mineralogy, and inorganic and organic geochemistry of oil shale as well as applied research on oil shale beneficiation. Managed joint oil shale characterization research projects with the University of West Virginia and the Pennsylvania State University.

Education

1983	Ph.D. Geology	Harvard University	Dissertation: <i>Age and Origin of Uraninite in the Elliot Lake, Ontario Uranium Ores, Canada</i>
1978	M.Sc. Geology	University of Wisconsin - Milwaukee	Thesis: <i>Distribution of Uranium and Thorium in the Wolf River Batholith, Northeastern Wisconsin</i>
1976	B.A. Geology	University of Wisconsin - Milwaukee	

Professional and Industry/Company Awards and Honors

SPE (Society of Petroleum Engineers) Distinguished Lecturer for 2018 (webinar)

SPE (Society of Petroleum Engineers) Distinguished Lecturer for 2015-2016. Two international and one domestic lecture tours.

SPE Economics and Management Journal Distinguished Technical Editor Award – 2014, 2016

Corporate Award for Reservoir Management Excellence, Chevron – 2011

SEPM - Society for Sedimentary Geology - Recognition Award for a Technical Presentation at the 2011 AAPG Annual Meeting - 2011

SPE Reservoir Evaluation & Engineering Journal Distinguished Technical Editor Award – 2007, 2008

Professional Activities and Affiliations

AAPG Annual Technical Conference and Exhibition, Vice Chair – Energy Transition and Sustainability; 2021 AAPG ACE, Denver, Colorado

AAPG Annual Technical Conference and Exhibition, Vice Chair – Technical Sessions; 2020 AAPG ACE, Houston, Texas

SPE Annual Convention and Exhibition, Chair – Geology and Geophysics; 2020 SPE ATCE, Denver, Colorado

SPE Annual Convention and Exhibition, Member – Geology and Geophysics Committee 2018-Present. (Term expires in 2022).

SPE RAC Member (Term expires in 2025)

Associate Editor (2011 – Present) – *SPE Reservoir Evaluation & Engineering (SPEREE) Journal*

Technical Editor (2017 – Present) – SPE Production and Operations Journal

Technical Editor (2013 – Present) – *SPE Economics and Management (SPEEM) Journal*

Technical Editor (2010 – Present) – *SPE Journal*

Technical Editor (2005 – Present) – *SPE Reservoir Evaluation & Engineering (SPEREE) Journal*

Technical Editor (2010 – Present) – *Bulletin of Canadian Petroleum Geology*

Technical Editor (2015 – Present) – *Marine and Petroleum Geology*

Technical Editor (2011 – 2013) – *Journal of Canadian Petroleum Technology*

Technical Editor (2013) – *Fuel: The Science and Technology of Fuel and Energy*

Technical Session Chair, 2015 Southwest Section AAPG Meeting, April, 2015, Wichita Falls, TX

Session Organizer/Chair for the 2014 Gussow Geoscience Conference sponsored by the Canadian Society of Petroleum Geologists (CSPG)

Judge (preliminary and/or second round; finalist selections - Jackson Hole Wildlife Film Festival (2014, 2015, 2016, 2018, 2019, 2020, 2021, 2022); various film categories including Earth and Space, Earth Sciences, Science and Technology, Science and Elephants, Big Cats, Environmental Science Short Form Video, Science and the Environment Long Form. Have served as first/second round most years and served on the finalist committee once.

Invited Reviewer and Session Chair for numerous US and International AAPG, EAGE, and SPE meetings including SPE, AAPG, and EAGE Annual Meetings (2007 – 2020)

Invited Committee Member – 2012 EAGE Innovation in Reservoir Modeling Conference: Integrating Data for Optimum Reservoir Management

Invited Committee Member – 2011 SPE Forum on Uncertainty Management and Risk Mitigation over Asset Lifecycles

Invited Session Chair – 2006 SEPM Bob F. Perkins Research Conference – Reservoir Characterization: Integrating Technology and Business Practices.

Invited Talks and Short Courses

Invited Speaker (Short Course) – 2019 Reservoir Modeling and Production Forecasting with a Focus on Application to Large and Not So Large Reservoirs, Houston, Gulf Coast Association Geological Societies Annual Meeting.

