CREWES 30th Annual Meeting Welcome and Introduction

CREWES Annual Sponsor's Meeting

Nov 29 2018

Banff AB CA

- Banquet tonight (Thu) 6:30pm
- Checkout tomorrow prior to session; store luggage
- This year: all content is online

Slide Shows for 2018

Talk	Author(s)	Title	Availability
0	Kris Innanen	Welcome and Introduction	Document
1	Don Lawton	A shear wave land streamer	Document
2	Kevin Hall	CREWES 2018 simultaneous 3C/DAS WVSP field experiment	Document
3	Kris Innanen	Design and deployment of a multicomponent DAS sensor	Document
4	Nadine Igonin	Microseismic and SWD in the physical modelling lab	Document
5	Daniel Trad	Compressive sensing, de-blending and a new dataset	Document
6	Tyler Spackman	Monitoring with permanent source data	Document
7	Marie Macquet	Ambient noise monitoring at CaMI-FRS	Document
8	Tim Cary	Monitoring methane gas migration in the near surface	Document
9	Rachel Lauer	A proposal for and applications of a marine thermal probe	Document
10	Heather Hardeman	Results from 2018 CaMI DAS VSP data acquisition	Document
11	Huaizhen Chen	Inversion for stress and fluids in randomly-oriented fractures	Document
12	David Henley	Wrinkel reduction in 3D source ensembles	Document
13	Ron Weir	Integration of reflection and microseismic data	Document
14	Adriana Gordon	Processing of walkaway DAS/geophone VSP data	Document
15	Andrew Iverson	Internal multiple prediction and generator spectra	Document
16	Sergio Romahn	Log-validated FWI with wavelet phase and amplitude updating	Document
17	Scott Keating	Viscoelastic FWI: solving for Qp, Qs and Vp, Vs and density	Document
18	Matthew Eaid	Towards 4C FWI: DAS and 3C as complimentary datasets	Document
19	Raul Cova	Practical multicomponent land FWI	Document
20	Scott Keating	Connectin FWI and LSRTM through variable restriction	Document
21	Jian Sun/Junxiao Li	Deep learning and FWI	Document

