

Geo-soundings

NEWSLETTER - JUNE 2016



Welcome to the second edition of Geo-soundings for 2016.

The second quarter has been a busy period for our department, with academic staff and senior students enthusiastically engaged in presenting and publishing their research work (summarised below), the majority being presented at the EAGE Vienna Conference.

In addition to the new publications and presentations, various other things have happened this quarter. There are some new staff movements, updates on two of our research projects and also information on new geophysical software donations and renewals for our PC Laboratories and researchers.

We look forward to keeping our readers informed of our activities during 2016 and hope that the second half of the year ahead will be rewarding and productive for all.

JOURNAL PUBLICATIONS 2016

Saenger, E., **M. Lebedev**, D. Uribe, M. Osorno, **S. Vialle**, M. Duda, S. Iglauer, and H. Steeb, 2016, Analysis of high resolution X-ray CT images of Bentheim sandstone under elevated confining pressures: Geophysical Prospecting (online), <http://onlinelibrary.wiley.com/doi/10.1111/1365-2478.12400/abstract>.

Shulakova, V., J. Sarout, L. Pimienta, **M. Lebedev**, S. Mayo, M. B. Clennell, and **M. Pervukhina**, 2016, Effect of supercritical CO₂ on carbonates: Savonnières sample case study. Geophysical Prospecting (online), <http://onlinelibrary.wiley.com/doi/10.1111/1365-2478.12369/abstract>.

Al-Yaseri, A. Z., H. Roshan, **M. Lebedev**, A. Barifcani, and S. Iglauer, 2016, Dependence of quartz wettability on fluid density: Geophysical Research Letters, **4(8)**, 3771–3776, <http://dx.doi.org/10.1002/2016GL068278>.

Liu, J., T. Müller, **Q. Qi**, **M. Lebedev**, and W. Sun, 2016, Velocity-saturation relation in partially saturated rocks: Modelling the effect of injection rate changes: Geophysical Prospecting (online), <http://onlinelibrary.wiley.com/doi/10.1111/1365-2478.12376/abstract>.

Rahman, T., **M. Lebedev**, A. Barifcani, and S. Iglauer, 2016, Residual trapping of supercritical CO₂ in oil-wet sandstone. Journal of Colloid and Interface Science, **469**, 63–68, <http://www.sciencedirect.com/science/article/pii/S002197971630100X>.

Arif, M., A. Barifcani, **M. Lebedev**, and S. Iglauer, 2016, Structural trapping capacity of oil-wet caprock as a function of pressure, temperature and salinity: *International Journal of Greenhouse Gas Control*, **50**, 112–120, <http://www.sciencedirect.com/science/article/pii/S1750583616302055>.

Iglauer, S., T. Rahman, M. Sarmadivaleh, A. Al-Hinai, M. Ferno, and **M. Lebedev**, 2016, Influence of Wettability on Residual Gas Trapping and Enhanced Oil Recovery in Three-Phase Flow: A Pore-Scale Analysis by Use of Microcomputed Tomography: *Society of Petroleum Engineers Journal* (online), <http://dx.doi.org/10.2118/179727-PA>.

Arif, M., A. Barifcani, **M. Lebedev**, and S. Iglauer, 2016, CO₂-wettability of low to high rank coal seams: Implications for carbon sequestration and enhanced methane recovery: *Fuel*, **181**, 680–689, <http://www.sciencedirect.com/science/article/pii/S0016236116303684>.

Mikhailsevitch, V., **M. Lebedev**, and **B. Gurevich**, 2016, Validation of the laboratory measurements at seismic frequencies using the Kramers-Kronig relationship: *Geophysical Research Letters*, **42(10)**, 4986–4991, <http://onlinelibrary.wiley.com/doi/10.1002/2016GL069269/full>.

Zhang, Y., **M. Lebedev**, M. Sarmadivaleh, A. Barifcani, T. Rahman, and S. Iglauer, 2016, Swelling effect on coal micro structure and associated permeability reduction: *Fuel*, **182**, 568–576, <http://www.sciencedirect.com/science/article/pii/S0016236116304690>.

