

**Rob Bewick** (Ph.D., M.A.Sc., B.Eng., P.Eng.(ON)) is a lead mining rock mechanics engineer at Golder Associates. For the firm, he has completed expert reviews, site visits, and integrated mine scale stability optimizations for several seismic events and rockbursts; these conditions have caused damage and closure to mine excavations at both the local and global scales. He has provided practical recommendations for rehabilitation, mining sequence, and ground support for mines in Australia, Brazil, Canada, Indonesia, Sweden, and USA. Rob is responsible for the technical aspects of projects, business development, and the mentoring of personnel in several of Golder's North American offices. Rob has extensive experience in deep and shallow underground hard rock environments and block caving. His primary underground experience is complemented by crown pillar and large open pit slope site characterization and design. For the last seven years Rob has been involved in rock mechanics innovations for block caving through the Rio Tinto and is currently leading Golder's preferred consultancy with PTFI's Grasberg Operations since 2014. Dr. Bewick has worked on gold, base metal, diamond, iron ore and industrial mineral projects and in operating mines.

**Chia Weng Boon** obtained his doctorate at Oxford University in 2013, preceded by a B. Eng. at Nanyang Technological University in 2009. He was awarded the Rocha Medal in 2016 by the International Society for Rock Mechanics and Rock Engineering (ISRM). He was a past recipient of the Lee Kuan Yew Gold Medal, Professional Engineers Board Gold Medal (Singapore) and King's Scholarship (Malaysia). He has been with Gamuda Engineering Sdn Bhd, and seconded to the design-and-build contractor joint venture, MMC-Gamuda KVMRT (T) Sdn Bhd, where he contributes to the construction of underground tunnels and stations in the 1<sup>st</sup> and 2<sup>nd</sup> Line of the underground mass rapid transit project in Kuala Lumpur. In this project, the alignment traverses through the karstic limestone formation, metamorphic quartzite and phyllite formation, granitic geological unit and quartz intrusions. His key contributions in rock engineering are: rock bolt support mechanisms, i.e. reinforced rock unit, beam building or suspension, in relation to the rock bedding thickness and robust and efficient algorithms for modeling jointed rock in the distinct element method. Dr. Boon served as a reviewer for several international scientific journals (including Tunneling and Underground Space Technology, Computers and Geotechnics, and Engineering Geology). He is a committee member at the Geotechnical Engineering Technical Division, as well as Tunneling Underground Space Technical Division of the Institution of Engineers Malaysia.

**D. Nicolas Espinoza** is an Assistant Professor in the Hildebrand Department of Petroleum and Geosystems Engineering at The University of Texas at Austin. Dr. Espinoza earned his Civil Engineering diploma from Universidad Nacional de Córdoba in 2006, and his MS and PhD degrees from the Georgia Institute of Technology in 2008 and 2011. His primary research interests include mechanics and physics of natural porous solids and granular media, including applications to advanced completion techniques, reservoir geomechanics, methane recovery from microporous organic rocks, methane hydrate-bearing sediments, and carbon geological storage. He has co-authored over 40 peer-reviewed journal articles, served as an expert reviewer for several scientific and engineering journals, and given seminars at various leading research and educational institutions.

**Yi Fang** is a postdoctoral fellow in the Institute for Geophysics at the University of Texas at Austin. His research interests focus on reservoir geomechanics and geofluids with applications to geoenvironmental activities, such as enhanced geothermal system, induced seismicity, CO<sub>2</sub> sequestration, and submarine hydrate reservoir characterization and recovery. He received his Ph.D. in *Energy and Mineral Engineering* at the Pennsylvania State University in 2017, an M.S. in *Geology* from California State University, Long Beach in 2013, and a B.E. in *Civil Engineering* at China University of Geosciences, Wuhan in 2011. He has authored and co-authored over 30 technical papers. He also serves as a technical reviewer for ARMA, URTEC, and other international journals (e.g., JGR, GRL, WRR, SPEJ, Fuel, and others).

**Yongcun Feng** is currently a research associate in the Hildebrand Department of Petroleum and Geosystems Engineering at The University of Texas at Austin. He obtained his Ph.D. degree from The University of Texas at Austin in 2016, and his MS and BS degrees in 2012 and 2009 from China University of Petroleum (Beijing), all in petroleum engineering. His research interests lie primarily in geomechanics related issues faced by the petroleum industry, including lost circulation, well integrity, sand production, reservoir compaction, and induced faulting/seismicity. He has authored or co-authored over 20 peer-reviewed journal papers and 8 conference papers. Dr. Feng will join China University of Petroleum (Beijing) as a faculty member in petroleum engineering in September 2019.