Invited Speaker – 2017 MWSU Geology Colloquium – Experimenting on a Small Planet - Climate Change

Invited Speaker – 2017 Wichita Falls MakerFaire – Experimenting on a Small Planet - Climate Change

Invited Speaker (Short Course) – 2017 Reservoir Modeling and Forecasting Short Course for Oil & Gas Library, Wichita Falls, TX (short course; continuing education for oil & gas professionals)

Invited Speaker – 2017 Wichita Falls COPAS Chapter – A Short Introduction to Well Logs and Their Interpretation (short course; continuing education for COPAS members)

Invited Speaker – 2015 Wichita Falls Area Rotary Club – Fracking; Just the Facts, Please (short version)

Invited Speaker – 2015 Solvay (Vernon, TX) - Fracking; Just the Facts, Please

Invited Speaker – 2014 Midwestern State Speakers and Issues Series – Fracking; Just the Facts Please

Invited Speaker – 2014 Wichita Falls COPAS Chapter – Production Forecasting and Fracking – What We Know and What We Don't Know (short course; continuing education for COPAS members)

Invited Speaker – 2014 North Texas Geological Society

Invited Participant/Presenter – 2012 Hedberg (AAPG, SPE, SEG) Research Conference on Flow in Carbonates

Invited Speaker and Session Chair – 2014 Gussow Geoscience Conference (Banff) - Advances in Applied Geomodeling for Hydrocarbon Reservoirs

Invited Speaker – 2011 Gussow Geoscience Conference (Banff) - Advances in Geomodeling

Invited Speaker – Houston Geological Society (2011)

Invited Speaker – Landmark/Halliburton Reservoir Modeling Seminar (2010); Keynote Talk

Invited Speaker – AAPG ATW on Reserves (2009)

Invited Speaker – SPE ATW on Probabilistic Subsurface Assessments (2008)

Invited Speaker – University of Maryland Geology Colloquium (2008)

Invited Speaker – Baylor University Geology Colloquium (2007)

Invited Participant/Presenter – 2004 Hedberg (AAPG) Research Conference on Carbonate Reservoir Characterization (El Paso)

Invited Participant/Presenter – 2000 Hedberg (AAPG) Research Conference on Applied Reservoir Characterization Using Geostatistics (Houston)

Professional/Technical Affiliations

Member Geological Society of America (GSA)

Member American Association of Petroleum Geologists (AAPG)

Member Society of Petroleum Engineers (SPE)

Member European Association of Geologists and Engineers (EAGE)

Member Society of Exploration Geophysicists (SEG)

Member American Association for the Advancement of Science (AAAS)

Peer Reviewed External Publications including SPE Papers

Masaud, Mohamed, W. Scott Meddaugh, and Masaud Eljaroshi, Enhanced and Rock typing-based Reservoir Characterization of the Palaeocene Harash Carbonate Reservoir, Zelten Field, Sirte Basin-Libya, Accepted for 2021 SPE Annual technical Conference, Dubai, October 2021)

Masaud, Mohamed, W. Scott Meddaugh, and Masaud Eljaroshi, Characterization and Geostatistically Modeling a Geologically Complex Upper Cretaceous - Cambro-Ordovician Reservoir. Case study: Meghil Field, Sirte Basin, Libya, Accepted for 2020 SPE Annual technical Conference, Denver, October 2020)

Masaud, Mohamed and W. Scott Meddaugh, Reservoir Characterization-Geostatistical Modeling of the Paleocene Zelten Carbonate Reservoir. Case study: Meghil Field, Sirte Basin, Libya (SPE Paper, 95988, SPE Annual Technical Conference, Calgary, October 2019)

Meddaugh, W. Scott, Meddaugh, Andrew J., 2018. Geological Heterogeneity in Geological Models - A Review of the Impact of Available Data, Modeling Parameters, and Modeling Workflow on Primary Recovery, Waterflooding, and Steamflooding Projects (SPE Paper 191527, SPE Annual Technical Conference, Dallas, September 2018)

Meddaugh, W. Scott, Meddaugh, W. Craig, and McCray, Brian, 2017. Quantitative Assessment of the Impact of Sparse Data and Decision Bias on Reservoir Recovery Forecasts, (SPE Paper 187402), 2017 SPE Annual Technical Conference, San Antonio, October 2017

Meddaugh, W. Scott, 2015. Improving Reservoir Forecasts by Understanding the Relative Impacts of Sparse Data, Reservoir Modeling Workflow and Parameter Selection, and Human Bias (SPE Paper 175009), 2015 SPE Annual Technical Conference, Houston, September 2015

Osterloh, W. Terry, W. Scott Meddaugh, and Don Mims, 2013. Probabilistic Thermal Simulation of the 1st Eocene Large Scale Pilot (LSP) Steamflood, Partitioned Zone (PZ), Saudi Arabia and Kuwait, SPE Reservoir Evaluation & Engineering, p. 97-116, v. 16, n. 1, February 2013.

