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# Geo-soundings

## NEWSLETTER - SEPTEMBER 2014



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### Welcome to the third edition of Geo-soundings for 2014.

Welcome to the 3<sup>rd</sup> edition of Geo-soundings for 2014. We hope you enjoy this issue and look forward to always keeping our readers informed of our activities during 2014. We hope that the remainder of the year is rewarding and productive for all.

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### Student Committee Members

#### KEGS Office Bearers for 2014:

President:	Jason Robbshaw
Vice President:	Matt Kovacevic
Treasurer:	Bryce Teo
Secretary:	Rebecca Abel
4th Year Representative:	Sandy Jones
3rd Year Representative:	Leo Lui
2nd Year Representative:	Maddi Fairburn

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### JOURNAL PUBLICATIONS 2014

Pethick, A., and B. Harris, 2014, Bathymetry, Electromagnetic Streamlines and the Marine Controlled Source Electromagnetic Method: *Exploration Geophysics*, 45, (3).

Lebedev, M., M. E. J. Wilson, and V. Mikhaltsevitch, 2014, An experimental study of solid matrix weakening in water-saturated Savonnières limestone: *Geophysical Prospecting*, September. doi 10.1111/1365-2478.12168.

Shelley, A., M. Savage, C. Williams, Y. Aoki, and B. Gurevich, 2014, Modeling shear wave splitting due to stress-induced anisotropy, with an application to Mount Asama Volcano, Japan: *Journal of Geophysical Research: Solid Earth*, 119, no. 5, 4269–4286, doi:10.1002/2013JB010817.

Collet, O., B. Gurevich, M. Madadi, and M. Pervukhina, 2014, Modeling elastic anisotropy resulting from the application of triaxial stress: *Geophysics*, 79, C135–C145. doi: 10.1190/GEO2013–0311.1.

Mikhailsevitch, V., M. Lebedev, and B. Gurevich, 2014, A laboratory study of low-frequency wave dispersion and attenuation in water-saturated sandstones: *The Leading Edge*, 33, no. 6, 616–622. Doi: 10.1190/tle33060616.1

Caspari, E., Q. Qi, S. C. Lopes, M. Lebedev, B. Gurevich, J. G. Rubino, D. R. Velis, M. B. Clennel, and T. M. Müller, 2014, Wave attenuation in partially saturated porous rocks—New observations and interpretations across the scales: *The Leading Edge*, 33, 606–615. Doi: 10.1190/tle33060606.1.

Qi, Q., T. M. Müller, B. Gurevich, S. C. Lopes, M. Lebedev, and E. Caspari, 2014, Quantifying the effect of capillarity on attenuation and dispersion in patchy-saturated rocks: *Geophysics*, 79(5), WB35–WB50. doi: 10.1190/geo2013–0425.1.

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## CONFERENCE PRESENTATIONS

76th EAGE Conference & Exhibition, Amsterdam, The Netherlands, June 2014

### Oral/ Poster Presentations

Kinkela, J., S. Ziramov, A. Dzunic, M. Urosevic, and P. Hilliard, 2014, Seismic Exploration for Volcanogenic Massive Sulphides—The DeGrussa Copper-gold Mine, Western Australia.

Yavuz, S., J. Kinkela, M. Penney, V. Araujo, R. Neto, A. Dzunic, and M. Urosevic, 2014, Direct VMS Targeting Through Preserved Relative Amplitude Processed Seismic Imaging at Neves Corvo, Portugal.  
Urosevic, M. Seismic Across Different Mineral Deposits— Does it Work?

Hossain, M. S., M. Urosevic, and A. Kepic, 2014 Volumetric Interpretation of 3D Seismic Data from the Hillside IOCG Deposit in South Australia.

Kinkela, J., A. Dzunic, M. Urosevic, R. MacRae, and L. Webb, 2014, Seismic Exploration for Volcanogenic Massive Sulphides—The Rosebery Zinc, Lead, Copper Mine, Tasmania.

Ziramov, S., M. Urosevic, J. Kinkela, A. Dzunic, and M. Penney, 2014, Joining Diverse 3D Geometries in PSTM.

Greenwood, A. J., M. Urosevic, J. C. Dupuis, and A. Kepic, 2014, The Application of Borehole Hydrophone Arrays in Hardrock Environments.

