



Education Matters



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Seminar time: Seven steps to selling your project

Honours students around Australia are now on the home straight with their theses – and that all-important seminar presentation is a vital part of demonstrating to staff and colleagues that the year has been fruitful. That 20 minute presentation is probably going to account for 10% of your thesis mark, so it is worth weeks not hours of preparation.

One of the greatest challenges – and a speaker's greatest skill – is in deciding what to include when summarising a year of work into that brief presentation, and equally important is deciding what to leave out. A scientific talk should contain a proposition which the speaker proves (or in some important cases, will disprove).

Rule 1: Select three points you would like your listeners to remember from your talk. Shape an introduction and a conclusion which emphasize these points. Your audience will include 75% of students and staff who know little about your speciality, but it is your job to introduce them to the topic in a way that they learn from your detailed study, and hopefully they will also be convinced that you are now an expert.

Presenting that overview to the non-specialists must be balanced with some detail or insight which convinces the ultimate expert (your supervisor, or

maybe a self-opinionated graduate student who is one year ahead of you) that you have made your own contribution to the subject. After covering a selected point of detail, ensure the logic in your presentation allows you to return to the general points, thus picking up that fraction of the audience for whom the detail is complex. Acquiring that balance and logical development is a skill reflecting years of practice, but make it a goal from your very first presentation.

Rule 2: Keep to your allocated time. If the Chair has to skip question time because you are over time, you have lost an important part of your opportunity to show your command of the subject.

Rule 3: A PowerPoint presentation is not a thesis presentation. Figures which may look good on the printed page are often poor on a screen, due to details of drafting and annotation. A slide on the screen must be comprehensible to a non-expert in the space of a fraction of a minute. The screen presentation is most useful to your audience when it is uncluttered and immediately highlights your key point. If using a map or an image, make a simplified key which highlights only the features relevant to your talk. A beautiful feature of PowerPoint is the ability to add arrows or highlighting features which appear at a mouse-click, thus giving visual emphasis to match which-ever verbal emphasis you seek to make.

Rule 4: Practice the presentation so that you can speak with minimal reading of notes. Making eye-contact with the audience is a vital part of holding their attention. In particular, being able to present your introduction and conclusion with direct eye contact is helpful in engaging your audience and in asserting your authority. Most students will need to use some notes for the body of the presentation, but ensure you know your presentation sufficiently well that you do not read large sections of it.

A practice run with a few friends in the intended seminar room is especially helpful, as it provides a 'feel' for the audio-visual system and the acoustics you will use on the day.

Rule 5: Use a microphone if you need one. When presenting in a large seminar

room speakers with quiet voices are at a disadvantage. Get familiar with the audio capabilities before your talk, and if in doubt ensure that you have a microphone (preferably a lapel device) set up so that you can move and point at the screen without losing amplification.

Rule 6: Project with confidence and authority. As any actor knows, body language is a vital part of communication, and there are many subtleties here. A few worth mentioning:

- Dress up from your audience; if your peer group is used to T-shirt and jeans, go smart casual. If smart casual is the norm, go for business attire for your presentation.
- Stand confidently alongside rather than behind a lectern.
- Control the butterflies. Nervousness can cause first-timers to lean on a desk, make unnecessary hand gestures, or adopt awkward postures such as swaying, foot-tapping, or a cross-legged stance, to name a few. A rehearsal with a colleague may identify these and help avoid them.

Practising your presentation aloud and thinking about how two or three key audience members will receive it will enable you to hone your presentation. For example imagine that you are your supervisor, a fellow honours student or another staff member – what would you think of the presentation? What key messages would you take away?

Rule 7: Answer questions succinctly. If there is a dumb question, take the opportunity to provide a recap of a point not understood. If there is a barbed question from the above-mentioned graduate student, play a straight bat; spirited argument can be kept for the tea-room later.

Good luck to all our students presenting their work this year, and we hope to see many of you presenting again at local ASEG Branch meetings. Most importantly we expect the best to be presenting at the ASEG Conference in Adelaide in 12 months time. As Cicero, the silver-tongued orator of Rome 2060 years ago said, constant practice devoted to one subject often outdoes both intelligence and skill.

Forthcoming lecture tours for professional development and continuing education

Wendy Watkins
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We have distinguished lecturers from both the SEG and the EAGE visiting Australia later this year. Watch your local branch newsletters or contact Wendy Watkins on the ASEG Federal Executive, for details (continuingeducation@aseg.org.au).

