



Gang Han is a Petroleum Engineering Consultant at Aramco Services Company. He has worked over 20 years in global oil and gas fields to address geomechanics issues related to unconventional development, reservoir performance, production optimization, and well planning and construction. His expertise includes hydraulic fracturing, reservoir geomechanics, sand management and control, well integrity, and salt modeling. He has over 55 publications, and is a leading author of the book, *Drilling in Extreme Environments*. He holds a PhD in Chemical Engineering/Geomechanics from the University of Waterloo. He served as a board member of ARMA, the chair of Hydraulic Fracturing Community, and is a member of SPE, AAPG, and SEG.



John McLennan is an Associate Professor in the Department of Chemical Engineering, a Senior Research Scientist at the Energy & Geoscience Institute, and an Adjunct Professor in the Department of Civil Engineering at the University of Utah. With a Ph.D. in Civil Engineering from the University of Toronto, he has more than thirty-five years of experience with petroleum service and technology companies. He worked nine years for Dowell Schlumberger in their Denver, Tulsa and Houston facilities. Later, John was with TerraTek in Salt Lake City, Advantek International in Houston, and ASRC Energy Services in Anchorage. He has worked on projects concerned with subsurface energy recovery in a variety of reservoir environments, throughout the world. He has served as President of ARMA.



Joseph P. Morris is the Group Leader of the Computational Geosciences Group at Lawrence Livermore National Laboratory. He received his Ph.D. from Monash University (Melbourne, Australia) in the area of meshfree computational methods. With over 20 years' experience developing new computational methods for fluid mechanics and geomechanics, his focus at Lawrence Livermore National Laboratory has been investigating defense, energy and environmental applications involving the coupling of fluid and solid mechanics. He also worked for almost 5 years as a Principal Scientist with Schlumberger-Doll Research. He is a member of SPE and Vice President of the American Rock Mechanics Association. He is author of over 25 peer-reviewed publications and 2 patents.



Mark Zoback is the Benjamin M. Page Professor of Geophysics and the Director of the Stanford Natural Gas Initiative at Stanford University. He co-directs SCITS Stanford Center for Induced and Triggered Seismicity (SCITS, conducting research on in situ stress, fault mechanics, and reservoir geomechanics. He is the author of a textbook entitled Reservoir Geomechanics (published in 2007 by Cambridge University Press), as well as the author/co-author of 400 technical papers and holder of five patents. His online course, Reservoir Geomechanics, has been completed by over 8000 students around the world. He has received a number of awards and honors, including recent the Robert R. Berg Outstanding Research Award of the AAPG in 2015 and the Outstanding Contribution to the Public Understanding of the Geosciences Award from AGI in 2016. A member of the U.S. National Academy of Engineering, he served on the National Academy of Energy committee investigating the Deepwater Horizon accident and the Secretary of Energy's committee on shale gas development and environmental protection.



Mukul M. Sharma is Professor and the "Tex" Moncrief Chair in the Department of Petroleum and Geosystems Engineering at the University of Texas at Austin, where he has been for the past 33 years. His current research interests include hydraulic fracturing, oilfield water management, formation damage and improved oil recovery. He has published more than 400 journal articles and conference proceedings and has 18 patents. Sharma has a PhD in chemical and petroleum engineering from the University of Southern California. Among his many awards, he is a member of the National Academy of Engineering and is the recipient of the 2009 Lucas Gold Medal, SPE's highest technical award.



Ahmad Ghassemi is the McCasland Chair Professor in the Mewbourne School of Petroleum & Geological Engineering, OU and is the director of the Halliburton Rock Mechanics Laboratory. He has a Ph.D. in Geological Engineering and specializes in geomechanics for unconventional petroleum & geothermal & reservoir development. He has been working on hydraulic fracturing and high-temperature rock mechanics research for the past 25 years with emphasis on modeling of multiple hydraulic fractures, coupled geomechanics/fluid flow modeling in naturally fractured reservoirs, wellbore stability analysis, induced seismicity, and experimental determination of reservoir rock properties. His teaching interests include reservoir geomechanics, numerical modeling, petrophysics, and stimulation.



Maurice Dusseault is a Professional Engineer and teaches Geological Engineering at the University of Waterloo. He carries out research in deep underground engineering issues including oil production, hydraulic fracturing, energy storage, geothermal energy, carbon sequestration, and deep injection disposal of granular solids and liquid wastes (including biosolids, oilfield wastes, and civil wastes). He holds over 90 international patents and has about 570 full-text papers published in journals and conferences and has taught Petroleum Geomechanics short courses in 28 countries. Many of the general energy processes he works on involve hydraulic fracture implementation to generate communication, or analysis to prevent hydraulic fracturing onset.



Sidney Green is Founder / President of Enhanced Production, Inc. and is Research Professor at the University of Utah. He was a founder and past President of TerraTek in Salt Lake City, Utah that was acquired by Schlumberger in 2006. He has published many papers, holds a number of patents, and has given many invited presentations. He has served as Director for a number of companies, on Government Committees and University advisory boards, and has testified at various Congressional hearings. He has served on a number of National Research Council/National Academies committees and currently is on the Army Science & Technology Subcommittee on Demilitarization of Chemical Weapons. Mr. Green attended the University of Pennsylvania and Stanford graduate schools. He is a member of SPE, a Fellow of the American Rock Mechanics Association, and is a member of the US National Academy of Engineering.