Tertyshnikov, K. V., R. Pevzner, A. Bóna, F. Alonaizi, and B. Gurevich, 2014, Diffraction Imaging in Hard Rock Environments.

Tertyshnikov, K. V., R. Pevzner, A. Bóna, F. Alonaizi, and B. Gurevich, 2014, Diffraction Imaging for Exploration of Seafloor Massive Sulfide Deposits—Case Study Solwara 1 Site.

Meira, M., R. Pevzner, and E. Caspari, 2014, Stochastic Time-lapse Inversion of a CO<sub>2</sub> Sequestration Synthetic Seismic Data.

Glubokovskikh, S. M., and B. Gurevich, 2014, Double Shell as a Directly Solvable Model of a Micro-inhomogeneous Poroelastic Medium.

Collet, C., and B. Gurevich, 2014, Estimating Azimuthal Stress-induced P-wave Anisotropy from S-wave Anisotropy Measured by VSP.

Pevzner, R., A. Bóna, and M. Lebedev, 2014, Estimation of Volumetric Fraction of Coal Seams in a Thick Layer Using Anisotropy Parameters—Feasibility Study.

Pevzner, R., T. Müller, A. Alasbali, R. Galvin, and B. Gurevich, 2014, Seismic Attenuation from VSP and Well Log Data—NW Shelf Australia Case Study.

Patrusheva, N., M. Pervukhina, M. Lebedev, J. Dautriat, and D.N. Dewhurst, 2014, Changes in Microstructure and Elastic Properties of Mancos Shale after Pyrolysis.

Asgharzadeh, M., and A. Bóna, 2014, Inversion based accuracy comparison of non-hyperbolic moveout approximations for P-waves in VTI Media.

Sun, B., and A. Bóna, 2014, Diamond Drill-Bit Seismic-While-Drilling Velocity Analysis Using Semblance and MUSIC from Hillside, South Australia.

Mikhaltsevitch, V., 2014, A Laboratory Study of Elastic and Anelastic Properties of Savonnières Limestone.

#### **AESC Newcastle, July 2014.**

Lebedev, M., M. Pervukhina, N. Patrusheva, A. Yurikov, J. Dautriat, V. Shulakova, Y. Uvarova, B. Gurevich, and D. Dewhurst, 2014, Changes in microstructure and elastic properties of organic-rich Mancos and Kimmeridge shales after pyrolysis.

Pevzner, R., 2014, Estimation of volumetric fraction of coal in the stack of coal seams from seismic anisotropy parameters: Feasibility study.

#### **BOOK / CHAPTERS**

Pervukhina, M., B. Gurevich, D. Dewhurst, M. Lebedev, and P. Golodoniuc, 2014, Rock physics analysis of shale reservoirs, in Rezaee, R. eds., *Fundamentals of Gas Shale Reservoirs*, Wiley., in Press.

Gurevich, B., R. Pevzner, M. Urosevic, A. Kepic, V. Shulakova, E. Caspari, and M. Lebedev, 2014, 2D and 3D seismic investigations for Stages 1 and 2C, in Cook, P. J. Eds., *Geologically Storing Carbon: Learning from the Otway Project Experience*, p 155–195.

Hillis, R. R., D. Giles, S. E. Van Der Wielen, A. Baensch, J. S. Cleverley, A. Fabris, S. W. Halley, B.D. Harris, S. M. Hill, P. A. Kanck, A. Kepic, S. P. Soe, G. Stewart, and Y. Uvarova, 2014, Coiled Tubing Drilling and Real-Time Sensing—Enabling Prospecting Drilling in the 21st Century? in *Society of Economic Geologists, Inc., Special Publication 18*, p 243–259.

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#### **HONOURS / GRANTS / AWARDS**

On behalf of all members of the Department we offer our congratulations to:

**Associate Professor Anton Kepic** and his team for receiving the Science and Engineering Prize. They have developed the Autonomous Sonde; a small shuttle-like device that drilling staff can use to collect down-hole geological data when drilling in minerals exploration.