World Class 'Education Days' is coming to Perth

From 31 August to 11 September 2015, EAGE is organising for the first 'Education Days' event in Perth, Australia. A variety of two-day short courses will cover most recent specific knowledge in geophysics, geology and related engineering areas.

Jacques Blanco (PhySeis/Pau University) will present 'Borehole Seismic: Advanced Analysis and Integration' (31 August–1 September). The course will cover advanced methods assessment of borehole seismic parameters from 3C VSP and 3D/4D VSP techniques, which create more positive 'vision' of the geological setting, including a precise rock-type characterisation and a good understanding of hydrocarbon flow paths.

Prof Dorrik Stow (Heriot-Watt University) will continue the Perth sessions with his course on 'Deepwater Reservoirs: Exploration and Production Concepts' (7–8 September) providing insight for geophysicists, geologists and petroleum engineers involved in deepwater exploration. One theme is that by keeping pace with new technology and complex geological structures of the deep marine environment in SE Asia and Australia, participants can overcome the pitfall of interbedded mudstones and variety of deepwater play in pursuit of reserves replacement in potential larger-sized fields.

Dries Gisolf (Delft Inversion) on 'Full Waveform Inversion for High Resolution Reservoir Characterization' (10–11 September) will complete the 'Education Days' event with his master-class on full waveform inversion. As full waveform inversion is identified as a critical tool to perform quantitative full waveform seismic-to-well matches, participants can expect to benefit by becoming more familiar with making better calls on when and how inversion of seismic data for reservoir properties is feasible and meaningful.

As a gesture of appreciation to ASEG as an associated society, the EAGE has offered to extend the same EAGE membership price to ASEG members. For more information on the 'Education Days Perth' event, refer to lg.eage.org and click Education Days Perth under Classroom Training button. For registration, please send an email to rmo@eage.org. A Certificate of Attendance endorsed by EAGE, and lunch, will be provided for attending this course. See you in Perth!

SEG and EAGE Distinguished Lecturer Presentations

As advertised in the June issue of *Preview*, we also have the following presentations scheduled.

18 November, Perth; 19 November, Adelaide; 23 November, Brisbane; 30 November, Hobart; 9 November, Canberra; 10 November, Melbourne:

Hansreudi Maurer, Professor of ETH exploration and engineering geophysics at ETH Zürich, Switzerland, is the SEG's 2015 Near Surface Honorary Lecturer. His topic is 'The curse of dimensionality in exploring the subsurface, with particular application to tomographic inversions of 2D and 3D seismic data.'

<http://www.seg.org/education/lectures-courses/honorary-lecturers/2015/maurer/abstract>

20 November, Perth, and 25 November, Canberra:

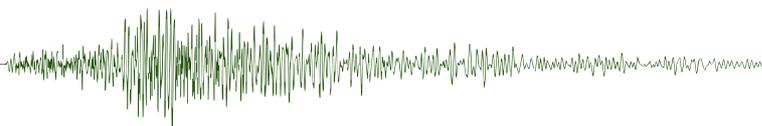
Alessandro Ferretti, CEO of Tele-Rilevamento Europa, Milan, Italy, is the EAGE's visiting lecturer in its international continuing education and training program. His topic is Satellite InSAR Data: Reservoir Monitoring from Space, a one-day seminar in radar interferometry (InSAR), which is becoming a standard tool for monitoring surface deformation phenomena. This EET course is intended as a guided tour of InSAR and its applications.

<http://lg.eage.org/?evp=10266>



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Australian Society of
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Australian Specialist's Travelling Education Programme (OzSTEP)

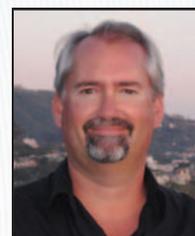
4D Seismic Reservoir Monitoring

Date: October 2015

Who Should Attend: Managers and staff on development and production asset teams; geophysicists, geologists, and reservoir engineers; any others with a science or engineering background, including university students, who are interested in time-lapse techniques to monitor fluid flow in the earth.