Passwords

Research Reports

Conf. Abstracts

Friday Talks

CREWES Software

CREWES News

Overview Slides

Talks & Courses

Sponsors Meeting

Sponsors Meeting Talks

Sponsors Meeting Posters

Sponsors Meeting

NSERC CRSNG

5 Research Staff - 7 Postdoctoral Fellows - 3 Directors - 7 Collaborators & Investigators & 26 Graduate students
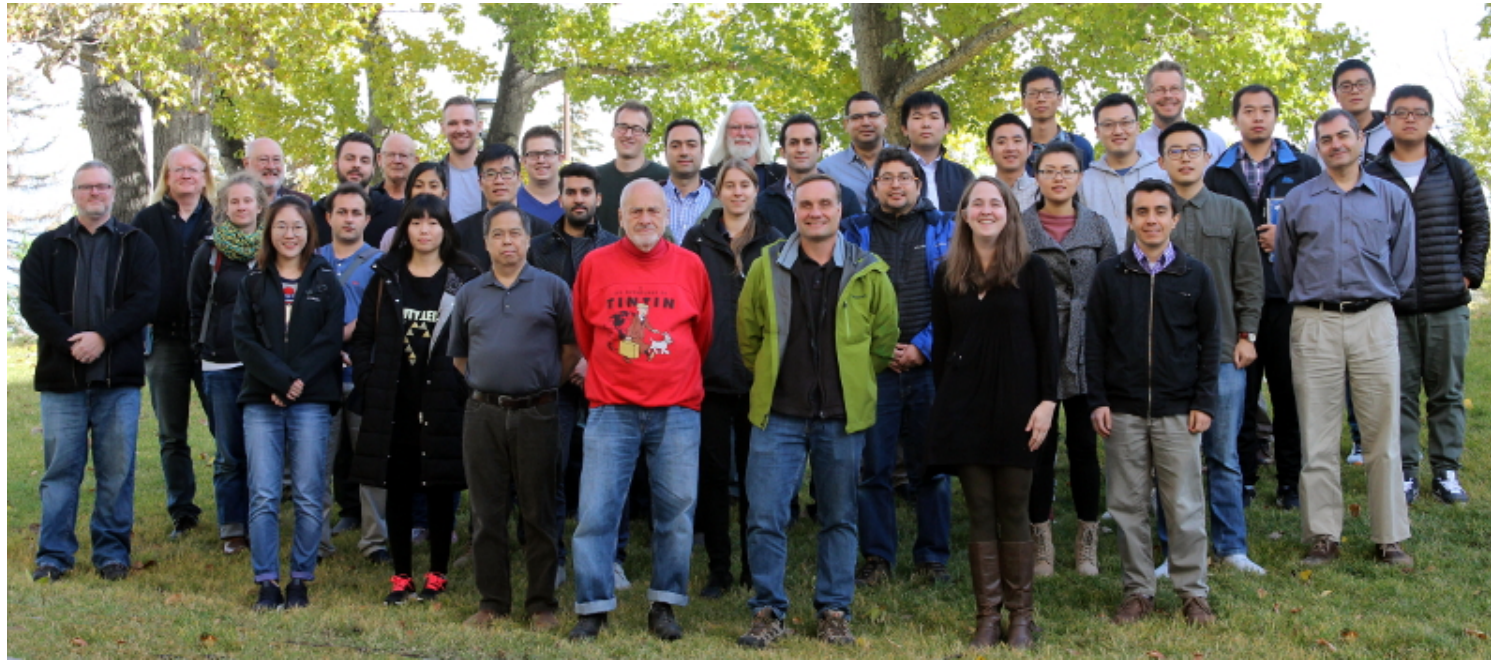
We do the basic and applied science behind the creation and extension of new seismic technology

CREWES

Acceleware

CGG

Chevron Corporation

Devon Energy Corporation

Halliburton

INOVA Geophysical

Nexen Energy ULC

PETRONAS Carigali SDN BHD

Repsol Oil and Gas

RIPED, Petrochina

SINOPEC

TGS

Photo courtesy of
Andreas Cordsen

Central Okanagan
Search and Rescue

www.cosar.ca

CREWES @ University of Calgary Geophysics Field School
(see K. Bertram et al., CREWES 2018 Report)

CREWES @ University of Calgary Geophysics Field Sc
(see K. Bertram et al., CREWES 2018 Report)

Welcome back Joe!

Upgrades to the Physical Modeling Lab – new benchmark datasets
(MS, SWD, time reversal: see Igonin et al., CREWES 2018 Report

CREW
(see K

Upgrades to the Physical
(MS, SWD, time reversal:

CREWES 2018 3C/DAS WVSP
(see Hall et al., 2018 CREWES Report)
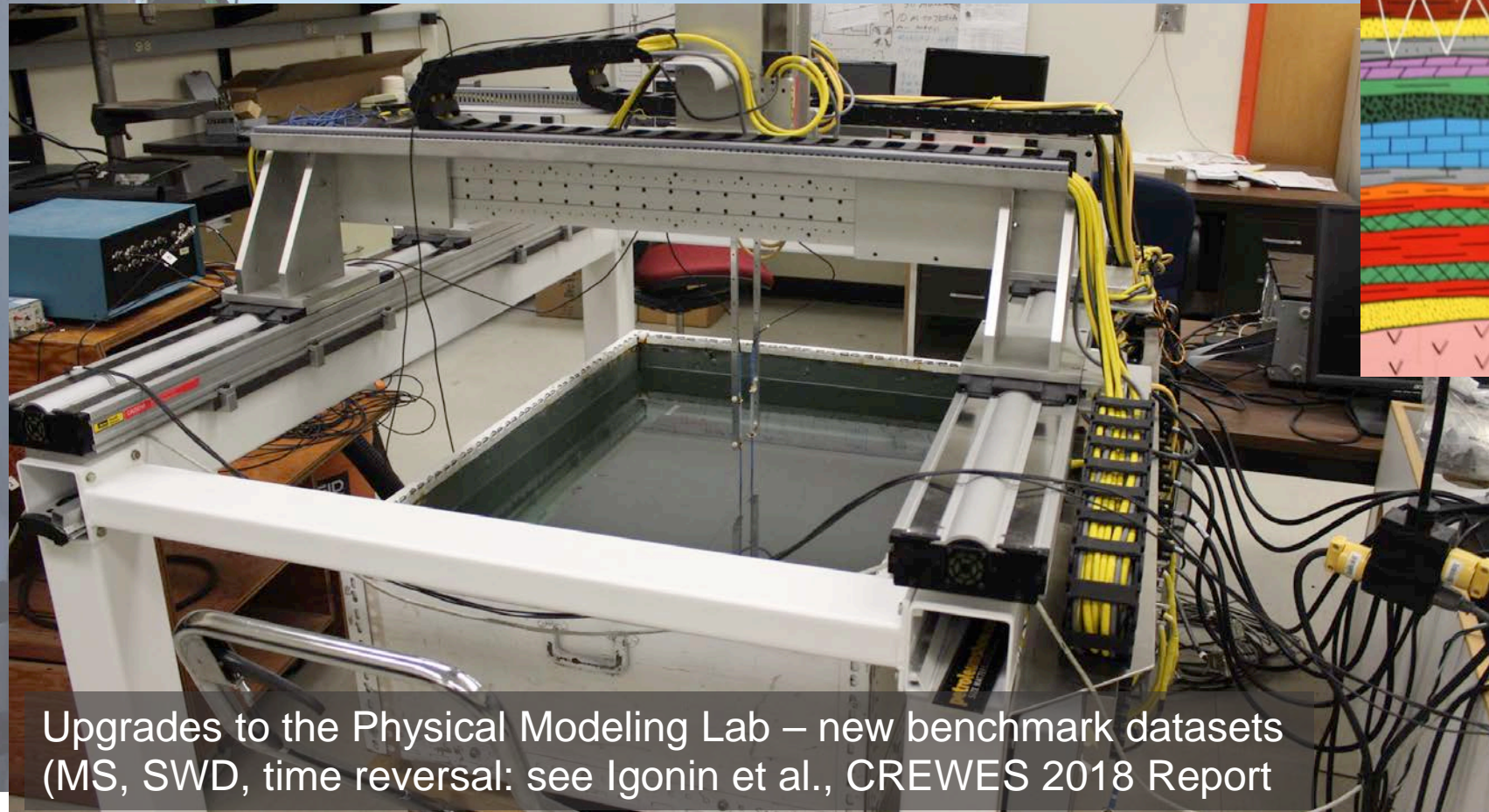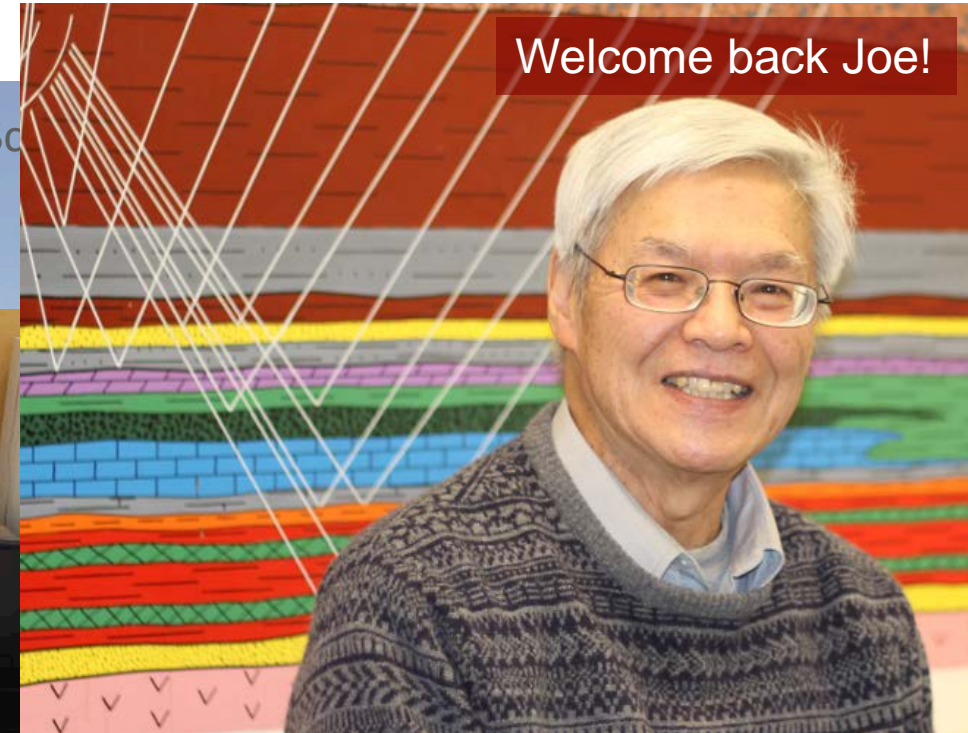