The Sonde uses sensors to analyse the surrounding rock as it is raised from the depths of the borehole, collecting data that far surpasses the traditional method of extracting a narrow core from the earth. Similar analysis has previously been obtained using wireline techniques but the expensive equipment and supervision by technical staff often makes the costs prohibitive for minerals exploration. **Associate Professor Kepic's** Autonomous Sonde means mineral exploration teams can now have access to quality information in less time and at a reduced cost. You can watch the video for the Innovation Award here: <https://www.youtube.com/watch?v=ohCq8G9dF0w>.

**Dr Mehdi Asgharzadeh** on being awarded his PhD, which was officially approved on the 12<sup>th</sup> September 2014. The title of his thesis is "Analysis of seismic anisotropy at the CO2CRC Otway project site". Supervisor: **Milovan Urosevic** and Associate Supervisors: **Roman Pevzner** and **Andrej Bóna**. Mehdi is currently working for Schlumberger in Perth.

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## RESEARCH ACTIVITIES

Seismic experimental investigations along Bor city, Serbia were conducted in July 2014 for Freeport McMoran Copper Gold. The project was organised by **Milovan Urosevic** and **Anton Kepic**. The survey was conducted by Milovan with logistic support provided by the Geoin Group. This was the first ever seismic survey carried out for mineral exploration in the Balkan. The main objective of the survey was to establish the feasibility of the application of this method for an investigation of a deep, complex copper-gold system, which has been mined over the last 6,500 years in this region.

Seismic data was acquired using a combination of small explosive charges placed in shallow boreholes and accelerated weight drop. The active receiver spread consisted of only 174 channels arranged in a split spread configuration. The nominal designed fold was of the order of 45 but the actual fold due to ragged terrain and obstacles was less than 36. Despite this, for a hard rock environment with very low fold and after only basic but necessary processing steps, initial images proved to be of very high quality. We hope these results will pave the way for a widespread application of seismic reflection methods for both 2D and 3D surveys over large mineralised systems in Eastern Serbia.

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## STAFF NEWS

### WELCOME

#### **Clarisse BORDES—Visiting Associate Professor**

Clarisse is from the University of Pau (France), Complex Fluids and Reservoirs Laboratory, Geosciences Department.



During her sabbatical leave, Clarisse is visiting the Department of Exploration Geophysics for approximately 11 months and while here will be undertaking collaborative research work with Anton Kepic and Maxim Lebedev, concentrating on seismoelectric conversions of interfaces and seismoelectric imaging of thin layers.

Clarisse completed her PhD entitled “Seismomagnetic measurements: a laboratory approach in low noise underground laboratory” at the Université Joseph Fourier Grenoble 1 between 2001–2005, held a temporary position as Lecturer at the Université de Nice Sophia-Antipolis between 2005–2006 and has held a permanent position as Associate Professor at the Université de Pau et des Pays de l’Adour since 2006.

She has been the lead author and co-author of 6 journal publications and 25 other published conference/poster papers. In addition to this Clarisse teaches 230 hours per academic year in “Introduction to rock mechanics, Wave propagation in elastic and porous media, and Borehole measurements” and is also responsible for the 3rd year of the Earth Sciences Bachelor degree and a new Drilling Diploma (academic and industry partnership) course.

Clarisse is accompanied by her husband (Laurent) and 2 daughters (Adele and Flore) and we hope they all enjoy their first experience visiting Australia.

#### **Dr Stephanie Vialle—Lecturer**

Stephanie arrived to commence her two year Limited Term Contract with the Department of Exploration Geophysics on Monday 22nd September.



Stephanie has a MSc in Fundamental and Applied Geochemistry from Paris Diderot University where she collaborated with the Centre for Research and Restoration of French Museums on "Alteration and lead speciation of buried altered archeological glazes". She completed her PhD, entitled “Experimental study of the effects of dissolution (and reprecipitation) on the transport properties of limestones” with the Rock Physics Group at IPG Paris.

In late 2009–2012 Stephanie held a Postdoctoral Research position at Stanford University with the Rock Physics Group in their Geophysics Department. In 2013 her Postdoctoral position was extended and during this time she worked with the Stanford Carbon Capture Project in the Geological and Environmental Sciences Department.

