



# Geo-soundings

NEWSLETTER – JUNE 2007

Editors: Rusta and Deirdre  
Curtin University of Technology  
GPO Box U1987, Perth WA 6845

Dr Anton Kepic, Head  
Department of Exploration Geophysics

Enquiries: Tel (08) 9266 3408/3565  
Fax (08) 9266 3407

Email [enq@geophy.curtin.edu.au](mailto:enq@geophy.curtin.edu.au)  
[www.geophysics.curtin.edu.au](http://www.geophysics.curtin.edu.au)

## WELCOME

Welcome to the 2nd edition of Geosoundings for 2007. During this past quarter, staff and senior students have been very productive, resulting in two journal publications and 16 conference papers/posters, the majority being presented at the EAGE London Conference and a further two presented in Beijing.

Several staff have also been involved with fieldwork activities and the Department acknowledges the support provided by the relevant research partners.

We hope you enjoy this edition of Geosoundings and as always we welcome your feedback.

## JOURNAL PUBLICATION

Dodds, Kevin J., Dewhurst, David N., Siggins, Anthony F., Ciz, Radim, Urosevic, Milovan, Gurevich, Boris & Donald H. Sherlock, (2007), *Experimental and theoretical rock physics research with application to reservoirs, seals and fluid processes*, Journal of Petroleum Science and Engineering, Vol 57, p16-36.

Abbott, Simon, Chadwick, David, & Greg Street, (2007), *Geoscientific land management planning in salt-affected areas*, Exploration Geophysics, Vol 38, p98-109.

## CONFERENCE PRESENTATIONS

69<sup>TH</sup> Annual EAGE Conference & Exhibition, London, June 2007

Fourteen oral and poster presentations were presented at the EAGE Conference & Exhibition during June. The oral presentations were:

Mueller, T.M., Toms, J., & G. Quiroga Goode, *Velocity-Saturation relation for rocks with fractal distribution of the pore fluids*.

Toms, J., Mueller, T.M., & B. Gurevich, *Modelling P-wave velocities from x-ray tomographic images of partially saturated porous rock*.

Makarynska, D., Gurevich, B., & R. Ciz, *Finite element modelling of Gassmann fluid substitution of heterogeneous rocks*.

Urosevic, M., & C. Juhlin, *An analysis of seismic information obtained from crooked line seismic surveys in crystalline rocks, Australia*.

Dupuis, J.C., Butler, K.E., **Kepic, A.W.**, & B.D. Harris, *The seismoelectric response of a sandy aquifer-borehole experiments*.

Dupuis, J.C., Butler, K.E., & **A.W. Kepic**, *The seismoelectric response of a sandy aquifer – surface profiling experiment*.

**Toms, J., Gurevich, B.**, Mueller, T.M., & D.L. Johnson, *Acoustics of random patchy saturation*.

And the poster presentations were:

Ciz, R., Saenger, E.H. & **B. Gurevich**, *Micro-scale modelling of poroelastic reflection – theory vs numerical simulation*.

**Gurevich, B.**, & R. Ciz, *A new rock physics model for sand-clay structures with effective porosity*.

**Toms, J.**, *Attenuation and dispersion due to random patchy saturation of porous rock*.

**Karpfinger, F., Gurevich, B.**, & A. Bakulin, *Modeling of borehole modes using the spectral method*.

Keshavarz, N.F.K., & **B.J. Evans**, *Dissolved CO2 Quantification using transmission seismic method*.

Brajanovski, M., Mueller, T.M., & **B. Gurevich**, *Characterization of fractured reservoirs using seismic wave attenuation*.

**Nadri, D.**, & **B. Hartley**, *Non-linear AVO inversion in a VTI medium*.

Summer Workshop,  
Challenge in Seismic Rock Physics,  
Beijing, China, June 2007

The following 2 papers were presented:

**Grochau, M.**, & **B. Gurevich**, *Effect of core damage on elastic properties for time-lapse interpretation, offshore Brazil*.

**Alhassain, M., Gurevich, B., Urosevich, M.**, & E. Liu, poster, *Spherical wave effects in isotropic and anisotropic AVO: experiment versus theory*.

## PUBLIC PRESENTATIONS

**Boris Gurevich**, *Carbonates: some aspects of seismic rock physics*: presented to PETROBRAS personnel in Rio de Janeiro, May 2007.

