Dr. Guochang Wang

Assistant Professor
Petroleum and Natural Gas Engineering
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Most recent update: 7/2017

EDUCATION

West Virginia University   Morgantown, WV, USA

Ph.D. in Geology   08/2008 – 08/2012

Dissertation: Black Shale Lithofacies Prediction and Distribution Pattern Analysis of Middle Devonian Marcellus Shale in the Appalachian Basin, Northeastern U.S.A.

China University of Geosciences (Wuhan)   Wuhan, China

Master Student in Oil & Gas Development Engineering   09/2006 – 06/2008

Directly transfer to Ph.D. Candidate in April 2008

B.S. in Petroleum Engineering   09/2002 – 06/2006

Research AREAS

Reservoir Characterization for Shale Gas, Conventional Hydrocarbon and CO_2 Sequestration

Petrophysical Analysis and Three-Dimensional Seismic Attribute Interpretation

Pore Structure Characterization by Microscopy Observation and Gas (N_2, CO_2 and Ar) Physisorption

Three-dimensional Geological Modeling and Numerical Simulation

Pattern Recognition, Artificial Intelligence, Mathematical Algorithms and Computer Coding

PROFESSIONAL EXPERIENCE

Assistant Professor, Engineering Department, Saint Francis University, March 2015 to present

— Teaching in the area of Petroleum Geology and Engineering

— Research in the area of geological modeling and numerical simulation of conventional and unconventional reservoirs

Postdoctoral Fellow, Cooperative Advisor Dr. Yiwen Ju, College of Earth Science, University of Chinese Academy of Sciences, August 2012 to February 2015

— Organic mudrock distribution, pore structure characterization, and organic matter properties

PROFESSIONAL ACTIVITIES

Committee of 2018 Eastern Section AAPG Fieldtrip, May 2017 to June 2018

Member of **Faculty Development Committee of Saint Francis University**, April 2016 to Present

Council Member of Chinese Sub-Society for Soft Rock Engineering & Deep Disaster Control, Nov. 2013 to Present

Council Member of Postdoctoral Association in Chinese Academy of Sciences, Mar. 2013 to Present

Editorial Board Member of Journal of Coal Science & Engineering (China), Dec. 2012 to Present

Editorial Board Member of American Journal of Geoscience, Sep. 2014 to Present

Technical Reviewer for Applied Geochemistry (since 2014), Arabian Journal of Geosciences (since 2014), Austrian Journal of Earth Sciences (since 2013), British Journal of Applied Science & Technology (since 2013), Computers & Geosciences (since 2014), Energy (since 2015), Journal of Earth Science (since 2014), Journal of Hazardous Materials (since 2013), Journal of Natural Gas Science & Engineering (since 2014), Journal of Petroleum Science and Engineering (since 2013), Journal of the Energy Institute (since 2014), Marine and Petroleum Geology (since 2012), Measurement (since 2014), International Journal of Pattern Recognition and Artificial Intelligence (Since 2015), Journal of Applied Geophysics (Since 2016), Geophysics (Since 2016) Interpretation (Since 2016), AAPG Bulletin (Since 2016), Geological Journal (Since 2017)

Session Chair at the AAPG Annual Convention & Exhibition in Pittsburgh, PA, USA, 19-22 May, 2013

Conference Secretary for 476th Xiangshan Science Conferences, Theme: The frontier science problems of Nanogeology and nano accumulation or metallogenesis, Jul. 2013 to Dec. 2013

Conference Secretary for 443rd Xiangshan Science Conferences, Theme: Major Basic Problem of Deep Coal Mine Gas Disaster and Coalbed Methane Development, Sep. 2012 to Dec. 2012

RESEARCH GRANTS

Saint Francis University Faculty Development Grant, 2017 (half year): "Organic Matter-hosted Pore Characterization of Shale by SEM Imaging", $3,000.

