

# CREWES NEWS

The Consortium for Research in Elastic Wave Exploration Seismology

## CREWES Sponsors Meeting Schedule

We are pleased to present our comprehensive schedule for the CREWES Sponsors Meeting, being held November 18 to November 20 at the Delta Lodge at Kananaskis, Alberta, Canada.

We are very excited about the wide variety of research that we have to present, and we are sure we have something to interest everyone.

Don't forget to check our website for the latest information about location and accommodation ([www.crewes.org](http://www.crewes.org)).

We look forward to hosting you in the Rockies.



Date	Time	Events
Sun. Nov. 18	9:00am - 5:00pm	Courses (see details below)
	7:00pm - 9:00pm	Registration and Reception
Mon. Nov. 19	8:30am - 4:30pm	Presentations & Discussions
Tues. Nov. 20	8:30am - 4:30pm	Presentations & Discussions

## CREWES Short Courses - Free for Sponsors!

CREWES invites sponsors to attend one or both of the short courses we are offering in the Earth Sciences Building at the University of Calgary on Sunday, November 18.

Please note that the Interpretation course will be limited to 21 people, and advance registration is required for both courses. Information about the courses can be found on our website, [www.crewes.org](http://www.crewes.org), on the Sponsors Meeting page.

Time / Location	Title	Instructors
9am - 1pm ES924	<i>Interpreting multicomponent seismic data using well logs and synthetic seismograms</i>	Gary Margrave & Robert Stewart
1pm - 5pm ES136	<i>Migration and Inversion</i>	John Bancroft & Larry Lines

Please contact Louise Forgues at [louise@crewes.org](mailto:louise@crewes.org) if you wish to attend.

## Presentation Schedules

On the following three pages, please find the oral and poster presentation schedules to facilitate planning your two days with CREWES. We hope you will find plenty of particular interest. Please note, however, that individual presentations may be subject to change due to circumstances beyond our control.

Current schedules can be found on our website: [www.crewes.org](http://www.crewes.org).

## In This Issue...

### CREWES Sponsors Meeting - Special Edition Newsletter

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  - Oral and poster sessions
- **Feature Article:**
  - Time-lapse seismic and AVO modelling

## Sponsors Meeting

### Important Info:

#### Dates:

Sunday November 18  
Monday November 19  
Tuesday November 20

#### Information:

Louise Forgues  
+1 (403) 220 8279  
[louise@crewes.org](mailto:louise@crewes.org)

#### Venue:

Delta Lodge at Kananaskis  
Res: 1-800-268-1133  
(Toll-free, Canada/U.S.A.)  
Phone: +1 403 591 7711  
Fax: +1 403 591 7770

#### Website information:

[www.crewes.org](http://www.crewes.org)

### The CREWES Project

Dept. of Geology & Geophysics  
University of Calgary  
2500 University Dr. N.W.  
Calgary, Alberta CANADA  
T2N 1N4

**Fax:** (403)284-0074

**Email:** [crewesinfo@crewes.org](mailto:crewesinfo@crewes.org)

**WWW:** [www.crewes.org](http://www.crewes.org)

<b>Talks at the CREWES Sponsors Meeting</b>		
<b>Topic</b>	<b>Title</b>	<b>Presenter</b>
<b>Monday AM</b>		
<b>Acquisition</b>	A field study of wind noise-abatement techniques for 3-C geophones OBS multiple attenuation Imaging dipping layers in horizontal well VSP surveys Single-well seismic imaging using the full waveform of an acoustic sonic	Henry C. Bland R. James Brown Carlos Nieto Louis Chabot
<b>Rock Physics</b>	Exploitation of an oil field using AVO and post-stack rock property analysis methods	Andrew Royle
<b>Monday PM</b>		
<b>Numerical Modelling</b>	Extending AVO inversion techniques Finite-difference modelling of near-surface effects Finite-difference anisotropic traveltimes and raypaths Mapping the conversion point in Vertical Transversely Isotropic (VTI) media Seismic modelling of coal bed methane strata, Willow Creek, Alberta	Charles P. Ursenbach Peter M. Manning Marco A. Perez Jianli Yang Sarah E. Richardson
<b>Processing</b>	Gabor deconvolution	Gary F. Margrave
<b>Tuesday AM</b>		
<b>Imaging and Migration</b>	Methods for isolating coherent noise in the Radon domain New proMAX modules for reflectivity calibration and noise attenuation Weighted stacking of 3-D converted-wave data for birefringent media	Shauna K. Oppert David C. Henley Richard A. Bale
<b>Interpretation</b>	Review of seismic imaging: prestack Constrained three-parameter AVO inversion and uncertainty analysis	John C. Bancroft Jonathan E. Downton
<b>Blackfoot</b>	Combining geostatistics and multiattribute transforms - A channel sand case study	Brian H. Russell
<b>Western Canada</b>	Multicomponent seismic survey at the Calgary airport	Don C. Lawton
<b>Tuesday PM</b>		
<b>Pikes Peak</b>	Heavy-oil reservoir characterization using elastic wave properties Seismic monitoring of "hot and cold" heavy oil production	Ian A. Watson Laurence R. Lines
<b>MacKenzie Delta</b>	Multicomponent seismic survey over ground-fast and floating ice, MacKenzie Delta, N.W.T	Kevin W. Hall
<b>East Coast</b>	Assessment of 4-C ocean-bottom seismometer data, SCREECH Cruise, Newfoundland Time-lapse Seismic and AVO Modelling, White Rose, Newfoundland.	Robert R. Stewart Ying Zou