## VISITORS and RESEARCH ACTIVITIES

### PETROBRAS and UENF Visitors:

Representatives from the Brazilian national oil company ("PETROBRAS - Petroleo Brasileiro SA") and UENF (North Fluminense State University, Brazil's top oil & gas university), spent almost a week at the Physical Modelling Laboratory, which is directed by Brian Evans and the CSIRO CIPS Modelling Process, directed by Don Sherlock. Their aim is to learn about the complexities of pressured reservoir models with a goal to installing a similar system at a Brazilian university. This would allow the Petrobras Petroleum Engineering Department to study fluid dynamics under high pore and confining pressures. For further information, contact Brian Evans, at: [b.evans@curtin.edu.au](mailto:b.evans@curtin.edu.au)

### Saudi Aramco Visitors:

Dr Misfir AzZahrani, Head of the Saudi Aramco Reservoir Characterisation Department, and who is responsible for the continued operations of 103 drilling rigs in Saudi Arabia visited the Department during May. During the visit, Misfir met Brian Evans and the 23 Saudi students studying geology and geophysics degrees in WA and toured the Curtin departments of Exploration Geophysics, Applied Geology, Petroleum Engineering and Spatial Sciences.

### Turi Project in New Zealand

During April, research staff recorded a 400m x 400m 3-D research seismic survey using our 420 channel Seistronix system for the Turi project near New Plymouth, New Zealand. The aim of the survey was to tie existing outcropping turbidite formations with 3-D seismic data, so that a better knowledge is developed of the seismic and structural style of sealing faults in such potential hydrocarbon bearing formations. Data was excellent and we await the processed result. For further information, contact [Anthony.gartrell@csiro.au](mailto:Anthony.gartrell@csiro.au)

### Physical Modelling Laboratory

A model of the Ghawar field – the largest oil field in the world – has recently been constructed and has been shipped to Saudi Aramco. The model is the largest physical model ever built and represents all geological conditions found in that field. Saudi Aramco will use it to test out novel 3-D seismic parameters without the cost of hiring a field crew. If you want to find out more about this model, contact Brian Evans, at: [b.evans@curtin.edu.au](mailto:b.evans@curtin.edu.au)

## AWARDS/PRIZES/SCHOLARSHIPS/GRANTS

### ARC Linkage Grant

Congratulations to **Prof Boris Gurevich** and research partners Prof M Knackstedt (ANU) and Prof S A Shapiro on successfully being granted a 2 year ARC Linkage Grant, commencing mid-2007 through to mid-2009. The project title is '*Computational Rock Physics*'. The project aims to develop relationships by teaming up two Australian-based experts in 3D seismic image analysis and theoretical rock physics, with a global company at the forefront of the industry. Developing these relationships will be a cutting edge research achievement, will directly impact on exploration, interpretation and production decisions within the oil and gas industry in Australia and globally, and greatly advance Australia's reputation as a leader in petroleum research services and training.

### Petroleum Exploration Society of Australia (PESA)

Congratulations to **Michele D'Alessio** for being appointed the PESA WA Branch Student President for 2007.

## ARRC SHOWCASE TEACHERS' NIGHT

Curtin Exploration Geophysics participated in the very successful first ARRC Showcase for local school science teachers on May 28. We, along with our partners in ARRC – CSIRO, National Measurements Institute and BHP Billiton, organized displays and tours of our facilities and talked informally with the visiting teachers. Paul Wilkes, Dominic Howman and two of our honours students, Matt Little and Chris Semeniuk, represented our department. About 50 teachers came from about 30 schools and enjoyed the interaction with ARRC scientists. The newly appointed WA Chief Scientist Dr Lyn Beazley gave a talk on the relevance and fascination of science and this was followed by a talk on gold nuggets by Dr Rob Hough of CSIRO Exploration and Mining and a demonstration of 3D visualisation.



*Dominic Howman and a few of the delegates at the ARRC Showcase Teachers' night*

## STAFF APPOINTMENTS

We welcomed two new staff members to our Department during the last quarter:

**Mr. Aleksandar Dzunic** arrived recently from Serbia to commence his appointment as a Research Fellow within the Centre of Excellence in High Definition Geophysics (CHDG). Aleks will primarily be working with Milovan Urosevic on research associated with solid theoretical and applied seismic acquisition, signal analysis and imaging.

**Mrs Rusta du Plooy** commenced work in April as our new Research Secretary/Receptionist. Rusta worked for educational institutions in South Africa for several years prior to moving to Australia. Amongst her varied duties, Rusta will be the co-author of Geosoundings.

## UPCOMING EVENTS

*The Department of Exploration Geophysics will be represented at the following events:*

**CAREERS CHOICE EXPO**  
Burswood Dome, August 5-7

**WCU/UI WORLD CONGRESS ON ULTRASONICS**  
Beijing, China, August

**CONFERENCE ON THEORETICAL & COMPUTATIONAL ACOUSTICS**  
Hangzhou, China, September 19-23

**CRGC ANNUAL GENERAL MEETING**  
Venue and Date in Perth to be confirmed, but anticipated to be held in November