State Key Laboratory of Shale Oil and Gas Enrichment Mechanisms and Effective Development, 2016 (one year), "Longmaxi-Wufeng Shale Lithofacies Modeling and Pore Characterization, Eastern Sichuan Basin", RMB 290,000.

Postdoctoral National Research Funding, 2013 (two years): "Evolution Characteristics of Micro-nanometer Structure of Deformed Coal-bearing Shale Gas Reservoirs and Its Mechanism", RMB 50,000.

Open Funding of Key Laboratory of Tectonics and Petroleum Resources of MOE, 2013 (one year): " Features of Organic Matters in Shale-Gas Reservoirs Deposited in Terrestrial Facies", RMB 30,000.

EXTERNAL SUPPORT

IHS Global Insight, Inc: 2015

> Petra Software package with multiple license: Used to analyze and manipulate subsurface geological data, including well logs

> Kingdom Package with multiple license: Used to interpret seismic data and generate subsurface maps

> Harmony, Piper and WellTest Package with multiple license: Used to analyze production of conventional and unconventional wells

National Postdoctoral Administrative Committee Grant (RMB 30,000), August, 2014, funding for postdoctoral fellow to attend international conferences

China Scholarship Council Grant (~$53,000), 2008-2012, funding for oversea study by the China State-funded Study Abroad Program

HONORS

Excellent Individual Award in Annual Assessment   2013
Key Laboratory of Computational Geodynamics, Chinese Academy of Sciences

EMD's Loyd Carlson Memorial Award (Best Poster in AAPG 2012 ACE)   2012
Energy Minerals Division, American Association of Petroleum Geologists

Milton Tidd and Doris E. Heald Promising Researcher Award   2011
Department of Geology & Geography, West Virginia University

PUBLICATIONS

Peer Reviewed Articles

[1] Yiwen Ju, Cheng Huang, Yan Sun, Quan Wan, Xiancai Lu, Shuangfang Lu, Hongping He, Xueqiu Wang, Caineng Zou, Jianguang Wu, Hailing Liu, Longyi Shao, Xiuling Wu, Hongtai Chao, Qinfu Liu, Jieshan Qiu, Min Wang, Jianchao Cai, **Guochang Wang**, and Yue Sun, 2017, Nanogeosciences: Research History, Current Status, and Development Trends, vol.17, p.5930-5965.

[2] Mingming Wei, Yiwen Ju, Quanlin Hou, **Guochang Wang**, Liye Yu, Wenjing Zhang, Xiaoshi Li, 2017, A new parameter as an indicator of the degree of deformation of coals. Journal of Earth Science, vol.28, p.358-366.

[3] Kui Han, Yiwen Ju, **Guochang Wang**, Shujing Bao, Hongling Bu, Bhupati Neupane, 2016, Shale composition and pore structure variations in the progradation direction: A case study of transitional shales in the Xu-Huai district, southern North China. Journal of Natural Gas Science and Engineering, vol.36, Part B, p.1178-1187

[4] Yang Luo, Hongping Liu, Yanchao Zhao, **Guochang Wang**, 2016, Effects of gas generation on stress states during burial and implications for natural fracture development. Journal of Natural Gas Science and Engineering, vol.30, p.295-304.

[5] **Guochang Wang**, Yiwen Ju, 2015, Organic Shale Micropore and Mesopore Structure Characterization by Ultra-Low Pressure N2 Physisorption: Experimental Procedure and Interpretation Model. Journal of Natural Gas Science and Engineering, vol.27 Part 2, p.452-465.

[6] **Guochang Wang**, Yiwen Ju and Kui Han, 2015, Early Paleozoic Shale Properties and Gas Potential Evaluation in Xiuwu Basin, Western Lower Yangtze Platform. Journal of Natural Gas Science and Engineering, vol.22, p.489-497.

[7] **Guochang Wang**, Yiwen Ju, Zhifeng Yan and Qingguang Li, 2015, Pore Structure Characteristics of Coal–bearing Shale by Fluid Invasion Methods: A Case Study in Huainan–Huaibei Coalfield of China. Marine and Petroleum Geology, vol.62, p.1-13.