Glubokovskikh, S., **B. Gurevich**, and N. Saxena, 2016, A dual-porosity scheme for fluid/solid substitution: *Geophysical Prospecting* (online), <http://onlinelibrary.wiley.com/doi/10.1111/1365-2478.12389/full>.

Alasbali, A., **R. Pevzner**, **K. Tertysnikov**, **A. Bona**, and **B. Gurevich**, 2016, Estimation of seismic attenuation and prediction of VTI anisotropy parameters from VSP and log data: a case study from the Middle East: *Arabian Journal of Geoscience*, **9(7)**, 1–11, <http://link.springer.com/article/10.1007/s12517-016-2509-4>.

Saxena, N., G. Mavko, R. Hofmann, **B. Gurevich**, **S. Glubokovskikh**, S. Aliyeva, and P. Dutta, 2016, Rock-physics models for heavy-oil and organic-solid substitution: *The Leading Edge*, **35(6)**, 506–510, <http://library.seg.org/doi/abs/10.1190/tle35060506.1>.

Collet, O., and **B. Gurevich**, 2016, Frequency dependence of anisotropy in fluid saturated rocks - Part II: Stress-induced anisotropy case: *Geophysical Prospecting* (online), <http://onlinelibrary.wiley.com/doi/10.1111/1365-2478.12385/full>.

Glubokovskikh, S., **R. Pevzner**, T. Dance, **E. Caspari**, **D. Popik**, **V. Shulakova**, and **B. Gurevich**, 2016, Seismic monitoring of CO₂ geosequestration: CO₂CRC Otway case study using full 4D FDTD approach: *International Journal of Greenhouse Gas Control*, **49**, 210–216, <http://www.sciencedirect.com/science/article/pii/S1750583616300809>.

CONFERENCE PRESENTATIONS

EGU 2016, 17-22 April, Vienna, Austria

Vialle, S., and M. Lebedev, 2016, Quantitative microstructure characterization and elastic properties upscaling of carbonate rocks: Presented at the EGU 2016 conference, 17–22 April, Vienna, Austria.

Gurevich, B., M. Lebedev, S. Glubokovskikh, A. Dyskin, E. Pasternak, and **S. Vialle**, 2016, Physical modelling of the effect of fractures on compressional and shear wave velocities: Presented at the EGU 2016 conference, 17–22 April, Vienna, Austria.

78th EAGE Conference and Exhibition 2016

Oral Presentations

Gurevich, B., and P. N. J. Rasolofosaon, 2016, Rock Physics I: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Liu, J. W., T. M. Muller, **Q. Qi, M. Lebedev**, and W. T. Sun, 2016, Velocity-saturation Relation in Partially Saturated Rocks - Modelling the Effect of Injection Rate Changes: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Glubokovskikh, S., B.Gurevich, and N. Saxena, 2016, A Dual Porosity Solid Substitution Recipe for Heavy Oil Rocks: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Freifeld, B. M., **R. Pevzner**, S. Dou, **J. Correa**, T.M. Daley, M. Robertson, **K. Tertyshnikov**, T. Wood, J. Ajo-Franklin, **M. Urosevic**, and **B. Gurevich**, 2016, The CO2CRC Otway Project deployment of a Distributed Acoustic Sensing Network Coupled with Permanent Rotary Sources: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Seive, B. N., 2016, Research on the Applicability of MASW to Detect a Near Vertical Fault in a Near Surface Synthetic Model of the Otway Pro: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Pevzner, R., B. Gurevich, K. Tertyshnikov, A. Bóna, and S. Vlasov, 2016, Scattering Attenuation from the Coal Seams (Copper Basin, Australia): Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Bazaikin, Y., **B.Gurevich**, T. Khachkova, D.R. Kolyukhin, **M. Lebedev**, V.V. Lisitsa, and V.A. Tcheverda, 2016, Recovery of Transport and Geometrical Properties of Rock by Statistical Analysis of Microtomographic Images: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Glubokovskikh, S., R. Pevzner, D. Popik, T. Dance, **E. Caspari, V. Shulakova**, and **B.Gurevich**, 2016, Seismic Monitoring of CO2 Geosequestration- CO2CRC Otway Case Study Using Full 4D Elastic Modelling: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Khosnavaz, M.J., A. Bóna, and M. Urosevic, 2016, Comparison of Different Traveltime Approximations for VTI Media in Context of Poststack Diffraction Imaging: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Beloborodov, R., M. Pervukhina, and M. Lebedev, 2016, Measurements and Modelling of the Elastic Properties of Artificial Shales: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Yavuz, S., B.M. Freifeld, R. Pevzner, K. Tertysnikov, A. Dzunic, S. Ziramov, V. Shulakova, M. Robertson, T.M. Daley, A. Kepic, M. Urosevic, and B. Gurevich, 2016, Subsurface Imaging Using Buried DAS and Geophone Arrays- Preliminary Results from CO2CRC Otway Project: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Guo, J., J.G. Rubino, B. Gurevich, S. Glubokovskikh, A. Dyskin, and E. Pasternak, 2016, Effects of Fracture Intersections on Seismic Dispersion- Theoretical Predictions Versus Numerical Simulations: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Poster Presentations