Instructor: Prof David Lumley, UWA

David Lumley is a Winthrop Professor and Chair in Geophysics, jointly appointed to the School of Physics, and School of Earth & Environment, at the University of Western Australia (UWA). He is also the founding Director of the UWA Centre for Energy Geoscience research. Prof. Lumley has published 150+ refereed journal papers and expanded abstracts, and is the lead or senior Chief Investigator for over \$130 Million in competitive research grants. He is a physicist with a focus on geophysical energy and environment applications, with prior research and operations roles in industry (including Chevron Research), and academic institutions (including Stanford University, PhD '95, and the University of Southern California). David has significant business owner experience as the Founder and Chief Scientist of 4th Wave Imaging Corp., a 4D seismic technology company purchased by Fugro in 2007. Prof. Lumley actively participates with international scientific societies such as ASEG, SEG and AGU, where he has served as a chairman and organizer of various scientific committees and workshops, and was elected as First Vice President of the SEG (2009-10) representing 35,000 members worldwide. David has served as an international Distinguished Lecturer for the SEG, SPE and AAPG societies, and has received several scientific honors including the first SEG Karcher Award for his "pioneering work in developing time-lapse 4D seismology" to image subsurface fluid flow. Prof. Lumley serves as an expert adviser to industry and government organizations, including the Western Australia state government for regional exploration and development of hydrocarbons, geothermal energy and CO₂ storage, and the US National Academy of Sciences.

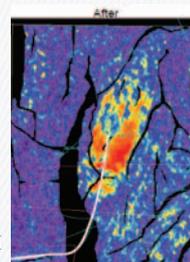
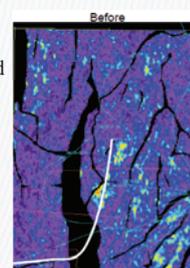


Course Outline:

This 1-day course is a practical overview of the most important theory, concepts and methods used in the modeling, design, acquisition, processing and quantitative interpretation of time-lapse 4D seismic data. Lecture topics include:

- 4D Rock and Fluid Physics, and various approaches to time-lapse 1D/2D/3D Seismic Modeling, to quantify how physical changes in the reservoir respond as changes in seismic data. This is useful for predicting the strength of the 4D signal, designing 4D seismic surveys and processing flows to enhance 4D signal and reduce 4D noise, and quantitatively interpreting 4D seismic data in order to estimate changes in reservoir properties such as fluid saturation and pore pressure.
- 4D Seismic Acquisition and 4D Processing techniques, to quantify non-repeatable 4D noise and suppress it, and to enhance real 4D seismic signal in the reservoir.
- 4D Quantitative Interpretation techniques to detect and analyze reservoir fluid flow anomalies, and to quantify them in terms of changes in pressure/saturation and other reservoir properties, using both qualitative and quantitative methods, including inversion.
- Monitoring aquifer drive and injected fluids such as water, gas, steam and CO₂, locating bypassed hydrocarbons, identifying reservoir compartmentalization, and quantifying the hydraulic properties of faults (seals, leaks, baffles).
- Integration of 4D seismic information with geologic and engineering data to update the reservoir fluid flow model so that predictions of hydrocarbon recovery and fluid injection match the actual production data better ("4D seismic history matching").
- Time permitting... advanced 4D seismic topics including compaction, geomechanical stress, anisotropy, 4D FWI (full waveform inversion), passive and ambient noise seismology, 4D gravity.
- Many case study examples from around the world, both onshore and offshore, including primary depletion, water or gas injection, steam flood, and CO₂ storage.

**4D Seismic
Pressure Anomaly**





Australian Society of
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Australian Specialist's Travelling Education Programme (OzSTEP)

Potential fields: a (re)introduction for geophysicists and geologists

Date: October 2015

Who Should Attend: geophysicists who wish to update/expand their appreciation of the use of potential field techniques; geologists who use gravity and/or magnetic data in mapping, exploration or interpretation (or who should do so!).

Instructor: Bob Musgrave, Geological Survey of New South Wales

Bob Musgrave is the Research Geophysicist with the Geological Survey of NSW. Bob graduated with a BSc (Hons) from the University of Sydney in 1981, majoring in geology and geophysics. Bob went on to complete a PhD (1987) at the University of Sydney in palaeomagnetism. Bob's interests in tectonics, palaeomagnetism and magnetic petrophysics led him through post-doctoral fellowships at Victoria University of Wellington (1987), the Australian National University (1988-89), and the University of Tasmania (1989-91). Bob went on to join the Ocean Drilling Program, based at Texas A&M University (1991-93), and to date has sailed on 5 ODP/IODP expeditions, the most recent in 2014. Returning to Australia, Bob was a Senior Lecturer in geophysics at La Trobe University until 2003. Bob was then a Senior Research Fellow at Macquarie University, before joining the Geological Survey of NSW in 2005. Bob is currently also a Conjoint Senior Lecturer at the University of Newcastle and an Honorary Associate of the University of Sydney. Bob's initial interest in palaeomagnetism has broadened over the years into a diverse range of applications, from magnetostratigraphic dating and tectonics, to magnetic petrophysics studies of hydrocarbon migration, gas hydrate accumulation, and the relationship of mineralisation processes to remanence-dominated magnetic anomalies. His work with GSNSW has emphasized applications of magnetic and gravity studies, including novel data filtering and presentation, long-wavelength interpretation and integration with passive seismic datasets, and joint magnetic and gravity inversion of complex tectonic settings. His research has yielded more than 50 peer-reviewed publications.