[8] **Guochang Wang**, Yiwen Ju, Timothy R. Carr and Fengqi Tan, 2015, The hierarchical decomposition method and its application in recognizing Marcellus Shale lithofacies through combining with neural network. Journal of Petroleum Science and Engineering, vol.127, p.469-481.

[9] Hongling Bu, Yiwen Ju, **Guochang Wang**, Lizhi Fang, Zhifeng Yan and Qingguang Li, 2015, Composition and adsorptivity of shales in coal-bearing rock strata of Huainan coalfield. Journal of University of Chinese Academy of Sciences, v.32, no.1, p.82-90.

[10] Yiwen Ju (Corresponding author), Ying Sun, **Guochang Wang**, Fengqi Tan, 2015, Dynamic types of basin formation and evolution and its geodynamic mechanisms. Chinese Journal of Geology, v.50, no.2, 503-523.

[11] Hongling Bu, Yiwen Ju, Jingqiang Tan, **Guochang Wang**, and Xiaoshi Li, 2015, Fractal characteristics of pores in non-marine shales from the Huainan coalfield, eastern China. Journal of Natural Gas Science and Engineering, vol.24, p.166-177.

[12] Wenjing Zhang, Yiwen Ju, Mingming Wei, and **Guochang Wang**, 2015, Study on characteristics and mechanism of adsorption/desorption on different metamorphic-deformed coal reservoirs. Earth Science Frontiers, vol.22, no.2, p. 232-242.

[13] Renqiang Liu, Yonggang Duan, Fengqi Tan, **Guochang Wang**, Jianhua Qin, Bhupati Neupane, 2015, Evaluation on an original resistivity inversion method of water flooding a conglomerate reservoir based on petrophysical analysis. Journal of Geophysics and Engineering, vol.12, no.5, p.780-792.

[14] Yiwen Ju, Shuangfang Lu, Yan Sun, Fengqi Tan, **Guochang Wang**, Ku Han, Yuan Bao and Qingguang Li, 2015, Nano-Geology and Unconventional Oil and Gas. Acta Geologica Sinica (English Edition), vol.89, p.192-193.

[15] **Guochang Wang**, Yiwen Ju, Yuan Bao, Zhifeng Yan, Xiaoshi Li, Hongling Bu and Qingguang Li, 2014, Coal-Bearing Organic Shale Geological Evaluation of Huainan−Huaibei Coalfields, China. Energy & Fuels, v.28, no.8, p.5031-5042.

[16] **Guochang Wang**, Timothy R Carr, Yiwen Ju and Chaofeng Li, 2014, Identifying Organic-rich Marcellus Shale Lithofacies by Support Vector Machine Classifier in the Appalachian Basin. Computers & Geosciences, v.64, p.52-60.

[17] Yiwen Ju, **Guochang Wang**, Hongling Bu, Qingguang Li and Zhifeng Yan, 2014, China Organic-rich Shale Geologic Features and Special Shale-Gas Production Issues. Journal of Rock Mechanics and Geotechnical Engineering, v.6, no.3, p.196-207.

[18] Yiwen Ju, Hongling Bu and **Guochang Wang**, 2014, Main characteristics of shale gas reservoir and its effect on the reservoir reconstruction. Advances in Earth Science, v.29, no.4, p.72-86.

[19] Yuan Bao, Chongtao Wei, Chaoyong Wang, **Guochang Wang** and Qingguang Li, 2014, Geochemical characteristics and generation process of mixed biogenic and thermogenic coalbed methane in Luling coalfield, China. Energy & Fuels, v.28, no.7, p.4392-4401.

[20] Yiwen Ju, Guiliang Wang, Mingming Wei, Fengqi Tan, Yuan Bao, **Guochang Wang**, Qingguang Li, Bhupati Neupane, 2014, North China Energy Basin and Orogenic Belt Coupled Evolution Process and Its Characteristics since Meso-Cenozoic. Coal Geology of China, v.26, no.8, p.15-19.