Urosevic, M., S. Komatina, M. Burazer, K. Suto, S. Arsenovic, D. Milosevic, S. Ziramov, and F. Coren, 2016, Geophysical Characterization of Landslides in Serbia and Bosnia and Hercegovina—A GWB Project: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Han, T., **B. Gurevich, M. Pervukhina**, and M.B.Clennell, 2016, A Link between the Pressure Dependency of Elastic and Electrical Properties of Porous Rocks: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Mikhailsevitch, V., M. Lebedev, and B. Gurevich, 2016, An Experimental Evidence of the Squirt-flow Effect in Glycerol-saturated Berea Sandstone at Seismic Frequencies: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

Bóna, A., 2016, Kinematic Redatuming Using Common Emergence Rays: Presented at the 78th EAGE Conference and Exhibition, 30 May–2 June 2016, Vienna, Austria.

HONOURS / GRANTS / AWARDS

We congratulate **Dr Qiaomu QI** on being awarded his PhD which was officially approved on the 1st April 2016. Qiaomu is currently an employee of CSIRO, Kensington, but hopes to secure a "Post-doctoral" position in SE Asia shortly. On behalf of all members of the Department we offer our Congratulations to Qiaomu and his supervisor – Boris Gurevich and all panel members on this achievement.

Mr Zubair Ahmed and **Mr. Roman Beloborodov**, both 2nd year PhD students, have been granted an ASEG Research Foundation grant towards their PhD research project. Well done.

RESEARCH ACTIVITIES

Curtin's hydrogeophysics team complete the high-resolution Two Rocks seismic survey

The department has completed a high-resolution 2D seismic survey just South of Two Rocks. The survey was completed as part of the Perth Regional Confined Aquifers Capacity (PRCAC) study within the context of a collaborative agreement between Curtin University and the Department of Water, Western Australia. The hydrogeophysics project aims to develop and deploy geophysical technologies to assist with the definition of Perth's multi-level confined aquifer systems. One particular objective of the project is recovery hydrostratigraphy within and across large displacement fault systems.

Deep Exploration Technologies Cooperative Research Centres Project 3.1

In April 2016 the Department conducted a comprehensive seismic experiment in The Gawler Ranges National Park, South Australia. The survey was a part of the DET CRC 3.1 Program in conjunction with the Mineral System Drilling Program (MSDP) run by the Geological Survey of South Australia.

The main purpose of the seismic acquisition was to adapt new emerging seismic technologies and instruments for mineral exploration and to complement MSDP activities with seismic information. The experiment consisted of several components. Two parallel 2D lines approximately 20 m apart and 4 km long were instrumented every ten metres with three component (3C) geophones. Wireless, easy-to-deploy three-channel seismic UNITE units were used to record seismic signals. The setup was implemented to test a new methodology of seismic data analysis that allows us to consider 3D effects of geology on seismic wavefields using an extra 2D line of geophones in the standard 2D seismic acquisition approach.