<b>Poster Presentations at the CREWES Sponsors Meeting</b>	
<b>Title</b>	<b>Author</b>
<b>Acquisition</b>	
Multicomponent acquisition - a field guide for recorders	Henry C. Bland et al.
Ultrasonic imaging of a heavy oil recovery model	Kevin W. Hall et al.
Binning considerations for a sparse 4C-3D seismic geometry	Kevin W. Hall et al.
Conceptual design of a wireless geophone recording system	Henry C. Bland et al.
<b>Case Studies</b>	
FX spectral analysis for the 1995 and 1999 3C-3D seismic data	Han-xing Lu et al.
Time-lapse seismic analysis for the Blackfoot 1993, 1995, 1999 3C-3D seismic datasets	Han-xing Lu et al.
Seismic tomography of Maya pyramid ruin, Chan Chich, Belize	Chuangdong Xu et al.
Seismic monitoring of heavy oil reservoirs: case history review	John Zhang et al.
<b>East Coast</b>	
Design specifications for a 3C-3D OBS survey at White Rose	Kevin W. Hall et al.
<b>Imaging and Migration</b>	
Further comments on oblique reflectors	John C. Bancroft
Review of seismic imaging: post-stack	John C. Bancroft
Event detection in P-SV prestack time migration using matched filters	Jeff K. Beckett et al.
Recursive Kirchhoff wavefield extrapolation	Gary F. Margrave et al.
Joint P-P and P-S seismic inversion	Gary F. Margrave et al.
Anisotropic pre-stack depth migration of complex geological structures	M. Graziella Kirtland Grech et al.
New imaging results at the Chan Chich archaeological site	David C. Henley
Dual-algorithm wavefield extrapolation applied to depth imaging	Yanpeng Mi et al.
Converted-wave prestack depth imaging with the nonstationary wavefield extrapolators	Yanpeng Mi et al.
Integrated high-resolution tomography	Marco A. Perez
Weighted stacking of 3-D converted-wave data for birefringent media	Richard A. Bale
<b>Interpretation</b>	
Fluid-property discrimination with AVO: A Biot-Gassmann perspective	Brian H. Russell et al.
<b>Numerical Modelling</b>	
Finite difference modelling of near surface effects	Peter M. Manning et al.
Finite-difference anisotropic traveltimes and raypaths	Marco A. Perez
Seismic modelling of coal bed methane strata, Willow Creek, Alberta	Sarah E. Richardson et al.
Interactive Explorers: A useful geophysical tool	Charles P. Ursenbach
Mapping the conversion point in Vertical Transversely Isotropic (VTI) media	Jianli Yang et al.
"FluidSeis" user's guide (A Matlab fluid substitution program)	Ying Zou et al.
<b>Pikes Peak</b>	
Heavy-oil time-lapse seismic monitoring at Pikes Peak, Saskatchewan	Ian A. Watson et al.
Analysing the Pikes Peak multi-offset VSP data set	Carla A. Osborne et al.

<b>Poster Presentations at the CREWES Sponsors Meeting</b>	
<b>Title</b>	<b>Author</b>
<b>Processing</b>	
Gabor deconvolution	Gary F. Margrave et al.
Constant-Q wavelet estimation via a nonstationary Gabor spectral model	Jeff P. Grossman et al.
A ProMAX implementation of nonstationary deconvolution	David C. Henley et al.
Spectral clipping: a ProMAX module for attenuating strong monochromatic noise	David C. Henley
The spectral ratio technique for determining sea-floor reflectivity	David C. Henley
Suppression of water-column multiples by combining components of OBS surveys	Yan Yan et al.
Reprocessing the 1999 Blackfoot 3C-3D seismic data and anisotropy analysis for the radial component converted-waves	Han-xing Lu et al.
Angle of incidence estimation for converted-waves	Carlos Nieto et al.
Methods for isolating coherent noise in the Radon domain	Shauna K. Oppert et al.
Estimation of Thomsen's anisotropy parameter delta using CSP gathers	Pavan Elapavuluri et al.
How much does migration aperture actually contribute to migration result?	Shuang Sun et al.
Gabor deconvolution applied to a Blackfoot dataset	Victor Iliescu et al.
<b>Reviews</b>	
The parabolic cylinder function in elastodynamic problems	P.F. Daley
Snell's law in transversely isotropic media	P.F. Daley
A review of AVO analysis	Hongbo Zhang et al.
4-D seismic and time-lapse reservoir geology	Rudi Meyer
<b>Rock Physics</b>	
Seismic zonation performance measures	Laurence R. Bentley et al.
Exploitation of an oil field using AVO and post-stack rock property analysis methods	Andrew Royle
A generalized Gardner relation	Charles P. Ursenbach
Simulation of elastic moduli for porous materials	Charles P. Ursenbach
Extending AVO inversion techniques	Charles P. Ursenbach et al.
Approximating the P-S reflection coefficient for small incidence angles	Alexandru Vant et al.
<b>Western Canada</b>	
Comparison of shallow seismic and ground-penetrating radar images, Calgary airport	Robert R. Stewart et al.