[21] Yiwen Ju, Kray Luxbacher, Xiaoshi Li, **Guochang Wang**, Zhifeng Yan, Mingming We, Liye Yu, 2014, Micro-structural evolution and their effects on physical properties in different types of tectonically deformed coals. International Journal of Coal Science & Technology, v.1, no.3, p.364-375.

[22] **Guochang Wang** and Timothy R Carr, 2013, Organic-rich Marcellus Shale lithofacies modeling and distribution pattern analysis in the Appalachian basin. AAPG Bulletin, v.97, no.12, p.2173-2205.

[23] **Guochang Wang**, Guojian Cheng and Timothy R Carr, 2013, The application of improved NeuroEvolution of Augmenting Topologies neural network in Marcellus Shale lithofacies prediction. Computer & Geosciences, v.54, p.50-65.

[24] Zhifeng Yan, Yiwen Ju, Shuheng Tang, Quanlin Hou, Baocun Zhu and **Guochang Wang**, 2013, Numerical Simulation Study of Fracturing Process in Coalbed Methane Reservoirs in Southern of Qinshui Basin. Chinese Journal of Geophysics, v.56, no.5, p.1734-1744.

[25] Lizhi Fang, Yiwen Ju, **Guochang Wang** and Hongling Bu, 2013, Composition and Gas-Filled Pore Characteristics of Permian Organic Shale in the Southwest Fujian Depression, Cathaysia Landmass, Earth Science Frontiers, v.20, no.4, p.229-239.

[26] **Guochang Wang** and Timothy R Carr, 2012, Methodology of organic-rich shale lithofacies identification and prediction: a case study from Marcellus Shale in the Appalachian basin. Computer & Geosciences, v.49, p.151-163.

[27] **Guochang Wang** and Timothy R Carr, 2012, Marcellus Shale lithofacies prediction by multi-class neural network classification in the Appalachian basin. Mathematical Geosciences, v.44, no.8, p.975-1004.

[28] Fengde Zhou, Guangqing Yao, **Guochang Wang**, Zhikui Zhao, Liwu Wang and Hongbo Miao, 2007, Elman Neural Networks Applied in the Low Permeability Reservoir Sensitivity Prediction. Geological Science and Technology Information, v.26, no.6, p.91-94.

[29] **Guochang Wang** and Xueju Lv, 2006, Application of Generalized Regression Neural Network and Genetic Algorithm to Production Decline Analysis. Xinjing Petroleum Geology, v.27, no.1, p.90-93.

Conference Proceedings

[30] **Guochang Wang**, Alireza Shahkarami, Jonathan Bruno, TOC Content Distribution Features in Utica-Point Pleasant Formations, Appalachian Basin. 2016 Unconventional Resources Technology Conference in San Antonio, Texas, 1-3 August 2016

[31] Alireza Shahkarami, **Guochang Wang**, Horizontal Well Spacing and Hydraulic Fracturing Design Optimization - A Case Study on Utica-Point Pleasant Shale Play. 2016 Unconventional Resources Technology Conference in San Antonio, Texas, 1-3 August 2016

[32] Guochang Wang, Timothy R. Carr, Yiwen Ju, The identification and modeling of shale lithofacies based on mineral composition and organic matter richness and its significance. Annual Meeting of Chinese Geosciences Union, Beijing October 19-23, 2014.

[33] Yan Sun, Yiwen Ju, **Guochang Wang**, Wei Zhou, Mudrock nano/micro-scale pore types and their effect on unconventional gas occurrence. Annual Meeting of Chinese Geosciences Union, Beijing October 19-23, 2014.

[34] Yiwen Ju, Fengqi Tan, Ying Sun, Jianguang Wu, **Guochang Wang**, Xiaoshi Li, Yuan Bao, Zhifeng Yan, Liye Yu, Mingming Wei, Qingguang Li, Bhupati Neupane, Progress of basin-scale detachment structure and its effect on shale gas occurrence. Annual Meeting of Chinese Geosciences Union, Beijing October 19-23, 2014.