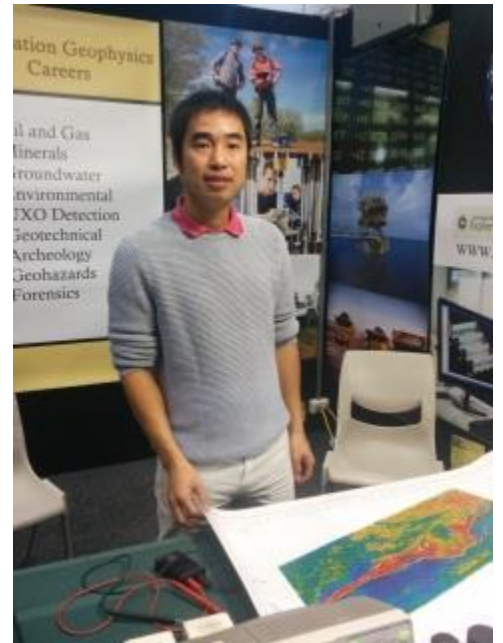
Collecting data with 3C geophones provides an opportunity to improve seismic imaging using information about the propagation of shear waves. During the survey seismic, data were also recorded simultaneously with a drag-along seismic system. In addition to surface seismic, two downhole measurements were performed in the MSDP 10 borehole located in the survey area. The vertical seismic profiling (VSP) data were recorded in the borehole using a hydrophone string.

At the same time, data were collected using distributed acoustic sensors (DAS) technology, which uses fibre optic cables as seismic sensors interrogating laser light through the cable during the acquisition. A Silixa iDAS interrogator was used to perform measurements with the fibre optics. All data was collected using a weight drop as a seismic source. The experiment was efficiently conducted within a week by the Department's crew (A. Bóna, D. Howman, K. Tertyshnikov, P. Ahmadi) with help from Peter Jaensch (Boart Longyear) and Adrian Fabris (Geological Survey of South Australia).

CAREERS AND EDUCATION EXPO

Dominic Howman has once again played a leading role in the Department's presence at the **Careers and Education Expo**, held 12th–15th May at the Perth Convention and Exhibition Centre.

More than 10,000 people attended the four day event. We are very grateful to Dominic and the following staff and students who volunteered to contribute their time to support this activity: **Andrew Squelch, Stephanie Vialle, Konstantin Tertysnikov, Andrew Pethick, Alex Costall, Ida Hooshyari-Far, Duy Thong Kieu, Timothy Hill, Dane Padley and Paul Anile.**



STAFF NEWS

Welcome!

Dr Nghia Nguyen

Dr Nghia Nguyen's Curtin Research Contract appointment as a Research Fellow commenced on the 13th June 2016. Dr Nguyen has a mix of skills in engineering and sensor research that will compliment this Departments DETCRC and Boart Longyear Chair grant requirements. In particular, he has considerable experience working with multi-disciplinary scientific teams performing engineering research in embedded instrumentation, especially with sensors and sensor networks which is important in the development of geophysical instrumentation.



Dr Nguyen will be working closely with Professor Anton Kepic and Dr Michael Carson.

Dr Nguyen's educational background is as follows:

- 1994-1997 - Associate Diploma in Electronics Engineering from the Advanced Manufacturing Technology Centre, WA.
- 1997-2000 - Bachelor of Engineering in Computer Systems / Honours – First Class from Edith Cowan University, WA.
- 2010 - Awarded his PhD in Communication Engineering from Edith Cowan University, WA. His dissertation title was – Optical networks design and optimization with multiple QoS service classes.

Since 2000, Dr Nguyen has held appointments as an Electronics Engineer with Omnitronics Ltd; a Post-Doctoral Research Fellow at ECU - Electron Science Research Institute (ESRI); Adjunct Senior Lecturer/Technical and Research Projects Consultant at ECU – School of Engineering. Since 2006 he has worked on 17 research projects either as the Chief Investigator or to provide project technical support. Dr Nguyen has been a co-author of 23 published works, 5 as the lead author.

Ms Nichole Sik

The Department also welcomes our new Research Secretary, **Ms Nichole Sik**. Her email contact is: nichole.sik@curtin.edu.au and Phone extension is: 3408.

Goodbye!