Course Outline:

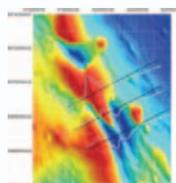
Prerequisites: basic geology. No prior geophysical training is necessary, and the maths will be kept "light", so the course should be accessible to all geoscientists – but there will be the opportunity for more sophisticated discussion for those with established skills in geophysics.

Session 1 - Basics:

- Course overview and scope
- Basic form of potential field anomalies
- Data acquisition
- Scalar, gradient and tensor data. Earth's gravity and magnetic fields

Session 2 - Physical properties :

- Density and magnetic susceptibility
- Remanence
- Magnetic properties and mineralisation
- Microbes and magnetic diagenesis

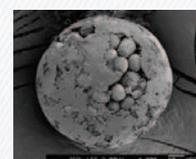
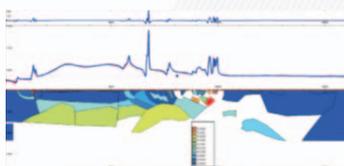


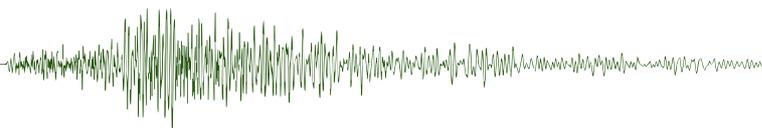
Session 3 - Data presentation and filtering :

- Derivative filters; phase filters and the tilt filter.
- Edge analysis ("worming").
- Euler depths; spectral depths. Curie depth.
- Isostatic correction.
- Tensor and gradient data interpretation.

Session 4 - Potential field inversion :

- Source mapping; derivative maps; inferring lithology.
- Direct inversion, and its limitations.
- Geologically constrained inversion.
- Remanence and inversion.
- Case studies.





Australian Society of
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Australian Specialist's Travelling Education Programme (OzSTEP)

AVO and Inversion Methods in Exploration Seismology

Dates: 2nd Nov (Perth), 4th Nov (Brisbane) and 6th Nov (Melbourne)

Who Should Attend: Geoscientists with a solid background in exploration seismology who wish to broaden their knowledge of AVO and inversion methods and their applications.

Instructor: Dr Brian Russell

Brian Russell graduated from the University of Saskatchewan (BSc) in 1973 with a major in physics, and received a BSc (Hons) (1975) at the same university, a MSc in geophysics from Durham University (1978), U.K., and a Ph.D. from the University of Calgary (2004), all in exploration geophysics. He joined Chevron as an exploration geophysicist in 1976 and subsequently worked for Teknica and Veritas before co-founding Hampson-Russell Software with Dan Hampson in 1987. Hampson-Russell is now a subsidiary of CGG, where Brian is Vice President, GeoSoftware and a CGG Fellow. Brian is involved in the development of new AVO, rock physics, inversion and seismic attribute techniques as well as presenting courses throughout the world. He is a past-President of both the SEG and Canadian SEG (CSEG) and has received Honorary Membership from both societies, the CSEG Medal and the Cecil Green Enterprise Award from SEG. He is currently Chairman of the Board of the Pacific Institute for the Mathematical Sciences (PIMS), an Adjunct Professor in the Department of Geoscience at the University of Calgary and at the School of Energy Resources at the University of Wyoming, and is registered as a Professional Geophysicist (P.Geoph.) in the Province of Alberta.



Course Outline:

- Part 1: The rock physics basis of AVO and inversion
- Part 2: Post-stack seismic inversion and wavelet analysis
- Part 3: Pre-stack inversion and AVO methods and case studies.
- Part 4: Azimuthal amplitude and velocity analysis for fracture determination.
- Part 5: Stochastic inversion methods.
- Part 6: Applications to unconventional plays.