[35] Qingguang Li, Yiwen Ju, Fengqi Tan, Yuan Bao, **Guochang Wang**, Mingming Wei, The pathway, identification, and progress of biogenic coalbed methane. Annual Meeting of Chinese Geosciences Union, Beijing October 19-23, 2014.

[36] **Guochang Wang**, Yiwen Ju, Timothy R Carr, Chaofeng Li and Guojian Cheng, Application of Artificial Intelligence on Black Shale Lithofacies Prediction in Marcellus Shale, Appalachian Basin. 2014 Unconventional Resources Technology Conference, Denver, August 25-27, 2014.

[37] **Guochang Wang**, Timothy R Carr and Yiwen Ju, Statistical Reverse Model to Predict Mineral Composition and TOC Content of Marcellus Shale. SPE Unconventional Resources Conference, Woodlands, TX, USA, April 1-4, 2014.

[38] **Guochang Wang**, Timothy R Carr and Yiwen Ju, Integrated Approach to Predict Mineral Composition AND TOC Content in Marcellus Shale, Appalachian Basin, USA. The Thirtieth Annual Pittsburgh Coal Conference, September 15-18, 2013, Beijing, China.

[39] Timothy R Carr, **Guochang Wang** and Taylor McClain, Petrophysical Analysis and Sequence Stratigraphy of the Utica Shale and Marcellus Shale, Appalachian Basin, USA. The 6th International Petroleum Technology Conference, March 26-28, 2013, Beijing, China.

[40] Kevin Ellett, Qian Zhang, Cristian Medina, **Guochang Wang**, Timothy R Carr, Uncertainty in Regional-scale Evaluation of CO_2 Geologic Storage Resources-comparison of the Illinois Basin (USA) and the Ordos Basin (China). Energy Procedia, v.37, p.5151-5159.

[41] Fengde Zhou, Guangqing Yao, **Guochang Wang**, Oyinkepreye David Orodu and Qingjun Yang, Integrated Modeling of Fractured Low Permeability Reservoir, Sangonghe Formation, Baolang Oilfield, Northwest China. International Petroleum Technology Conference, IPTC 2008, v.2, p.718-725.

Presentation and Poster Abstracts

[42] **Guochang Wang**. Issues Concerning Application of Horizontal Well Data in 3-D Modeling of Shale Reservoirs. AAPG Annual Convention & Exhibition in Houston, TX, April 2017.

[43] **Guochang Wang**, Alireza Shahkarami, Jonathan Bruno, TOC Prediction Analysis of Utica-Point Pleasant Formations in the Appalachian Basin. AAPG 2016 Annual Convention & Exhibition in Calgary, Canada, June 2016

[44] Shuvajit Bhattacharya, Timothy Carr and **Guochang Wang**. Shale Lithofacies Classification and Modeling: Case Studies From the Bakken and Marcellus Formations, North America. AAPG Annual Conference and Exhibition, Denver, CO, May 31-June 3, 2015.

[45] **Guochang Wang**, Timothy R Carr and Yiwen Ju. Research of Organic Shale Lithofacies Based on Mineral Composition and Organic Matter Richness. Annual Meeting of Chinese Geoscience Union, Beijing China, October 20-23, 2014.

[46] Timothy R Carr, Taylor McClain, Liaosha Song, and **Guochang Wang**, Geologic Parameters to Better Understand Mudrock (Shale) Reservoirs. AAPG Geoscience Technology Workshop (GTW), Pittsburgh, PA, June 17-19, 2014.

[47] Yiwen Ju and **Guochang Wang** (Presenter). China Shale Gas Development Issues: Status, Geological Features, Special Problems and Suggestions. Euro-Asia Regional Energy Summit of Euro-Asia Economic Forum, Xi'an China, September 26-28, 2013.