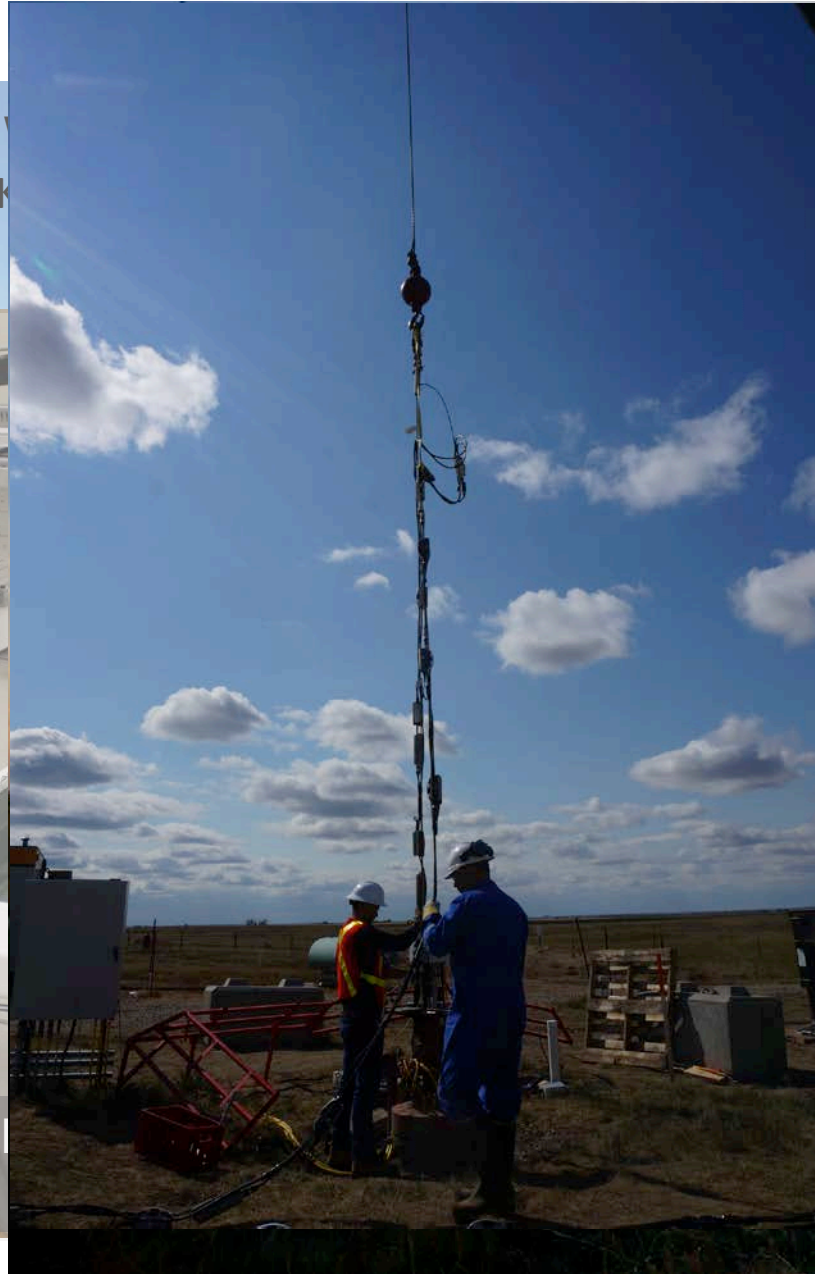
Prototype multicomponent DAS sensor
(see Innanen et al., 2018 CREWES Report)