Mike Smith graduated with a PhD in Mechanical Engineering (Rock Mechanics) from Rice University (1974) and joined Amoco Production Research. There he had the good fortune to work for Bob Fast – one of the discoverers of hydraulic fracturing. He later co-founded NSI technologies – now part of Premier Oilfield Group. During his career he conducted fracture treatments in more than 30 countries around the world, while authoring nearly 100 technical papers and one text book - aptly named “Hydraulic Fracturing”. For his work he was awarded the SPE Lester Uren award for achievements prior to the age of 35 and most recently was named by the SPE as a “Legend of Hydraulic Fracturing”.



Derek Elsworth is a professor in the Departments of Energy and Mineral Engineering and of Geosciences and the Center for Geomechanics, Geofluids, and Geohazards at Pennsylvania State University. His interests are in the areas of computational mechanics, rock mechanics, and in the mechanical and transport characteristics of fractured rocks, with application to geothermal energy, the deep geological sequestration of radioactive wastes and of CO₂, unconventional hydrocarbons including coal-gas, tight-gas-shales and hydrates, and instability and eruption dynamics of volcanoes.



Douglas Blankenship is the manager of the Geothermal Research Department at Sandia National Laboratories, a group that focuses on R&D activities related to geothermal well construction and reservoir completion and operations. Mr. Blankenship has over 35 years of experience in the development, testing, and monitoring of drilled and mined openings in subterranean environments. He has been involved in wide variety of technical and managerial efforts; including basic R&D associated with the development of high-temperature drilling tools (e.g., Diagnostics-While-Drilling); the planning, development and supervision of grassroots drilling exploration programs; in situ stress measurements and well testing in deep boreholes; coordination and development of underground drilling programs; design and installation of instrumentation systems for underground and surface excavations; and numerical analyses of drilled and mined excavations in geologic materials.



Dave Cramer is a Senior Engineering Fellow on the ConocoPhillips Global Completions Engineering staff in Houston, TX and specializes in hydraulic fracturing applications and treating pressure analysis. Dave has published 52 technical papers and holds 2 U.S. patents. He is a registered Professional Engineer in Colorado. Industry recognitions include the Henry Mattson Technical Achievement Award by the Denver SPE chapter in 1993 and the SPE International Completions Optimization and Technologies Award in 2011. Dave was an SPE Distinguished Lecturer from 2003-2004 and the SPE Region Director for the U.S. and Canada Rocky Mountain region from 2004-2007.



Herbert H. Einstein, Professor Civil and Environmental Engineering at the Massachusetts Institute of Technology, received his degree in civil engineering from ETH-Zürich. His teaching and research areas are underground construction, rock mechanics and engineering geology. Professor Einstein has been involved as an advisor, consultant and researcher in issues related to underground construction, rock mechanics and rock engineering and natural hazards, notably landslides, and in waste repository problems. He has been and is member of a number of national and international technical/scientific committees and advisory boards; he is also co-

editor of the journal, *Rock Mechanics and Rock Engineering* and member of the editorial boards of *Tunneling and Underground Space Technology* and of *Engineering Geology*. Professor Einstein is author or co-author of over 300 publications in his area of expertise. He was the recipient of the prestigious Müller lecture award of the International Society for Rock Mechanics and of the "Outstanding Contributions to Rock Mechanics" award of the American Rock Mechanics Association. He also received several teaching awards from his Department and from the School of Engineering.



Branko Damjanac got his bachelor's degree in civil engineering from Belgrade University in 1979. He completed PhD in civil engineering at University of Minnesota in 1996. The same year he joined Itasca. He has more than 25 years of experience in application of rock mechanics to solving problems in different industries. He has been involved in design and stability analysis of underground excavations for oil storage and nuclear waste isolation, including 10 year of participation in the Yucca Mountain Project. His experience includes stability analyses for open pit and underground mines in both hard and soft rocks. In recent

years he has been involved in development of new numerical methodologies and their application to analysis of rock mass treatment by fluid injection in oil and gas, mining and geothermal industries. He led Itasca's effort on the fundamental study, funded by U.S. Department of Energy, on viability of the enhanced geothermal systems (EGS).



Abdelwahab Noufal is a technical expert of Structural Geology and Geomechanics. With over than 30 years of international experience in exploration and operation, he works on combining various types of G&G data to improve static reservoir and geomechanical models. He received a Bachelor of Science in Honors Geology in 1989 and a Master of Structural Geology in 1992 from Cairo University and a PhD in Stress analysis in 1997 from Tübingen University, Germany. He has been through various positions such as Senior Structural Geologist and Structural Modeling and the Geomechanics Domain Champion at Schlumberger, as a Geomechanics and Structural Geology Specialist by PETRONAS Carigali and ADNOC Group. His project experience covers many play types including oil sands, shale gas, tight gas, carbonates, and conventional reservoirs throughout many basins such as Egypt, Libya, Oman, GCC (Gulf Countries), Malay Basin (Malaysia), China Sea, Cuba and others. He is a registered Professional Structural Geology and Geomechanics with AAPG, a member of SPE, SEG, and EAGE.



Andrew Bungler is an Associate Professor in the University of Pittsburgh's Department of Civil and Environmental Engineering. He joined the University of Pittsburgh in 2013 after spending 10 years in Melbourne, Australia working in the Geomechanics Group within the Commonwealth Scientific and Industrial Research Organization (CSIRO). Prior to that, he received his PhD in Geological Engineering from the University of Minnesota. His research interests include the mechanics of hydraulic fractures, coupled fluid-shale interaction, and the emplacement dynamics of magma-driven dykes and sills.