Meddaugh, W. Scott, Paul Frydl, Rachel Dvoretzky, Dennis Dull, Steve Gross, Saleh al-Gamdi, and Steve Johansen, 2013. The Wafra Second Eocene Heavy Oil Carbonate Reservoir, Partitioned Zone (PZ), Saudi Arabia and Kuwait: Reservoir Characterization, Modeling, and IOR/EOR Evaluation, SPE 164247, March 2013

Meddaugh, W. Scott, W. Terry Osterloh, Ipsita Gupta, Nicole Champenoy, Dana Rowan, Niall Toomey, Shamsul Aziz, Steve Hoadley, Joel Brown, and Falah Al-Yami, 2012. The Wafra Field

First Eocene Carbonate Reservoir Steamflood Pilots: Geology, Heterogeneity, Steam/Rock Interaction, and Reservoir Response, SPE 158324, October 2012.

Meddaugh, W. Scott, W.T. Osterloh, S.F. Hoadley, N. Toomey, N. Champenoy, S. Bachtel, D.E. Rowan, J. Brown, F.M. Al-Dhafeeri, A.R. Deemer, 2011. Impact of Reservoir Heterogeneity on Steamflooding, Wafra First Eocene Reservoir, Partitioned Zone (PZ), Saudi Arabia and Kuwait, SPE 150606, December 2011

Champenoy, N., D.E. Rowan, W. Meddaugh, G. Gonzalez, S. Aziz, 2011. Understanding the Historical Assessment of Reservoir Performance (HARP) of the 1st Eocene Reservoir for Future Steam Flooding, PZ, Saudi Arabia and Kuwait, SPE 150578, December 2011

Gross, Steve, Steve Johansen, Tomas Perinot, Art Deemer, Steve Hoadley, W. Scott Meddaugh, 2011. Steamflood Pilot Design for the Wafra Field 2nd Eocene Reservoir in the Partitioned Zone, SPE 150610, December 2011

Osterloh, W. Terry, Scott Meddaugh, and Don Mims, 2011. Probabilistic Thermal Simulation of the 1st Eocene Large Scale Pilot (LSP) Steamflood, Partitioned Zone (PZ), Saudi Arabia and Kuwait, SPE 150580, December 2011

Meddaugh, W. Scott, Nicole Champenoy, W. Terry Osterloh, and Hong Tang, 2011. Reservoir Forecast Optimism - Impact of Geostatistics, Reservoir Modeling, Heterogeneity, and Uncertainty, SPE145721, October 2011

Tang, Hong, Niall Toomey, and W. Scott Meddaugh, 2011. Using an Artificial-Neural-Network Method To Predict Carbonate Well Log Facies Successfully, SPE Reservoir Evaluation & Engineering, Volume 14, Number 1, February 2011, pp. 35-44

Tang, Hong, Niall Toomey, and W. Scott Meddaugh, 2009. Successful Carbonate Well Log Facies Prediction Using an Artificial Neural Network Method: Wafra Maastrichtian Reservoir, Partitioned Neutral Zone (PNZ), Saudi Arabia and Kuwait, SPE 123988, October 2009

Meddaugh, W. Scott, Stewart Griest, and David Barge, 2009. Quantifying Uncertainty in Carbonate Reservoirs - Humma Marrat Reservoir, Partitioned Neutral Zone (PNZ), Saudi Arabia and Kuwait, SPE120102, March 2009.

Iqbal, Afzal, John Smith, Ali Reza Zahedi, Deemer, Arthur, Falah M. Al-Yami, W. Scott Meddaugh, Mansoor A. Rampurawala, Bingjian Li, Ihsan Gok, and Talal Al Enazi, 2010. Characterization of a Complex Carbonate Heavy Oil Reservoir – A Case Study, SPE 120423, March 2009.