**Jesse Hampton** is a Principal Scientist with New England Research, Inc. (NER). He received his PhD in Civil Engineering from Colorado School of Mines. His specialties include experimental rock mechanics and nondestructive evaluation for the purpose of reservoir rock and fracture characterization. He presently helps NER in the development and analysis of geomechanics and petrophysics R&D programs to aid in reservoir rock characterization and model generation. His current research involves the development of methodologies suited for contact measurements to determine elastic and inelastic rock properties and strength.

**Mahdi Heidari** is a Research Associate at the Bureau of Economic Geology, Jackson School of Geosciences, The University of Texas at Austin (UT). He works for the AGL and GeoFluids consortia. Mahdi is a Civil/Geotechnical Engineer. He received his PhD on Tunneling in difficult ground conditions from UT in 2013. He holds a M.Sc. in Structural Engineering from SUT, Iran, and a M.Sc. in Earthquake Engineering from University of Tehran, Iran. His current research focuses on geomechanical modeling of stresses and pore pressure in salt basins. His areas of expertise are: geomechanics, pore pressure prediction, finite-element modeling of geological structures, and constitutive modeling of geomaterials over large stress and strain ranges.

**Qinghua Lei** is a Lecturer and Senior Scientist in Engineering Geology at the Department of Earth Sciences, ETH Zürich, Switzerland. He holds a bachelor's degree (2009) and a master's degree (2012) in Civil Engineering from Tongji University, China. He obtained his PhD degree (2016) in Rock Mechanics (fully-funded by the departmental scholarship) from Imperial College London, UK. Then, he worked as a Postdoctoral Research Associate in Fluid Mechanics at Imperial College London between 2016 and 2018. Dr Lei is the winner of the 2019 Rocha Medal from the International Society for Rock Mechanics and Rock Engineering (ISRM). He is also the recipient of the 2015 Rock Mechanics Research Award and the 2016 NGW Cook PhD Dissertation Award from the American Rock Mechanics Association (ARMA). His research covers many cutting-edge topics in the field of rock mechanics and rock engineering. His research interests include coupled processes in geological media, fracture mechanics, damage mechanics, flow and transport in fractured porous media, seismic wave propagation, slope stability, stress characterization and numerical modelling. Dr Lei is a member of the ISRM Commission on Thermal-Hydro-Mechanical-Chemical Processes in Fractured Rock.

**Botao Lin** is an assistant professor at the College of Petroleum Engineering, the China University of Petroleum at Beijing (CUPB). His current research interests include efficient hydraulic fracturing of heavy oil reservoirs and conglomerate reservoirs, flow back analysis in shale reservoirs, multi-scale description of tectonic stresses in tight reservoirs, and prediction of soil-structure interaction in the exploitation of deep-water resources. Before joining CUPB, he obtained his Ph.D. degree from the University of Oklahoma, Norman, USA, in 2012, majoring in civil engineering under the supervision of Dr. Amy Cerato. He also graduated from Sun Yat-sen (Zhongshan) University, China, with a master degree in geotechnical engineering in 2007 and a bachelor degree in geology in 2005.

**Andrea Lisjak** is the numerical modelling lead and a co-founder of Geomechanica Inc. (Toronto, Canada), an engineering company that develops simulation software and provides simulation-aided, technical consulting and laboratory testing services. Andrea leads the development of new simulation capabilities in Geomechanica's finite-discrete element simulation software (Irazu) and carries out consulting activities in several fields of geomechanics. His research interests focus on the numerical simulation of damage development around underground excavations, hydraulic fracturing, and thermo-hydro-mechanical behavior of discontinuous rock masses. He has authored several technical papers and published his research findings in top-tier international journals. He received the prestigious Manuel Rocha Medal 2015 of the International Society for Rock Mechanics for his doctoral thesis entitled "Investigating the influence of mechanical anisotropy on the fracturing behavior of brittle clay shales with application to deep geological repositories". Andrea holds BSc and MSc degrees in civil engineering from the University of Trieste, Italy, and a PhD degree in rock mechanics from the University of Toronto, Canada.

