

5th International Workshop on Rock Physics Technical Programme

Date: 23-26 April 2019 (Tuesday - Friday)

Time: 09:00-17:30

Venue: 2/F, Yasumoto International Academic Park, The Chinese University of Hong Kong

- Lecture Theatre 7 (Conference Room)
- Seminar Room 201 (Poster Hall)

Time	23 April 2019 (Tuesday)
08:30 – 09:00	Registration
09:00 – 09:10	Opening Remarks by <i>Teng-fong Wong</i> Director, Earth System Science Programme, Faculty of Science, The Chinese University of Hong Kong
	Session 1: Pressure Dependence (Chairs: Arthur Cheng and Teng-fong Wong)
09:10 – 09:35	Effective stress law for the permeability and deformation of porous limestones and sandstones <i>(Teng-fong Wong, The Chinese University of Hong Kong, Hong Kong)</i>
09:35 – 10:00	Two models to reproduce ductile behaviour of granite and their application <i>(Hayate Ohtani, Kyoto University, Japan)</i>
10:00 – 10:25	Phase-field modeling of rock fracture incorporating pressure-sensitivity and coupled Multiphysics <i>(Jinhyun Choo, The University of Hong Kong, Hong Kong)</i>
10:25 – 10:55	Coffee Break
10:55 – 11:20	Development of porosity and elastic strain during burial of carbonate rocks <i>(Ida Lykke Fabricius, Technical University of Denmark, Denmark)</i>
11:20 – 11:45	Generalised Hertz-Mindlin-Walton model with experimental verification <i>(Rune M Holt, NTNU, Norway)</i>
11:45 – 12:10	Interpreting Pressure-dependent Complex Conductivity in Sandstones <i>(Manika Prasad, Colorado School of Mines, USA)</i>
12:10 – 13:30	Lunch (Yasumoto International Academic Park)
13:30 – 15:00	Poster Session 1 1. 3D Multi-Scale Quantitative Modelling of Fault-Related Fractures Based on Geomechanics <i>(Hui Li, China University of Petroleum – East China, China)</i> 2. Stress-associated scattering attenuation for prestressed fluid-saturated rocks <i>(Li-Yun Fu, China University of Petroleum – East China, China)</i>

	<p>3. Pore-pressure induced transition of compaction bands to shear bands in saturated high-porosity sandstone: a multiscale study (Huanran Wu, <i>The Hong Kong University of Science and Technology, Hong Kong</i>)</p> <p>4. Stress-induced velocity anisotropy in a sandstone with inclined bedding (Xiaying Li, <i>Chinese Academy of Sciences, China</i>)</p> <p>5. Numerical study of fracture connectivity effect on seismic wave attenuation (Mikhail Novikov, <i>Novosibirsk State University, Russia</i>)</p> <p>6. Comparison of the AE monitoring results between the hydraulic fracturing and SC-CO₂ fracturing (Shan Wu, <i>China University of Petroleum – Beijing, China</i>)</p> <p>7. Numerical Simulation of the Fracture Toughness of the Layered Shale in the Longmaxi Formation (Jungxuan Zhang, <i>Southwest Petroleum University, China</i>)</p> <p>8. Role of effective pressure coefficient for porosity in poroelastic quasi-static compressibility measurements (Gautier Njiekak, <i>University of Alberta, Canada</i>)</p> <p>9. Seismic properties and fluid flow regimes in cracked and fluid-saturated glass (Abdulwaheed Ògúnsàmi, <i>Australian National University, Australia</i>)</p> <p>10. Stiffening by increased testing temperature of dry North Sea sandstones (Tobias Orlander, <i>Technical University of Denmark, Denmark</i>)</p> <p>11. The impact of Skempton's A on overburden pore pressure response above a depleting reservoir (Marcin Duda, <i>NTNU, Norway</i>)</p> <p>12. Porosity effects of electrostatic forces in chalk powder (Leonardo T.P. Meireles, <i>Colorado School of Mines, USA</i>)</p> <p>13. Fluid-Pressure Response and Effects of Gas-Oil Ratio in Low-Field (2MHz) NMR (Kurt Livo, <i>Colorado School of Mines, USA</i>)</p>
15:00 – 15:30	Coffee Break
	<p align="center">Session 2: Fracture (Chair: Rune Holt)</p>
15:30 – 15:55	<p>Rock faulting and injection-induced fault reactivation in the laboratory: Micro-seismicity as a (nearly!) real-time imaging tool (Yevhen Kovalyshen, <i>CSIRO, Australia</i>)</p>