[48] **Guochang Wang**, Timothy R Carr, Yiwen Ju and Chaofeng Li. The Application of Support Vector Machine in Organic-rich Marcellus Shale Lithofacies Identification, Appalachian Basin. The Thirtieth Annual Pittsburgh Coal Conference, Beijing China, September 15-18, 2013.

[49] **Guochang Wang** (Invited Talk)**.** Petrophysical Analysis and Reservoir Characterization for Shale Gas. Training for Education Center of Institute of Computing Technology, Chinese Academy of Sciences, Beijing China, September 6, 2013.

[50] **Guochang Wang**. Coal-bearing Shale Geological Features and Shale Gas Resource Potential in Huainan-Huaibei Coalfield, China. The Sixth Postdoctoral Academic Forum of University of Chinese Academy of Sciences, Beijing China, July 14, 2013.

[51] **Guochang Wang** and Timothy R Carr. Prediction and Distribution Analysis of Marcellus Shale Productive Facies in the Appalachian Basin, USA. AAPG Annual Conference and Exhibition, Pittsburgh, PA, May 19-22, 2013.

[52] **Guochang Wang** (Invited Talk). Methodology of Unconventional Shale Gas Reservoir Characterization. Anhui Provincial Bureau of Coal Geology, Hefei China, April 22-23, 2013.

[53] **Guochang Wang** (Guest Lecture). Shale Gas Reservoir Characterization: Core Analysis, Petrophysical Analysis, and 3-D Modeling. Graduate Course of Petroleum Geology (622054Y), University of Chinese Academy of Sciences, Beijing China, April 15, 2013.

[54] **Guochang Wang** (Invited Talk). Primary Problems in Shale Gas Reservoir Characterization. China University of Geosciences, Wuhan China, April 1, 2013.

[55] **Guochang Wang** and Yiwen Ju. Key Issues for Shale Gas Exploration and Development. China National Unconventional Gas Exploration and Development Technology Conference, Shenzhen China, November 2-4, 2012.

[56] **Guochang Wang** (Invited Talk). Shale Gas Reservoir Characterization Methods: History, Process and Key Methods. China University of Geosciences, Wuhan China, September 14, 2013.

[57] **Guochang Wang** and Timothy R Carr. Black Shale Lithofacies Identification and Distribution Model of Middle Devonian Intervals in the Appalachian basin. AAPG Annual Convention and Exhibition, Long Beach, California, April 22-25, 2012.

[58] Timothy R Carr, **Guochang Wang**, et al. Approaches to Subsurface Characterization of Unconventional Reservoirs-Marcellus Shale of the Appalachian Basin, USA. 41st Annual Eastern Section AAPG Meeting, Cleveland, Ohio, 2012.

[59] **Guochang Wang** and Timothy R Carr, 2011, Evaluation of CO_2 Geological Storage Capacity in the Paleozoic Formations of the Ordos Basin, China. Geological Society of America Abstracts with Programs, v.43, no.1, p.94.

[60] Timothy R Carr, **Guochang Wang**, Matthew L Boyce and Anne Yanni, 2011, Understanding Controls on Deposition of Organic Content in the Middle Devonian Organic-rich Shale Intervals of West Virginia and Western Pennsylvanian. Geological Society of America Abstracts with Programs, v.43, no.1, p.50.

[61] **Guochang Wang** and Timothy R Carr. Preliminary Evaluation of CO_2 Geologic Storage Resources in the Ordos Basin, China. AAPG Annual Convention and Exhibition, New Orleans, April 11-14, 2010.

<u>PROFESSIONAL ASSOCIATIONS</u>

Chinese Sub-Society for Soft Rock Engineering & Deep Disaster Control

International Association for Mathematical Geosciences

American Association of Petroleum Geologists (AAPG)

Society for Sedimentary Geology (SEPM)

The Society of Petroleum Engineers (SPE)

Sigma Gamma Epsilon