

Education matters



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Professional development is the ASEG Continuing Education Committee's highest priority

This month we take the opportunity to meet Emma Brand, the Chair of the ASEG Continuing Education Committee, and learn about the forward plans set out for the education portfolio.

Emma is Project Manager for Geophysical Operations for Origin Energy, operating in the 'upstream' end of this national gas and electricity energy supplier. She also looks after a portfolio

of training tasks in the Company, chairing a committee responsible for graduate training and oversight of student interns. Last June, Emma took on the important ASEG roles of Chairman of the Continuing Education Committee and member of the Federal Executive.

The ASEG Education Committee is tasked with ensuring the continuing education of ASEG Members and liaising with students and academic staff. Under Emma's management the Committee has developed a strategic plan that is focused on offering more professional development courses for ASEG Members.

The Committee's priorities (in decreasing order of importance) are as follows:

1. **OzStep** and **OzLeap** courses, targeted respectively at young professionals, and at all professionals seeking a deeper insight into particular geophysical methods.
2. International visiting lecturers via SEG and EAGE Courses (including DISC, DL, HL and EET)
3. ASEG courses and lectures
4. Support of wider education programmes in schools, universities and the community, such as TESEP, ESWA, Augen, ACARA.
5. Promotion of geophysics.

The Committee operates with the following assumptions:

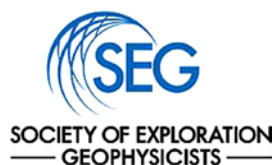
1. Any courses should be run on a cost neutral basis to the ASEG.
2. Topics should align with the membership base.
3. Courses should be held in each state/territory every year.
4. The Education Committee is responsible for facilitating courses, not running them.
5. Courses should broadly align with the following themes:
 - a. Case studies
 - b. Bridging courses for young geophysical professionals (OzStep)
 - c. Deep technical courses (OzLeap)
 - d. Other broadening subjects, such as technical writing, project management etc.

The strategy of the Committee over the next 12 months is, therefore, to:

1. Continue to facilitate SEG/EAGE courses.

2. Continue to support as required state branch, one-off monthly presentations.
3. Build a portfolio of case studies on topics that align with ASEG's goal of being more proactive in Geoscience debates. Such topics shall include monitoring of fracking in gas reservoirs, use of the seismic in marine environments and the social license to operate these technologies.
4. Support the development of a postgraduate, industry-focused short courses to help prepare young geophysical professionals.
5. Build a portfolio of deep technical courses across a range of topics of interest.
6. Build a portfolio of broadening topics and presenters.

To enable this strategy we need help building these portfolios of topics, and we're looking for representatives across other fields of interest, specifically coal, non-seismic acquisition, petrophysics, research and education, solid earth geophysics and geotechnical. If you are interested in being on the Committee, or giving a presentation or course on any of these topics then please reach out – your Society needs you!



SEG 2017 Distinguished Instructor Short Course: Doug Oldenburg

Geophysical electromagnetics: fundamentals and applications



Doug Oldenburg

Summary

Electromagnetics has applications in oil and gas exploration and production, mineral exploration, groundwater exploration and monitoring, geotechnical and environmental industries. Although it has widespread applications as a geophysical technique, it is not generally understood by the geoscience community. As a result it is underutilised, and in some cases misused, as a technology.

The aim of this course is to provide a fundamental understanding about EM geophysics so that practitioners can decide if an EM technique can help solve their problem, select which type of survey to employ, and set realistic expectations for what information can be gleaned. Case histories, spanning applications from many areas in the geosciences, are used as an underlying framework to bind the material together. For more information, see the online resources at <http://disc2017.geosci.xyz>.

Fundamentals and applications

Case histories pertain to problems in resource exploration, including oil and gas, minerals, water, environmental, and geotechnical areas and are contributed by experts worldwide. (<http://disc2017.geosci.xyz/>).

These include:

1. resource detection (e.g. methane hydrates) or de-risking (e.g. offshore hydrocarbons),

2. imaging SAGD steam chambers or monitoring hydraulic fracturing,
3. mineral exploration (on land, on the ocean floor sea floor massive sulfides),
4. water issues (e.g. monitoring salt water intrusion, imaging aquifers),
5. imaging geothermal systems,
6. detecting and discriminating unexploded ordnance,
7. geotechnical characterisation, including slope stability, and more (see http://em.geosci.xyz/content/case_histories/index.html for a growing list).

These applications are motivation for investigating fundamentals of electromagnetics. Applications successively investigated include those that make use of:

1. steady state fields (e.g. DC resistivity, induced polarisation),
2. frequency domain EM (e.g. marine CSEM, airborne surveys),
3. time domain EM (e.g. airborne, ground, borehole surveys),
4. natural source EM (e.g. magnetotellurics, Z-Axis Tipper/ZTEM).

Each case history is presented in a seven-step process that begins with the description of the geologic or geophysical problem to be solved and ends with the impact of the EM geophysical survey to help solve the problem. At points in the middle, the details of the particular EM survey are investigated, together with some fundamentals of electromagnetic induction, and techniques for processing/inverting the data. The ability to move seamlessly between these different levels of information, so that relevant questions or concepts can be addressed, is facilitated by new open-source numerical software, interactive simulations, and the 'textbook' resource <http://em.geosci.xyz>. Although we work continually with Maxwell's electromagnetic equations, the presentations are mathematically 'light' and the learning aspect is facilitated by the use of open-source, interactive numerical software and visual aides.

The site <http://disc2017.geosci.xyz> contains further details on the course, its goals, links to the open-source resources

that will be used, and ways to get connected!

Who should attend?

Geophysicists and any geoscientists who have the potential to use, or be associated with, electromagnetic data. The 2017 DISC is designed to be of interest to a broad audience, including researchers, practitioners, and industry geoscientists, and accessible to those with little background in EM.

Biography

Doug Oldenburg's 40-year research career has focused upon the development of inversion methodologies and their application to solving applied problems. He, with students and colleagues at the University of British Columbia Geophysical Inversion Facility (UBC-GIF), have developed forward modelling and inversion algorithms for seismic, gravity, magnetic and electromagnetic data. The inversion techniques and software are widely used in resource exploration problems. In recognition for his work building collaborative interactions between industry and academia, he was awarded the NSERC Leo Derikx and the AMEBC Special Tribute awards as well as the J.Tuzo Wilson medal. In 2011, Doug was the SEG Distinguished Lecturer; his presentation was entitled 'Imaging the Earth's near surface: The why and how of applied geophysics for the 21st century'.

Doug is currently a Professor at UBC, Director of UBC-GIF and holder of the TeckCominco Senior Keevil Chair in Mineral Exploration. He is an honorary member of the CSEG, SEG and a Fellow of Royal Society of Canada.

Doug Oldenburg's DISC is scheduled for:

27 July – Perth

2-3 August – Adelaide

7-8 August – Brisbane

Registration online at: <http://seg.org/Education/Calendar>