Meddaugh, W. Scott, David Barge, W. W. (Bill) Todd, and Stewart Griest, 2007. The Jurassic-age Marrat Reservoir at Humma Field, Partitioned Neutral Zone (PNZ), Saudi Arabia and Kuwait - Utilization of a Probabilistic, Two Stage Design of Experiments Workflow for Reservoir Characterization and Management, IPTC-11219, December 2007.

Dull, D. W., Garber, R. A., and Meddaugh W. S., 2007. The Sequence Stratigraphy of the Maastrichtian (Upper Cretaceous) Reservoir at Wafra Field, Partitioned Neutral Zone, Saudi Arabia and Kuwait: Key to Reservoir Modeling and Assessment, AAPG Memoir 88, p. 247-279.

Meddaugh, W. S., Dull, Dennis, Garber, Raymond, Griest, Stewart, and Barge, David, 2007. The Wafra First Eocene Reservoir, Partitioned Neutral Zone (PNZ), Saudi Arabia and Kuwait: Geology, Stratigraphy, and Static Reservoir Modeling, SPE 105087, March 2007

Meddaugh, W. S., Dull, D, Griest, S. D., Montgomery, P., and McNaboe, G., 2006. Stochastic Reservoir Model for the First Eocene Reservoir, Wafra Field, Partitioned Neutral Zone (PNZ), Geostatistics Banff 2004 (Leuangthong, O. and Deutsch, C. V., ed.), Volume 2, Springer, p.757-762.

Meddaugh, W. S., Griest, S. D., and Gross, S. J., 2006. Application of Design of Experiments to Expedite Probabilistic Assessment of Reservoir Hydrocarbon Volumes (OOIP), Geostatistics Banff 2004 (Leuangthong, O. and Deutsch, C. V., ed.), Volume 2, Springer, p.751-756.

Meddaugh, W. S., 2006. Evaluation of Stochastic Earth Model Workflows, Vertical Up-scaling and Areal Up-scaling Using data from the Eunice Monument South Unit (New Mexico) and the LL-652 Central Fault Block (Venezuela) Reservoirs, Geostatistics Banff 2004 (Leuangthong, O. and Deutsch, C. V., ed.), Volume 2, Springer, p.743-750.

Meddaugh, W. S. and Griest, S. D., 2006. A Design of Experiments-based Assessment of Volumetric Uncertainty during Early Field Delineation and Development, Humma Marrat Reservoir, Partitioned Neutral Zone, *in* Slatt, R. M. et al., eds., Reservoir Characterization: Integrating Technology and Business Practices: 26th Annual GCSSEPM Foundation Bob F. Perkins Research Conference Proceedings, p. 115-156
(December 2006)

Meddaugh, W. S., Gross, S. J., Griest, S. D., and Todd, W. W., 2006. Impact of Volumetric and Connectivity Uncertainty on Reservoir Management Decisions: Case Study from the Humma Marrat Reservoir, Partitioned Neutral Zone, *in* Slatt, R. M. et al., eds., Reservoir Characterization: Integrating Technology and Business Practices: 26th Annual GCSSEPM Foundation Bob F. Perkins Research Conference Proceedings, p. 1125-1167 (December 2006)

Meddaugh, W. S., 2006. Reservoir Modeling for Mature Fields – Impact of Workflow and Up-scaling on Fluid Flow Response, SPE 99833, May, 2006

Chakravarty, A., Liu, D. B., and Meddaugh, W. S., 2000. Application of 3D Streamline Methodology in the Saladin Reservoir and Other Studies, SPE 63154, October 2000

Mursky, G., Anderson, J. W., Cook, T. R., and Meddaugh, W. S., 1989. Uranium and Thorium in Selected Precambrian Rock units in Wisconsin: *Geoscience Wisconsin*, v. 13, p. 35-61.

Bloom, J. R. and Meddaugh, W. S., 1988. Chevron's Production Workstation: *Geoscience Information Society (GSA) Proceedings*, v. 19, p. 191-201.

Meddaugh, W. S., 1984. Variability of Fischer Assay products from Green River Formation Oil Shales, C-a Tract, Piceance Creek Basin, Colorado: *Proceedings, 17th Annual Oil Shale Symposium, Colorado School of Mines (April)*, p. 171-186.

Meddaugh, W. S., Imbus, S., Ting, F. T. C., and Salotti, C. A., 1984. Variation of Organic Geochemistry and Petrography with Depth of Burial, Green River Formation Oil Shales, Piceance Creek Basin, Colorado: *Proceedings, 17th Annual Oil Shale Symposium, Colorado School of Mines (April)*, p. 159-170.