18 3C/DAS WVSP
l., 2018 CREWES Report)

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(MS, SWD, time reversal:

Prototype multico
(see Innanen et a
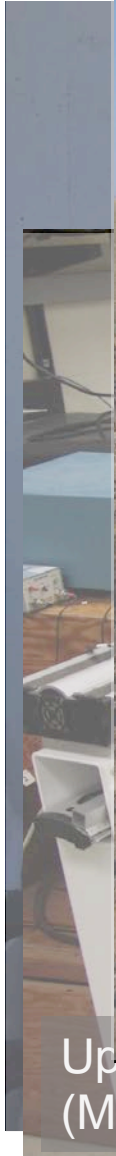
Permanent source installation (see Spackman et al., 2018 CREWES Report)

Upgrades to the Phy
(MS, SWD, time reve

C/DAS WVSP
018 CREWES Report)

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Expires 31 December 2019

Numerical Methods of Exploration Seismology

With Algorithms in MATLAB

Gary F. Margrave
University of Calgary
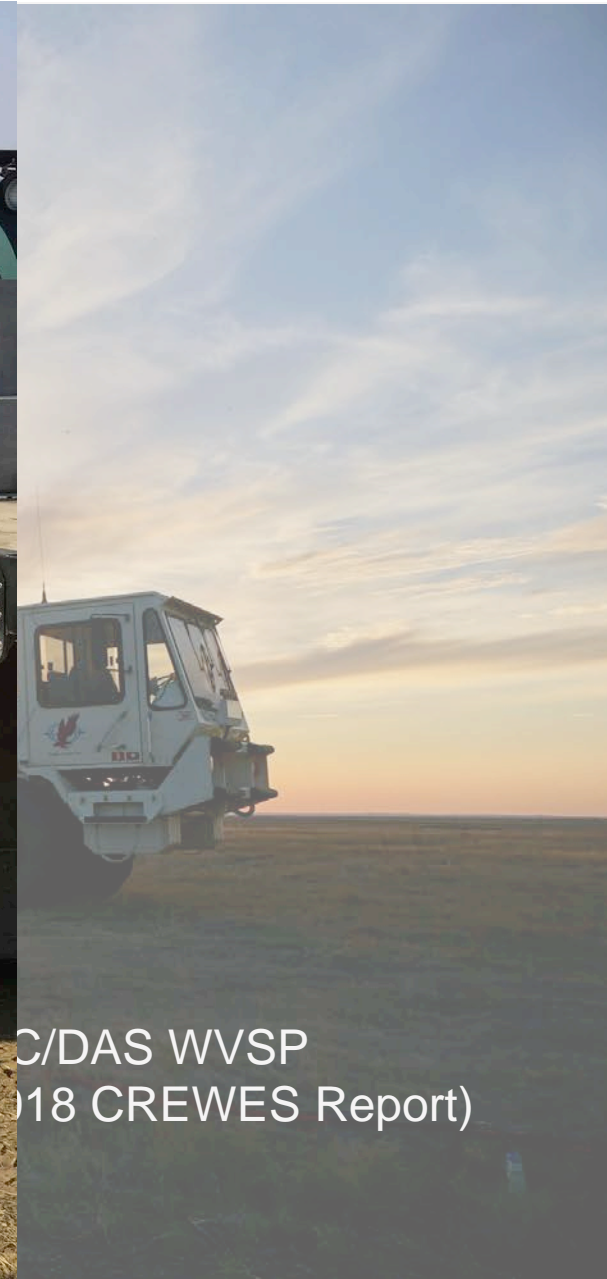
and Michael P. Lamoureux
University of Calgary

