



Geo-soundings

NEWSLETTER – SEPTEMBER 2007

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WELCOME

Welcome to the 3rd edition of Geosoundings for 2007. The past 3 months have been very productive, with 7 journal publications, 2 MERIWA projects reports and 19 conference presentations.

There have been several additions to the Department's staff/research personnel since our last newsletter. Some brief information is provided on each in this edition.

The third year field trip was an educating experience for both staff and students and we are always happy to report that the week long event was enjoyed by all and hopefully the students gained a great deal of practical experience.

JOURNAL & RESEARCH PUBLICATIONS

Gurevich, B., (2007), *Comparison of the low-frequency predictions of Biot's and de Boer's poroelasticity theories with Gassmann's equation*: Applied Physics Letters, Vol 91, online.

Gurevich, B., Brajanovski, M., Muller, T.M., Lambert, G., & R.J. Galvin, (2007), *Fluid substitution, dispersion, and attenuation in fractured and porous reservoirs - insights from new rock physics models*: The Leading Edge, 26, p.1162-1168.

Galvin, R.J., & B. Gurevich, (2007), *Scattering of a longitudinal wave by a circular crack in a fluid-saturated porous medium*: International Journal of Solids and Structures, Online.

Muller, T.M., Lambert, G., & **B. Gurevich**, (2007), *Dynamic permeability of porous rocks and its seismic signatures*: Geophysics, Vol. 72(5), p. E149-E158.

Sato, H., **Lebedev, M.** & J. Akedo, (2007), *Theoretical investigation of guide wave flowmeter*: Japanese Journal of Applied Physics, Vol 46, p. 4521-4528.

Hartshorn, R., Stockwell, S., **Lebedev, M.**, & S. Krumdieck, (2007), *Precursor system for bio-Integration ceramics and deposition onto tantala scaffold bone interface surface*: Surface and Coating Technology, Vol 201, p. 9413-9416.

Krumdieck, S., Kristinsdottir, A., Ramirez, L., **Lebedev, M.**, & N. Long, (2007), *Growth rate, microstructure and conformality as a function of vapour exposure for zirconia thin films by pulsed-pressure MOCVD*: Surface and Coating Technology, Vol. 201, p. 8908-8913.

Gurevich, B. Urosevic, M. & B. Evans, (2007), *The effect of seismic anisotropy on amplitude-based reservoir characterisation*: MERIWA Project No M351.

Urosevic, M. & B.J. Evans, (2007), *Feasibility of seismic methods for imaging gold deposits in Western Australia*: MERIWA Project No. M363.

CONFERENCE PRESENTATIONS

EAGE/SEG Research Workshop on Integrating Geosciences for Fractured Reservoirs, Perugia, Italy 3-6 September 2007

Gurevich, B., Brajanovski, M., Galvin, R.J., & G. Lambert, *Two Models for Seismic Attenuation and Dispersion in Fractured Porous Reservoirs*.

Brajanovski, M., Muller, T.M. & J.O. Parra, *A Rock Physics Model for Fractured and Patchy-saturated Reservoirs*.

Alhussain, M.A., Liu, E., Gurevich, B., & M. Urosevic, *Reflection Response of a Fractured Medium: Physical Modelling versus Numerical Simulations*.

77th SEG Annual Meeting, San Antonio, Texas, USA 23-28 September 2007

Posters:

Harrison, C.B., Urosevic, M., & E. Stoltz, *Processing, inversion and multi attribute analysis of the Intrepid seismic line at the St. Ives gold camp, Western Australia*.

Grochau, M. & B. Gurevich, *Investigation of core data reliability to support time-lapse interpretation in Campos, Basin, Brazil*.

Oral Presentations:

Gurevich, B., Osypov S.K., & R. Ciz, *Viscoelastic modeling of rocks saturated with heavy oil*.

Muller, T.M., & **J. Toms**, *Velocity-saturation relation for partially saturated rocks with fractal pore-fluid*.

Galvin, R., **Toms, J., & B. Gurevich**, *A simple approximation for seismic attenuation and dispersion in a fluid-saturated porous rock with aligned fractures*.