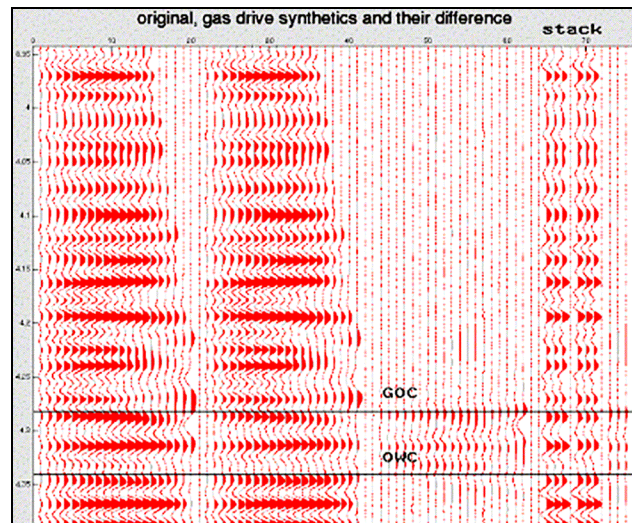
## Time-lapse seismic and AVO modelling, White Rose Field, Newfoundland

Ying Zou and Laurence R. Bentley

The White Rose field is located in Jeanne d'Arc Basin, offshore Newfoundland. Husky Oil drilled the White Rose L-08 well during the spring of 1999, and the field was found to contain a gas cap, an oil leg and a water drive. The White Rose Field has not been brought to production to date, but it is expected that time-lapse seismic surveying may play an important role in the production of the field as it has in many North Sea fields. To this end we have carried out a feasibility study for time-lapse monitoring of potential future production. Three production scenarios are presented - a water drive, a gas drive, and a mixed water/gas drive.

To carry out this study we have developed a software package, FluidSeis, included in this year's CREWES software release. It implements fluid substitution procedures developed previously at CREWES, and can be employed to predict post-production well logs from pre-production logs. We applied this to Husky Oil's L-08 well logs for each of the three scenarios, and then performed P-P and P-S AVO modelling with Hampson-Russell software and CREWES' SYNTH program. Differencing of the pre- and post-production AVO is illustrated in the accompanying figure for P-S AVO of the gas drive scenario.

This figure indicates a clear time-lapse signature of production effects. A more detailed analysis of all our results, to be presented at the CREWES Sponsors' Meeting, verifies this to be a robust result, and indicates that the White Rose Field is a good candidate for time-lapse seismic monitoring of fluid movements.



P-S wave synthetic traces for original logs, gas drive logs and their difference.

## Making Contact...

### Directors:

Dr. Robert Stewart: stewart  
Dr. Gary Margrave: gary  
Dr. Don Lawton: donl  
Dr. Larry Lines: lines

### Associated Faculty Members:

Dr. John Bancroft: bancroft  
Dr. Larry Bentley: bentley  
Dr. Jim Brown: jbrown  
Dr. Rudi Meyer: meyer

### Administrative Manager:

Louise Forgues: louise

### Research Staff:

Henry Bland: henry  
Dr. Pat Daley: daley  
Eric Gallant: eric  
Kevin Hall: khall  
Dave Henley: henley  
Mark Kirtland: kirtland

**Contact Note:** Readers wishing to contact staff and students should add the domain, @crewes.org, to the usernames listed below.

Han-Xing Lu: lu  
Carla Osborne: carosbor  
Dr. C. Ursenbach: ursenbach

### Graduate Students:

Richard Bale: rbale  
Jeff Beckett: beckett  
Louis Chabot: chabot  
Linping Dong: dongl  
Jon Downton: downton  
Pavan Elapavuluri: pavan  
Jeff Grossman: grossman  
Victor Iliescu: iliescu  
Jessica Jaramillo: sjmjaram  
Kum Liu: kliu  
Peter Manning: manning  
Michael Mazur: mazur  
Yanpeng Mi: mi  
Alexandre Minev: aminev  
Monica Moldoveanu: ammoldov

Carlos Nieto: nieto  
Christopher Ogiesoba: oogiesob  
Shauna Oppert: oppert  
Marco Perez: perez  
Sarah Richardson: serichar  
Andrew Royale: ajroyale  
Brian Russell: russell  
C. Silawongsawat: pensil  
Shuang Sun: shuang  
Alexandru Vant: vant  
Graham Warren: warren  
Ian Watson: watson  
Yan Yan: yyan  
Jianli Yang: yang  
Hongbo Zhang: hzhang  
Jianlin Zhang: zhang  
Ye Zheng: ye  
Ying Zou: zou