15:55 – 16:20	Effects of fracture aperture distributions on seismic attenuation and P-wave modulus dispersion caused by fluid pressure diffusion (<i>Simón Lissa, University of Lausanne, Switzerland</i>)
16:20 – 16:45	Assessment of fracture toughness in rocks using a new pseudo-compact tension (pCT) test and acoustic emission (<i>Andrea Muñoz-Ibáñez, University of A Coruña, Spain</i>)
16:45 – 17:10	How do Cataclasite and Mylonite physical properties drive wave velocities and reflectivity at the alpine fault, New Zealand (<i>Ludmila Adam, University of Auckland, New Zealand</i>)
17:10 – 17:30	Discussion

Time	24 April 2019 (Wednesday)
	Session 3: Anisotropy (Chairs: Ran Bachrach and Angus Best)
09:00 – 09:25	Wave propagation and shear wave anisotropy in partially saturated fractured rocks (<i>G. Papageorgiou, NTNU, Norway</i>)
09:25 – 09:50	Anisotropic dynamic and static stiffness of a Calcareous shale from the Duvernay unconventional reservoir (<i>Luyi Shen, University of Alberta, Canada</i>)
09:50 – 10:15	Modelling of effects of parameters of shales on anisotropic elastic properties (<i>Maxim Lebedev, Curtin University, Australia</i>)
10:15 – 10:45	Coffee Break
10:45 – 11:10	Pore-fabric induced seismic anisotropy and poroelastic coefficients (<i>Prahap Sahay, CICESE, Mexico</i>)
11:10 – 11:35	Stress-dependent anisotropy and fluid content identification in transversely isotropic rocks: theoretical predictions versus laboratory measurements (<i>Hengxin Li, China University of Petroleum – East China, China</i>)
11:35 – 12:00	Shale anisotropy estimation from well logs based on Hudson-Cheng's model and deep neural network (<i>Nan You, National University of Singapore, Singapore</i>)
12:00 – 13:30	Lunch (Chung Chi College Staff Club)
13:30 – 15:00	<p>Poster Session 2</p> <p>14. Elastic property study in cracked rocks using a sphere-equivalency method (<i>Song Xu, China University of Petroleum – Qingdao, China</i>)</p> <p>15. A rock physics model for characterizing the total porosity and velocity of shale : A case study in Fuling area, China (<i>Zhuang Xu, China University of Geoscience, China</i>)</p> <p>16. Effects of background anisotropy on effective elastic properties of fractured rocks (<i>Junxin Guo, Southern University of Science and Technology, China</i>)</p> <p>17. The Elastic Anisotropy of Whitby Mudstone under Saturated and Partially-Saturated Conditions (<i>Lisanne A.N.R. Douma, Delft University of Technology, Netherlands</i>)</p> <p>18. Quantitative relationship between the elastic properties and kerogen content in organic-rich shale (<i>Jianyong Xie, Chengdu University of Technology, China</i>)</p> <p>19. New transducer geometry for improved data interpretation of ultrasonic rock testing (<i>Yevhen Kovalyshen, CSIRO, Australia</i>)</p>

	<p>20. Evaluation and Characteristic Analysis of Shale Mode I Fracture Toughness Based on Logging Data (<i>Changyou Shi, Southwest Petroleum University, China</i>)</p> <p>21. Rock physics constrained inversion of seismic anisotropy parameters (<i>Fuyong Yan, University of Houston, USA</i>)</p> <p>22. Experimental Study on Ultrasonic Velocity and Anisotropy of Organic-rich Shales (<i>Mingsheng Zuo, China University of Petroleum – Beijing, China</i>)</p> <p>23. Integrated Approach to Bridge a Gap Between Organic Matter and Elastic Properties to Explore Organic Shale Reservoirs (<i>Muhammad Abid, Tongji University, China</i>)</p> <p>24. Response of rock electrical characteristics to different depositional environments of the Long Maxi formation shale in Sichuan Basin (<i>Kai Yang, Chengdu University of Technology, China</i>)</p> <p>25. Establishment and Application of Physics Model for Shale Based on Cuttings Microanalysis (<i>Yueyue Sun, China University of Petroleum – Beijing, China</i>)</p> <p>26. A combined elastic and resistivity anisotropy study of shallow weakly-cemented sandstone formations (<i>Angus Best, National Oceanography Centre, UK</i>)</p> <p>27. Experimental Study of the Velocity Anisotropy and Its Affection Factors in Tight Reservoirs (<i>Qian Zhang, China University of Petroleum – Beijing, China</i>)</p>
15:00 – 15:30	Coffee Break
	<p align="center">Session 4: Shale (Chair: Boris Gurevich)</p>
15:30 – 15:55	A rock physics model relating static and dynamic anisotropy in shale (<i>Xiyang Xie, NTNU, Norway</i>)
15:55 – 16:20	An improvement to the determination of dynamic elastic properties of transversely isotropic rocks eliminating the effect of beam skew (<i>Wei Li, Southwest Petroleum University, China</i>)
16:20 – 16:45	Impact of frequency on velocity stress sensitivity in shales (<i>Serhii Lozovyi, NTNU, Norway</i>)
16:45 – 17:10	Shale elastic properties - finite clay bound-water shear modulus impact (<i>Stephan Gelinsky, Shell, USA</i>)
17:10 – 17:30	Discussion