**Xiaodong Ma** obtained his PhD degree in geological engineering (2014) from University of Wisconsin-Madison. He subsequently conducted post-doctoral research at the Stress and Crustal Mechanics Group, Stanford University, before joining ETH Zürich in 2017. He is leading the geomechanics efforts in the Bedretto Underground Laboratory for field experiments related to enhanced geothermal system and induced seismicity. He had previously tackled a variety of geomechanical challenges, including the experimental characterization of the true triaxial mechanical response of porous sandstones subject to true triaxial stresses, static/dynamic poroelastic behavior of unconventional reservoir rocks, and stress variation in shales and its effect on the effectiveness of hydraulic fracturing. His research interest lies in the integrated geomechanics study of combining multi-scale field, laboratory and theoretical approaches for subsurface resources and fundamental geological processes.

**Jeffrey Oke** has been a geomechanic consultant at Mine Design Engineering Inc. since early 2015. He completed his Ph.D. studies in 2016 on the numerical, empirical, and analytical analysis of umbrella arch support systems in underground excavations at Queen`s University.

**Andrew Paul Rathbun** (Andy), is a Senior Research Scientist at the Chevron Energy Technology Company on the Rock Mechanics and Rock Physics Team. Andy received his B.S. with Distinction in Geological Sciences from The Ohio State University. He then went on to a M.S. and Ph.D. at Penn State in Geosciences working in the Rock and Sediment Mechanics Lab studying friction and fluid flow in granular shear zones including the bed of glaciers and faults. His work was focused on laboratory experiments of granular shear investigating frictional properties, shear localization, and earthquake energetics. After his Ph.D., he was a Research Fellow at ISTERre, University Joseph Fourier, Grenoble.

During this time he worked on the interplay between fault zone roughness and gouge properties on the localization and strength of faults in a series of discrete element simulations. His primary focus is the earthquake and fault mechanics, rock mechanics, granular friction, and index methods.

**Hiroki Sone** is an Assistant Professor in the Geological Engineering Program at University of Wisconsin-Madison. He received his BS and MS degree in Geology from Kyoto University in 2004 and 2006, and his PhD degree in Geophysics from Stanford University in 2012. His research interests span from basic scientific research on earthquake mechanics to engineering problems in subsurface resource recovery and underground structure design.

His specialty is in experimental rock mechanics, using insights gained from the lab applied to numerical and theoretical models to solve larger-scale geomechanical problems; such analyses are intended to optimize recovery of energy resources, minimize hazards during resource production, and address fundamental mechanical problems in tectonophysics. He also focuses on the long-term ductile properties of clay-rich and fractured rocks, with implications for how stress accumulate/relax in the lithosphere over time, the long-term productivity of unconventional gas reservoirs, and the integrity of waste disposal sites.

**Bryan Tatone** is the laboratory testing lead and a co-founder of Geomechanica Inc., a rock mechanics software and consulting company, based in Toronto, Ontario, Canada. Bryan manages the day-to-day rock mechanics laboratory testing activities and continues to design and improve testing equipment to expand Geomechanica's testing capabilities. Bryan holds a BAsC degree in Geological Engineering (University of Waterloo, 2007) and MASc and PhD degrees in Civil Engineering (University of Toronto, 2009, 2014). His graduate research focused on rock discontinuity roughness and shear behavior, which he has studied both experimentally via micro-CT imaging and numerically via the application of hybrid continuum-discontinuum numerical methods. For this work, Bryan was the recipient of the 2017 Rocha Medal awarded by the International Society of Rock Mechanics.

**Ingrid Tomac** is an Assistant Professor at the Structural Engineering Department at University of California, San Diego. She received a Civil Engineering diploma (Structures) in 2000 and Master of Science degree (Geotech) in 2007 from University of Zagreb, Croatia. She received her Ph.D. from Colorado School of Mines in 2014. She has been practicing geotechnical engineering in Croatia from 2000-2010. She authored, supervised and led more than 250 geotechnical projects in soils and rocks. Her research interests are micromechanical understanding of different coupled processes in geotechnics -- for example, dense-phase particle-fluid flow and transports, hydro-thermo-chemo-mechanical fracturing processes in geothermal rock reservoirs, elastoplastic rock fracturing, erosion offset and mitigation of hydrophobic soils in post-wildfire slopes and fracture of ice with impurities. She serves as editorial board member in ASCE Journal of Geotechnical and Geoenvironmental Engineering, ASTM Geotechnical Testing Journal and ASTM Journal of Testing and Evaluation. She currently serves on different ASCE-GI and ISSMGE committees and is member of ASTM, and actively participates in professional conferences as a track and session organizer, as well as, serves as a reviewer for articles in different journals, NSF proposals and international proposals. At UCSD, Dr. Tomac teaches courses on Slopes and Retaining Walls, Foundation Engineering, Rock Mechanics and Advanced Soil Mechanics.