From March 2014 she was a Guest Scientist at Lawrence Berkeley National Laboratory in their Earth Sciences Division, collaborating on rock physics, rock imaging and greenhouse-gas-related activities. Her research interests are in experimental rock physics, reactive transport modelling and geological carbon storage.

Stephanie also has a strong tertiary teaching background and formal teaching qualifications. Publications as either the lead author or co-author include the following: 3 papers in preparation, 4 published in peer-reviewed journals, 9 conference abstracts/proceedings, 12 non peer-reviewed papers/reports and about 30 communications, 7 of which were invited talks.

We welcome Stephanie and hope that she enjoys all aspects of her appointment with the group in the Department of Exploration Geophysics.

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## OTHER STAFF NEWS

The Vice Chancellor held a recognition reception in the Chancellery building on the 30<sup>th</sup> July for staff who have contributed to the Curtin journey for 30 and 40 years.

**Deirdre Hollingsworth** attended along with around 20 other staff from across the campus and was presented with a watch, a certificate of service and a book. The formal proceedings were followed by light refreshments. Deirdre is shown with the VC Professor Deborah Terry accepting congratulations and gift.



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## STUDENT OUTREACH / ACTIVITIES

On the 7<sup>th</sup> of July a group of Year 11 and 12 students visited the Department as part of the Focus on Mining program, which was organised by WASM Marketing. The program included a 5 day camp for the students who are studying TEE Maths and Science and are considering studying mining-related courses at university. The tour included visits to both the Bentley and the Kalgoorlie Campuses and visits to mine sites. Dominic Howman gave a presentation on what geophysics is and how to gain entry into the course as well as a short tour of the facilities within the department.

On the 3<sup>rd</sup> of August the annual Curtin Open Day was held. Staff Members volunteered and assisted with the geophysics activities on the day. We would like to thank staff members **Dominic Howman**, **Maxim Lebedev**,

**Anton Kepic, Andrej Bóna, Anna Podolska, Konstantin Tertyshnikov, Lee Ignacio and Murray Hehir**, as well as students **Bryce Teo** and **Petr Lebedev**. We also acknowledge those past graduates who volunteered their time on the day.



The Faculty of Science and Engineering Marketing group organised a media and advertisement campaign leading up to the next round of the TISC preferences to attract high school students to study geophysics at Curtin University's Exploration Geophysics Department. The campaign was run during September and included:

- 30 second radio live reads on Nova 93.7 and 92.9 radio stations
- outdoor bus-stop ad-shells in the Como, Willetton, Rossmoyne, Applecross and Alfred Cove areas
- online targeted ads through Facebook, Google and Exponential

We hope that this will attract more students to our degree program in 2015 and beyond.

### **STUDENT EDGE VIDEO—GEOPHYSICS**

A geophysics video has been filmed and produced with Student Edge featuring **Barrett Cameron** who graduated with Honours in Geophysics from Curtin University in 2002. The video is one of 6 episodes being featured on Channel 7 called 'I wanna be...' on Saturday 4th or 11th October at 3pm in connection with the current TISC campaign period. This is a fantastic opportunity for the Department as it provides free publicity for the geophysics

courses.

To view the video go to our [Exploration Geophysics Home Page](#) and then link to the video, which is listed under Announcements.

We thank **Curtin SAE Marketing** and **Student Edge** for this excellent promotional video.

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## UPCOMING EVENTS

### [SEG 84<sup>th</sup> Annual Meeting](#)

26<sup>th</sup>–31<sup>st</sup> November, Denver, USA.

### [IADC International Deepwater Drilling Conference](#)

13<sup>th</sup>–14<sup>th</sup> November, Rio, Brazil.

### [DETCRC Annual Conference](#)

19<sup>th</sup>–21<sup>st</sup> November, Adelaide, Australia.

### [Curtin Reservoir Geophysics Consortium \(CRGC\) Annual Meeting](#)

4<sup>th</sup>–5<sup>th</sup> December, Rottneest Island.

### [AGU Fall Meeting](#)

15<sup>th</sup>–19<sup>th</sup> December, San Francisco, USA.

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## 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.

[ALT - WellCAD](#)

[CGGVeritas - Hampson Russell Software](#)

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[DHI Group - FEFLOW](#)

[Down Under Geosolutions - Insight](#)

[ESRI - ArcGIS](#)

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