Time	25 April 2019 (Thursday)
	Session 5: Quantitative Interpretation (Chairs: Stephan Gelinsky and Manika Prasad)
09:00 – 09:25	A geologically constrained seismic modelling method connecting geological realism to seismic validation (<i>Ahmad Sharif Abd Rahman, PETRONAS, Malaysia</i>)
09:25 – 09:50	Anisotropic Litho-petro-elastic AVA and AVAz inversion (<i>Ran Bachrach, Schlumberger, USA</i>)
09:50 – 10:15	Data-driven and facies-guided rock-physics feasibility study in the Alvheim area, North Sea (<i>Per Avseth, Dig Science, Norway</i>)
10:15 – 10:45	Coffee Break
10:45 – 11:10	A novel approach for modeling fluid substitution in sub-resolution sand-shale sequences (<i>Nishank Saxena, Shell, USA</i>)
11:10 – 11:35	Chalk stiffness: Distribution in the Maastrichtian unit of the Dan Field (<i>Leonardo T.P. Meireles, Technical University of Denmark, Denmark</i>)
11:35 – 12:00	How fast fluid pressure diffuses in a deformable porous rock? (<i>Tobias Müller, CICESE, Mexico</i>)
12:00 – 13:30	Lunch (Yasumoto International Academic Park)
13:30 – 15:00	<p>Poster Session 3</p> <p>28. Frequency dependent anisotropy of porous media with an aligned set of slit cracks (<i>Bo-Ye Fu, China University of Petroleum – Beijing, China</i>)</p> <p>29. Validating the triple porosity model for solid/fluid substitution by numerical simulation based on the finite element method (<i>Yongyang Sun, Curtin University, Australia</i>)</p> <p>30. An improved reservoir facies characterization based on petrophysical analysis (<i>Wen Gu, BGP, China</i>)</p> <p>31. Continuous Complex Conductivity Measurements During Methane Hydrate Formation and Dissociation in Sandstone (<i>Mathias Pohl, Colorado School of Mines, USA</i>)</p> <p>32. Influence of creep drifts on dynamic moduli of sedimentary rocks at seismic frequencies (<i>Rafael Chavez, Pontifical Catholic University of Rio de Janeiro, Brazil</i>)</p> <p>33. From critical angles to elastic parameters using shear-wave information (<i>Ivan Lehocki, Lehocki Geospace, Norway</i>)</p>

	<p>34. Drag force theory for permeability (Mahyar Madadi, <i>The University of Melbourne, Australia</i>)</p> <p>35. The effect of stress on limestone permeability and effective stress behavior of damaged samples (Fanbao Meng, <i>The Chinese University of Hong Kong, Hong Kong</i>)</p> <p>36. The effect of the boundary conditions on the elastic moduli measurements at low frequencies: Experimental study (Vassily Mikhaltsevitch, <i>Curtin University, Australia</i>)</p> <p>37. Contact Angle Measurement at Different Surface Roughness (Chandra W. Winardhi, <i>Institut Teknologi Bandung, Indonesia</i>)</p> <p>38. A Novel Approach to Describe the Complexity of Flowpath in Porous Medium (Fourier Dzar Eljabbar, <i>Institut Teknologi Bandung, Indonesia</i>)</p> <p>39. Modelling permeability and capillary pressure curves for Lower Cretaceous marly chalks (Einar M. Storebø, <i>Technical University of Denmark, Denmark</i>)</p>
15:00 – 15:30	Coffee Break
	<p align="center">Session 6: Velocities, Attenuation, Polarization (Chair: Per Avseth)</p>
15:30 – 15:55	Modelling acoustic properties of partially saturated nano-porous media (Boris Gurevich , <i>Curtin University, Australia</i>)
15:55 – 16:20	Laboratory observations of frequency-dependent ultrasonic P and S-wave velocity and attenuation during methane hydrate formation in Berea sandstone (Sourav K Sahoo , <i>National Oceanography Centre, UK</i>)
16:20 – 16:45	Extending the frequency range and resolution of laboratory p-wave velocity measurement (Laurence J. North , <i>National Oceanography Centre, UK</i>)
16:45 – 17:10	Induced polarization of metallic inclusions in porous media (Lang Feng , <i>ExxonMobil, USA</i>)
17:10 – 17:30	Discussion
18:00 – 20:00	Conference Dinner (Royal Park Hotel)