**Gabriel Walton** received his Bachelors and Ph.D. degrees in Geological Engineering from Queen's University in Canada, and is currently an Assistant Professor at the Colorado School of Mines. In addition to his academic efforts, he has also worked as an independent consultant and has led applied research efforts in collaboration with tunneling and mining industry partners. His research interests include numerical modeling, mine ground control, applications of remote sensing and geophysics in rock mechanics and rock engineering, rockmass characterization, and post-peak behavior of rocks and rockmasses. In addition to advising students in the Geological Engineering program at the Colorado School of Mines, Gabriel is also actively involved in the interdisciplinary Underground Construction and Tunnel Engineering graduate program -- the only one of its kind in North America.

**Bisheng Wu** is currently an assistant professor at the Department of Hydraulic Engineering, Tsinghua University, China. He obtained his PhD degree of Applied Mathematics in 2008 from the University of Wollongong (Australia), Master degree of Engineering Mechanics in 2005 from Tsinghua University (China) and Bachelor degree of Mechanical Engineering in 2002 from Xi'an Jiaotong University (China). He joined CSIRO Australia in 2009 as a postdoctoral research fellow, was promoted to research scientist (indefinite term) in 2012 and then joined Tsinghua University in 2018. His research focuses on geomechanics related to efficient and renewable exploration of subsurface energy resources. He published around 40 journal papers, worked as session chair or organizing committee member of international conferences more than 10 times, was invited to be a reviewer for more than 20 internationally renowned journals and was designated a Distinguished Reviewer for International Journal of Rock Mechanics and Mining Sciences, Energy, International Journal of Solids and Structures, Applied Thermal Engineering and Geothermics.

**Kan Wu** is an assistant Professor in Harold Vance Department of Petroleum Engineering at Texas A&M University. Her research interests include hydraulic fracturing, coupled geomechanics/fluid flow modeling, and optimization of well performance in unconventional reservoirs. Wu has authored or co-authored more than 50 technical papers. She holds a Ph.D. degree in petroleum engineering from The University of Texas at Austin. She has served as an associate editor for the SPE Reservoir Evaluation & Engineering Journal.

**Qianbing Zhang** is a Senior Lecturer in the Department of Civil Engineering at Monash University, Australia. He received his Bachelor degree from Southwest Jiaotong University in 2007, his Master degree from Shandong University (China) and his PhD from the Swiss Federal Institute of Technology in Lausanne (EPFL) in 2014. Thereafter, Dr Zhang pursued post-doctoral research at the University of Cambridge. In 2016, he was awarded the Rocha Medal Runner-up Certificate from the International Society for Rock Mechanics. His research focuses on the development and application of experimental techniques and multi-physics computational tools to understand the progressive failure of geomaterials and structures under extreme conditions -- such as natural hazards (e.g., earthquake, landslides and explosive volcanic activity) and human-made disasters (e.g., terrorist attacks and induced earthquakes). He has co-authored over 40 ISI journal articles, and regularly reviews grant proposals, national and international theses, and papers for more than 20 journals. He served as an Associate Editor of Tunneling and Underground Space Technology (Elsevier) in 2016-2018; he was appointed an Editor-in-Chief since 2019.

**Cheng Zhu** is currently an assistant professor in the Department of Civil and Environmental Engineering at Rowan University. His research primarily concerns multi-scale rock behavior under thermo-hydro-chemo-mechanical coupled processes across various time scales, with emphasis placed on damage and healing mechanics, time-dependent deformation, microstructural characterization, and computational geomechanics, for applications in geological storage of energy (e.g., oil, gas, compressed air energy storage) and waste (e.g., wastewater injection, nuclear waste disposal). Prior to joining Rowan University, he worked in the Bureau of Economic Geology at the University of Texas at Austin as a postdoctoral fellow for one year. At Rowan University, he teaches Geotechnical Engineering, Foundation Engineering, and Rock Mechanics.