Smith, D. K., Sterner, S. M., Kerrick, D. M., and Meddaugh, W. S., 1984. Multiphase Quantitative Analysis of Colorado Oil Shales involving Overlap of Diffraction peaks: *Advances in X-ray Analysis*, v. 27, Plenum Publishing Corporation, p. 355-362.

Meddaugh, W. S., Salotti, C. A., Imbus, S., and Ting, F. T. C., 1983. Organic geochemistry of Green River Formation Oil Shales, Piceance Creek Basin, Colorado: *Geological Society of America Abstracts with Programs*, v. 15, n. 7, p. 447.

Meddaugh, W. S., and Salotti, C. A., 1983. Mineralogy and Geochemistry of Green River Formation Oil Shales, C-a Tract, Piceance Creek Basin, Colorado: *Proceedings, 16th Annual Oil Shale Symposium, Colorado School of Mines (April)*, p. 113-123.

Meddaugh, W. S., Holland, H. D., and Shimazu, N., 1982. The Isotopic Composition of Lead in Galena in the Uranium Ores at Elliot Lake, Ontario, Canada: *Ore Genesis - The State of the Art*, Springer-Verlag, p. 25-37.

Conference Proceedings

Meddaugh, W. Scott, 2019. Production Forecasting: Improved Understanding of Why Sparse Data, Static and Dynamic Reservoir Modeling Limitations, and Human Bias Leads to Optimistic Recovery Forecasts, American Association of Petroleum Geologists (AAPG) Annual Meeting and Conference, San Antonio, Texas

Meddaugh, W. Scott, 2019. An Updated Semivariogram “Atlas” for Carbonate Reservoirs: Impact on Geological Models and Dynamic Model Production Forecasts, American Association of Petroleum Geologists (AAPG) Annual Meeting and Conference, San Antonio, Texas

Meddaugh, W. Scott, 2018. Capturing Reservoir Heterogeneity in Reservoir Models – How Much is Enough?, American Association of Petroleum Geologists (AAPG) Annual Meeting and Conference, Salt Lake City, Utah

Meddaugh, W. Scott, 2018. Reservoir Modeling – An Insiders History of a Key Enabling Technology, American Association of Petroleum Geologists (AAPG) Annual Meeting and Conference, Salt Lake City, Utah

Meddaugh, W. Scott, 2017. Reservoir Forecast Quality – Impact of Reservoir Modeling, Uncertainty Assessment of Sparse Data, and Decision Bias, American Association of Petroleum Geologists (AAPG) Annual Meeting and Conference, Houston, Texas

Meddaugh, W. Scott, 2016. Improving Reservoir Production Forecast Accuracy – Application of Lessons Learned from Conventional Reservoirs, AAPG/SEG International Conference and Exhibition, September 6-9, Cancun, Mexico

Meddaugh, W. Scott, 2015. Reducing Sources of Optimism in Reservoir Production Forecasts – Application of Lessons Learned from Conventional Reservoirs to Unconventional Reservoirs, Reserve Estimation – Unconventionals Conference, August 11-13, 2015, Houston, TX (invited technical talk)

Meddaugh, W. Scott, Laura Gilbert, Trent Henderson, Brian McCray, Challenga Pickney, 2015. Improving Recovery by Improving Forecasting – Human, Science, and Technology Perspectives, AAPG, Denver (accepted for oral presentation June 2015 meeting).

Gilbert, Laura, Trent Henderson, Brian McCray, Challenga Pickney, and W. Scott Meddaugh, 2015. Production Forecasting Optimism - Impact of Workflows, Sparse Data, and Human Bias, AAPG Southwest Section Meeting, April 2015, Wichita Falls, TX

Meddaugh, W. Scott, 2014. Sources and Mitigation Strategies to Reduce Optimism in Reservoir Forecasting – Past, Present, and Future, Gussow Geoscience Conference – Advances in Applied Geomodeling for Hydrocarbon Reservoirs, Banff, Canada (September 22-24, 2014).

Meddaugh, W. Scott, Nicole Champenoy, and W. Terry Osterloh, 2012. Reservoir Performance Forecasting – How Well Are We Really Doing? EAGE Conference on Integrated Reservoir Modeling, Dubai, November 2012.