Time	26 April 2019 (Friday)
	Session 7: Digital Rock and Multi-Physics (Chairs: Ludmila Adams and Tongcheng Han)
09:00 – 09:25	Relationship between elastic velocity and electrical conductivity in artificial porous sandstone with control-shaped fractures (Tongcheng Han , <i>China University of Petroleum – East China, China</i>)
09:25 – 09:50	Joint elastic-electrical properties as an indicator of carbonate reservoir lithology and quality (Najeeb Aladwani , <i>National Oceanography Centre, UK</i>)
10:55 – 11:20	Integrated geophysical, hydraulic and mechanical assessment of fractured saline reservoirs analogues during and after CO ₂ injection (Ismael H. Falcon-Suarez , <i>National Oceanography Centre, UK</i>)
10:15 – 10:45	Coffee Break
10:45 – 11:10	What controls rock moduli computed using Digital Rock Physics? (Nishank Saxena , <i>Shell, USA</i>)
11:10 – 11:35	4D synchrotron X-ray imaging of multiscale failure and compaction localization in triaxially compressed porous limestone (Lingcao Huang , <i>The Chinese University of Hong Kong, Hong Kong</i>)
11:35 – 12:00	Pore Space Estimation Using Optimized DRP workflow in Complex Reservoirs (Ravi Sharma , <i>Indian Institute of Technology Roorkee, India</i>)
12:00 – 13:30	Lunch (Chung Chi College Staff Club)
13:30 – 15:00	<p>Poster Session 4</p> <p>40. Microstructural characterization, petrophysics and upscaling – from porous media to fractural media (Jie Liu, <i>Sun Yat-Sen University, China</i>)</p> <p>41. The optimal resolution selection method for constructing digital core based on CT scanning (Bing Li, <i>Technical Center of China Petroleum Logging, China</i>)</p> <p>42. Investigation of elastic weakening and deformation of Bentheim sandstone with water adsorption (Maxim Lebedev, <i>Curtin University, Australia</i>)</p> <p>43. Influence of Saturation Type on Electrical Resistivity of Rocks (Muhammad Bisri Mustofa, <i>Bandung Institute of Technology, Indonesia</i>)</p> <p>44. Controls upon elasticity and anisotropy in New Zealand's coaly source rocks (Stephen Brennan, <i>University of Auckland, New Zealand</i>)</p> <p>45. Estimation of CO₂ plume parameters from 4D seismic (Roman Isaenkov, <i>Curtin University, Australia</i>)</p>

	<p>46. Fracture elasticity influenced by surface roughness distributions (Joseph H.Y. Ma, <i>National University of Singapore, Singapore</i>)</p> <p>47. Reliability of representing fracture permeability with statistical roughness parameters (Rachel Qiu, <i>Massachusetts Institute of Technology, USA</i>)</p> <p>48. CO₂ Reaction with Organic- and Carbonate-Rich Shales (Manju Pharkavi Murugesu, <i>Colorado School of Mines, USA</i>)</p>
15:00 – 15:30	Coffee Break
15:30 – 17:30	<p>Discussion</p> <p>Feedback Session</p> <p>Award Presentation</p> <p>Voting on 6IWRP Location</p>

5th International Workshop on Rock Physics Field Trip



Field Trip to Tung Ping Chau

Welcome to the post-workshop field trip of the 5th International Workshop on Rock Physics. In this half day guided tour, we will visit Tung Ping Chau - a part of the Hong Kong UNESCO Global Geopark and the northernmost outlying island of Hong Kong. We will see the Ping Chau Formation, the youngest pre-Quaternary rock unit in Hong Kong.

The Ping Chau Formation is famous for its thinly bedded silt stones and calcareous siltstones with rare chert layers. Geological attractions include the sponge cake-like sedimentary rocks, the differential weathering on siltstones and chert, structures (particularly joints and faults) and the characteristic coastal geomorphology.

Meanwhile, our guide will introduce the geological history and other geological attractions in Hong Kong during our way heading to Tung Ping Chau. Buffet lunch will be provided on boat during the returning trip. Please take note of the gathering details as shown below.

Gathering Time: 8:15 am, 27th April, 2019

Location: Outside Exit A of MTR University Station

We will walk for around 15 minutes from the gathering location to Ma Liu Shui Public Pier and take the private ferries. One-way boat trip is expected to take 90 to 120 minutes, depending on the open sea condition. We will be dismissed after returning to Ma Liu Shui Pier at 3:00pm.

The contact person and guide of the trip is Dr. Wenzhu Hou. Please contact Dr. Hou directly if you have difficulty finding the gathering location. Her mobile number is **(+852) 56650312**.

Please be noted that proper shoes are important. Hiking boots or trainers are highly recommended. Considering the duration of the boat trip, please also get prepared especially if you may suffer from sea sickness. Please do not hesitate to contact the workshop staff if you have any other questions.