Exploration seismology uses seismic imaging to form detailed images of the Earth's interior, enabling the location of likely petroleum targets. Due to the size of seismic datasets, sophisticated numerical algorithms are required. This book provides a technical guide to the essential algorithms and computational aspects of data processing, covering the theory and methods of seismic imaging. The first part introduces an extensive online library of MATLAB seismic data processing codes maintained by the CREWES project at the University of Calgary. Later chapters then focus on digital signal theory and relevant aspects of wave propagation and seismic modelling, followed by deconvolution and seismic migration methods. Presenting a rigorous explanation of how to construct seismic images, it provides readers with practical tools and codes to pursue research projects and analyses. It is ideal for advanced students and researchers in applied geophysics, and for practicing exploration geoscientists in the oil and gas industry.

Preface; 1. Introduction to MATLAB and seismic data; 2. Signal theory – continuous; 3. Signal theory – discrete; 4. Wave propagation and seismic modelling; 5. Deconvolution – the estimation of reflectivity; 6. Velocity measures and ray tracing; 7. Elementary migration methods; References; Index.
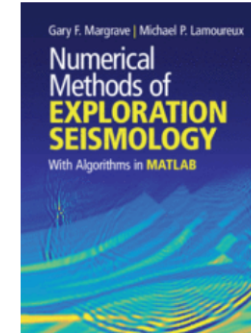
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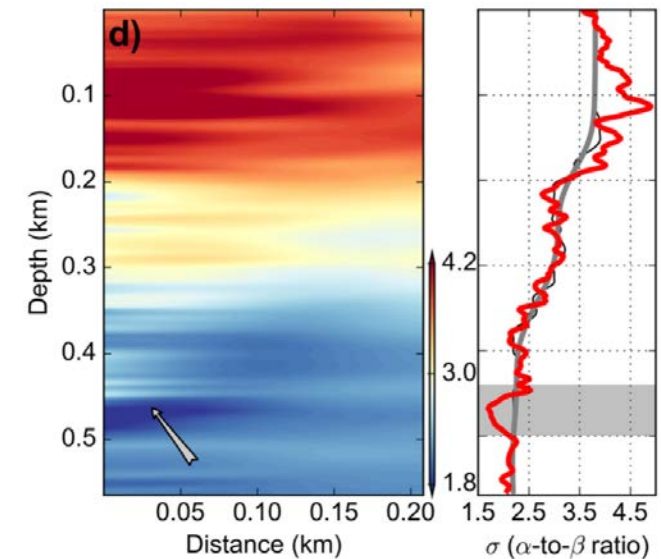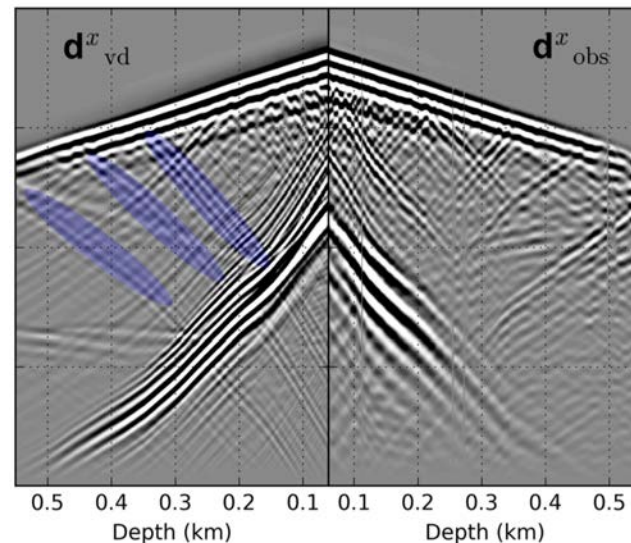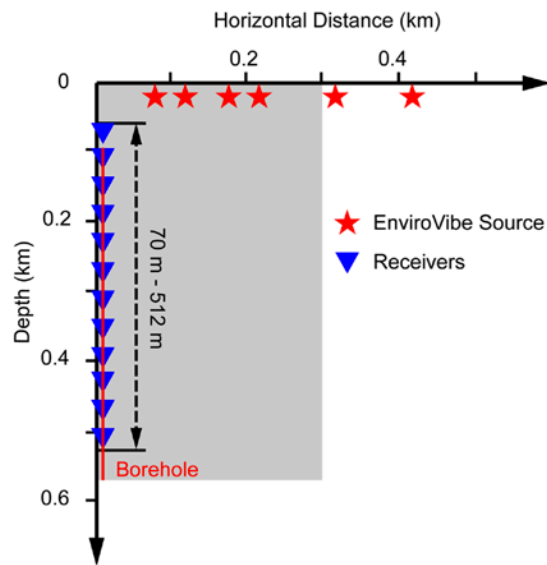**www.cambridge.org/9781107170148**