Ciz, R., Sharpiro, S.A., Saenger, E.H., & **B. Gurevich**, *Microscale modelling of temperature-dependent reflection from poroelastic interface - Application to heavy-oil reservoirs*.

Brajanovski, M., T.M. Muller, & J.O. Parra, *Strong dispersion and attenuation of P-waves in a partially saturated fractured reservoir*.

Alhussain M., Gurevich, B., & M. Urosevic, *Experimental verification of spherical wave effect on the AVO response and implications for three-term inversion*.

Alhussain, M., Liu, E., Gurevich, B., Urosevic, M. & S. Ur Rehman, *AVOaz response of a fractured medium: Laboratory measurements versus numerical simulations*.

Karpfinger, F., Gurevich, B. & A. Bakulin, *Computing borehole modes with spectral method*.

**5th Decennial International Conference on Mineral
Exploration 07, Toronto, Canada, 9-12 September 2007**

Presentations:

Williams, P.K., **Kepic, A.**, Gibson, L., & S. Sheppard, *Innovative EM exploration in surface exploration and underground mine settings.*

Urosevic, M., Kepic, A., Stolz E., & C. Juhlin, *3D Seismic exploration for gold, Yilgarn Craton, Australia.*

Invited speaker:

Urosevic, M., *Seismic exploration of mineral deposits in Yilgarn Craton, Western Australia.*

Posters:

Harrison, C., *Processing and Seismic Inversion of the Intrepid Seismic Line at the St. Ives Gold Camp, Western Australia.*

**7th International Workshop on the Application of
Geophysics to Rock Engineering
8 July 2007, Lisbon, Portugal**

Hatherly, P.J., Zhou, B., **Urosevic, M.**, & T. Peters, *Extracting geotechnical information from seismic reflection surveys - examples from Australian coal mines.*

Zhou, B., Hatherly, P.J., **Urosevic, M.**, & T. Peters, *Issues for the inversion of seismic reflection data for geotechnical properties.*

AWARDS/PRIZES/SCHOLARSHIPS/GRANTS

Dr Maxim Lebedev (the leading researcher) and **Prof Boris Gurevich** have been successful in securing funding from the **Curtin University of Technology - Internal Research Grants Scheme**. The approved grant is for \$11,588, which will be used to fund the research program "*Feasibility of using carbon and metal foams for controlled experimental studies of elastic properties of porous materials*". This project is one of 24 successful applications to receive funding in 2008 from across the University.

2006 ROYAL SOCIETY OF WA STUDENT MEDAL

The **2006 RSWA Student Medal** has been awarded to **Mr Owen Davis** for his academic achievements as the best performing student undertaking studies in the natural sciences, which includes earth sciences. Each year the RSWA present medals to the most outstanding science student from each of WA's universities. Owen was presented with his impressive medal at the RSWA Annual General Meeting on the 16th July 2007. Since graduating with First Class Honours at the end of 2006, Owen now works as a geophysicist with Woodside Energy Ltd in Perth.

STUDENT ACTIVITIES

THIRD YEAR FIELD TRIP

The 2007 3rd year geophysics field trip was to the Cue area, about 650 km north of Perth and provided the ten students with experience in Nickel exploration. The trip took place from August 27 to September 2 and was led by Paul Wilkes, Anton Kepic, Jayson Meyers and Dominic Howman. Access to the field area and existing datasets was provided by Alloy Resources. Fieldwork included time domain EM, magnetics and gravity. GPS was used to set out the field lines and to provide heights for the gravity survey. The field trip was a valuable learning exercise and all enjoyed a dry warmer spell away from wintry wet Perth.