Ms Zuzanna Kuklinski

Ms Zuzanna Kuklinski will be completing her contract appointment with the Department of Exploration Geophysics at the COB on Thursday, the 30th June 2016. We wish her all the best in her travels and all future endeavours.

MEDIA RELEASES

New Chair appointed at Curtin University

Professor Anton Kepic has been appointed the [Boart Longyear Professorial Chair](#) at Curtin University in WA: "[New professorial chair appointed at Curtin University](#)", (14 June 2016), Australian Mining.

DownUnder GeoSolutions Donates Seismic Interpretation Software to Curtin University.

Local geosciences company, [DownUnder GeoSolutions](#) (DUG) has kindly donated 47 [DUG Insight](#) software licences and supporting modules for teaching use in the Curtin University Department of Exploration Geophysics computing laboratories.

DUG provides cutting edge exploration and production services to the global oil and gas industry from its Perth headquarters and five international offices. DUG's founders are PhD graduates of Curtin and Company Director **Dr Matthew Lamont** is currently an adjunct Associate Professor at the university.

The commercial value of this generous donation is over A\$856,000. DUG also provides the Department with individual licences for research staff and students on request.

"DUG Insight is a full-featured 2D/3D/ pre-stack visualisation and interpretation package. It includes all the necessary tools for a complete interpretation workflow, from reconnaissance to crossplotting. Advanced modules provide Insight with additional features such as velocity and RMO picking, image gather processing, rock physics modelling and prediction, AVO attributes and pore pressure prediction, making DUG Insight a one-stop shop for all G&G workflows.."

UPCOMING EVENTS

[25th International Geophysical Conference & Exhibition](#), 21st–24th August, Adelaide, Australia.

[AAPG/SEG International Conference & Exhibition 2016](#), 6th–9th September, Cancun, Mexico.

[Near Surface Geoscience 2016](#), 4th–8th September, Barcelona, Spain.

[SEG 2016](#), 25th–28th September, Cesame, Turkey.

[SEG Annual Meeting](#), 16th–21st September, Dallas, USA.

[CRGC Annual Meeting](#), 1st–2nd December, Rottnest Island, Western Australia.

Educational Software Grants and Programs

A big thank you to all our software vendors who provide us with the continuing support and software resources we need for our teaching and research programs.

Grant and Educational Licence Renewals

GlobeClaritas Grant Renewal

[GlobeClaritas](#), the developers of the [Claritas software](#), has kindly renewed their grant to the Department of Exploration Geophysics, Curtin University.

The Globe Claritas seismic processing software is the result of 30 years of development and is used globally in land and marine data acquisition and processing by oil and gas explorers, and is research and academic institutions.

The commercial value of this grant is over US\$960,000.

Pitney Bowes Software

[Pitney Bowes Software](#) (PBS), a major solution provider of Location Intelligence software, has kindly renewed the Curtin University Department of Exploration Geophysics [Mapinfo Professional and Discover](#) licence grants for a further 12 months. The grant bundle also includes the

pbEncom [QuickMag](#) and [EMflow](#) packages, all of which are used for teaching and research in the Department.

PBS currently provides the Department with 60 Mapinfo Professional/Discover licences and 32 QuickMag and EMFlow licences.

Tensor Research Software Grant Renewal

[Tensor Research](#), the developers of [Modelvision](#), has kindly renewed the Department of Exploration Geophysics (Curtin University) Modelvision software licence grant for a further 12 months. Tensor provides specialist services in potential fields research, which covers forward and reverse modelling and currently provides the Department with a total of 64 Modelvision seats at a commercial value of over A\$1.1M.

Software generously provided by:

[ALT - WellCAD](#)

[CGGVeritas - Hampson Russell Software](#)

[CGGVeritas - Geovation Software](#)

[DHI Group - FEFLOW](#)

[Down Under Geosolutions - Insight](#)

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[IHS - Kingdom Software](#)

[Ikonscience - RokDoc](#)

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[Paradigm Software](#)

[Petrosys Software](#)

[Pitney Bowes - Encom, MapInfo and Discover](#)

[RadexPro Software](#)

[Sandmeier - ReflexW](#)

[Schlumberger - Petrel, Omni, Vista](#)

[Tensor Research - Modelvision](#)

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