Meddaugh, William; Osterloh, W. Terry; Champenoy, Nicole, 2011. Forecasting More Realistic Reservoir Performance – Observations from Studies of the Wafra First Eocene Carbonate Reservoir and Other Reservoirs, GEO2012 Meeting, Bahrain, March 2012.

Aziz, Shamsul, Steve Bachtel, Nicole Champenoy, Dennis Dull, Bambang Gumilar, Vincent Heesakkers, Marina Hruska, W. Scott Meddaugh, Paul Montgomery, W. Terry Osterloh, Richard Patience, David Pollitt, Meghan Playton, Mark Skalinski, Dana Rowan, Eugene Rubin, Art Saller, and Niall Toomey, 2011. An Updated Characterization of the Wafra First Eocene Dolomite Reservoir, Partitioned Zone (PZ), Saudi Arabia and Kuwait: Static and Dynamic Studies, GEO2012 Meeting, Bahrain, March 2012

Rowan, D. E.; Patience, Richard; Champenoy, Nicole; Meddaugh, W. Scott, 2012. Significant biologic and hydrodynamic control on reservoir oil properties and resultant reservoir geometry in the Wafra, First Eocene Reservoir, Partitioned Zone, Saudi Arabia and Kuwait, 2012 AAPG Annual Meeting, Long Beach, California

Ratcliffe, Ken, Meddaugh, W.S. Montgomery, P., Playton, T.E., and Spain, D., Linking repetitive pseudo-cyclical variations in inorganic whole rock geochemical data to sea level fluctuations; Examples from Devonian reef complexes, Paleocene/Eocene intertidal dolomites (1st Eocene reservoir) and Upper Jurassic black shales (Haynesville Formation), Geological Society of America, Minneapolis, October 2011.

Meddaugh, William; Osterloh, W. Terry; Champenoy, Nicole, 2011. Impact of Carbonate Reservoir Heterogeneity on Reservoir Forecasts: Why Are Production Forecasts Too Optimistic and Can Anything Really Be Done to Eliminate Forecast Bias?, AAPG, Houston, April 2011.

Montgomery, Paul; Ratcliffe, Ken; Wray, Dave; Bachtel, Steve; Wright, Milly; McCarty, Doug; Derkowski, Arek; Archuleta, Bonny; Toomey, Niall; Dull, Dennis; Meddaugh, William; Urvat, Michael, 2011. Application of Whole Rock Inorganic Geochemistry to Stratigraphic Understanding of Mixed Carbonate Evaporite Reservoirs, an Example from the First Eocene of the Wafra Field, PZ, AAPG, Houston, April 2011.

Bachtel, Steve; Toomey, Niall; Pollitt, David A.; Saller, Art; Playton, Meghan; Heesakkers, Vincent; Dull, Dennis; Montgomery, Paul; Archuleta, Bonnie; Anthonissen, Erik; Meddaugh, William, 2011. Reservoir Characterization of the Paleocene/Eocene First Eocene Dolomite Reservoir at Wafra Field, Partitioned Zone (Saudi Arabia and Kuwait), AAPG, Houston, April 2011.

Rowan, Dana; Aziz, Shamsul; Champenoy, Nicole; Meddaugh, William; Gonzalez, Gregorio, 2011. Integrating Wireline Pressure Data, Stratigraphy, and Historic Fluid Production to Better Understand the Areal and Stratigraphic Pressure Distribution Prior to Steamflood Operations in the Wafra First Eocene Reservoir, PZ, Saudi Arabia and Kuwait, AAPG, Houston, April 2011.

W. Scott Meddaugh, 2010. Perspectives on Geostatistics, Reservoir Modeling, Heterogeneity, and Uncertainty, Saudi Arabia Oil and Gas Exploration and Production Meeting, Dhahran, December 2010.

W. Scott Meddaugh, W. Terry Osterloh, Niall Toomey, Dennis Dull, Nicole Champenoy, Shamsul Aziz, and Dana Rowan, 2010. Geological Heterogeneity in Carbonates: Wafra First Eocene Reservoir, Partitioned Zone (PZ), Saudi Arabia and Kuwait – Implications for Steamflooding, Saudi Arabia Oil and Gas Exploration and Production Meeting, Dhahran, December 2010.

W. Scott Meddaugh, 2010. Semivariogram Parameters for Carbonate Reservoirs – Geological Variability and Potential Impact on Dynamic Modeling, EAGE, Barcelona, June 2010 (extended abstract)

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