NEW STAFF

Mr Andrew Greenwood - Commenced 2/7/07

Andrew has been appointed as a Research Fellow on a Fixed Term Contract for 6 months, ending 31/12/07. During this time he will be working for the CHDG, assisting the key research leaders with the research program on Seismic Reflection and will liaise with our industry partners. Some of the tasks he will be involved with, apart from several field trips, will include pre-processing of data and acquiring field data. Andrew is originally from New Zealand, where he acquired several years work experience as a geophysicist. Since mid-2005 to mid-2007 Andrew worked for Geoforce Pty Ltd as a Senior Field Geophysicist. He has a MSc Degree from the University of Auckland - thesis title was "**Subsurface investigation of the Kaawa Formation Aquifers, Manukau Lowlands**".

Dr Maxim Lebedev - Commenced 2/7/07

Maxim has been appointed as a Research Fellow on a Fixed Term Contract for 12 months, ending 1/7/08. Maxim will be working closely with Boris Gurevich and his primary role will be to develop and conduct laboratory measurements of the ultrasonic response to patchy saturation under x-ray tomographic control. This is one of the key elements of an ARC Discovery Grant acquired by Boris Gurevich and research partners. Maxim has two decades in materials science, and is an expert in materials microstructure and macrostructure characterisation and analysing. Other areas of research are in x-ray techniques, electron microscopy, spectroscopy, electrical properties of materials, non destructive ultrasonic testing, and mechanical properties of materials. Maxim has a PhD in Physics from the Moscow Institute (University) of Physics and has acquired extensive experience working in New Zealand, Japan, and Moscow since 1986 to the present. Maxim has 13 refereed conference papers, 1 book chapter, 36 refereed and invited publications, several honours and awards, and acquired 10 grants.

Dr Roman Pevzner - Commenced 16/7/07

Roman was appointed as a Visiting Senior Research Fellow for approximately 2 months, ending 5/9/07. Roman assisted with the development of 3D VSP migration code related to the Otway Basin CO₂CRC program. He was also analysed borehole data for a fractured sand project and worked closely with Milovan Urosevic during his visiting appointment. Roman has a PhD in Physics and Mathematics from Moscow State University - thesis title was "**VSP data modeling using finite difference approach**". Roman's current employment is with the Moscow State University, Geological Faculty, Seismometry and Geoacoustics Department as Assistant Chair.

Dr Miroslav Brajanovski - Commenced 6/8/07

Miroslav has been appointed as a Research Fellow on a Fixed Term Contract for 12 months, ending 5/8/08. Many of you will remember Miroslav, who graduated with his PhD from our Department in 2004. His thesis title was "**Effects of fractures on seismic waves in proelastic formations**". Since that time Miroslav has spent time travelling the World and working as a Postdoctoral Fellow at CSIRO (Melbourne) and the Geophysical Institute, Karlsruhe (Germany). During his contract with the Department, Miroslav will be assisting Dr Milovan Urosevic on a fractured sands research project and will also provide assistance to Prof Boris Gurevich, working on various CRGC research projects. Miroslav has the following publications record; 5 journal publications, 22 conference presentations and 5 seminar presentations.

Dr Andrej Bóna - Commenced 3/9/07

After a very length recruitment campaign, we are happy to announce the appointment and arrival of Dr Andrej Bóna, who has been appointed as a Senior Lecturer in the Department of Exploration Geophysics initially for 3 years. This appointment is required to develop significant research capabilities in seismic data analysis and imaging, with funding to support this appointment being provided by WAERA (Western Australian Energy Research Alliance), of which Curtin is an active partner. Andrej obtained his PhD in 2002 from the Department of Mathematics and Statistics at the University of Calgary, Canada. His thesis title was "**Applied Mathematics: Dirac's Equation in Geometric Quantization**". Since graduating, Andrej has worked as a Postdoctoral Fellow at both the University of Calgary and Memorial University. Andrej has the following publications; 11 refereed journals, 2 submitted refereed journals, 2 non-refereed journals, 6 conference presentations, 8 invited lectures and 2 book drafts in progress. In addition he has successfully obtained 5 research grants and taught a wide range of subject matter as well as supervised MSc and PhD students.

UPCOMING EVENTS

CRGC ANNUAL GENERAL MEETING,
Rottneest Island, 15-16 November

**19TH INTERNATIONAL GEOPHYSICAL CONFERENCE
& EXHIBITION**
18-22 November 2007