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New Collaborative Research and Development Grant Proposal

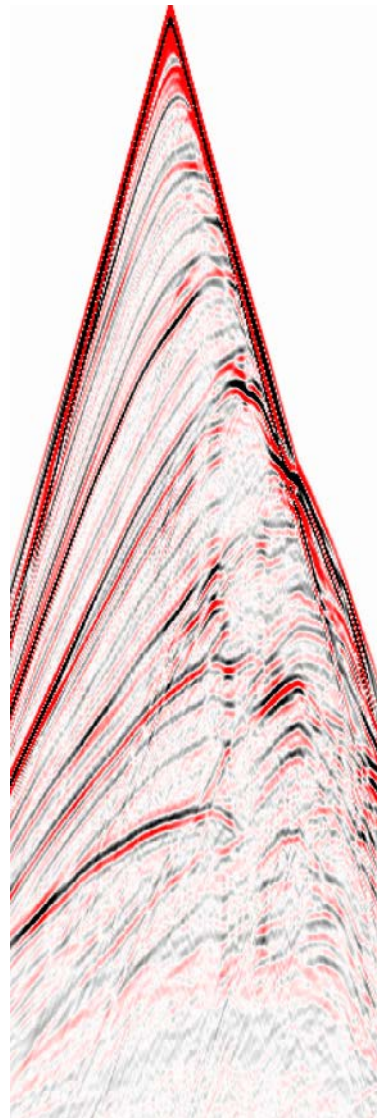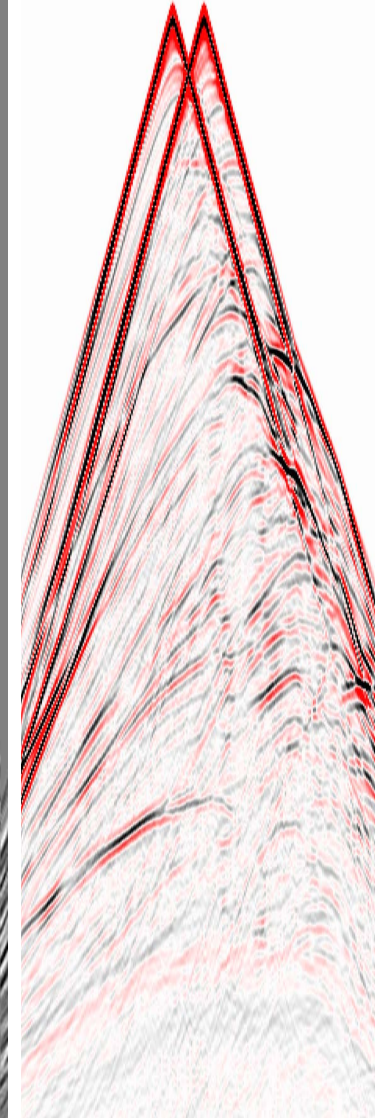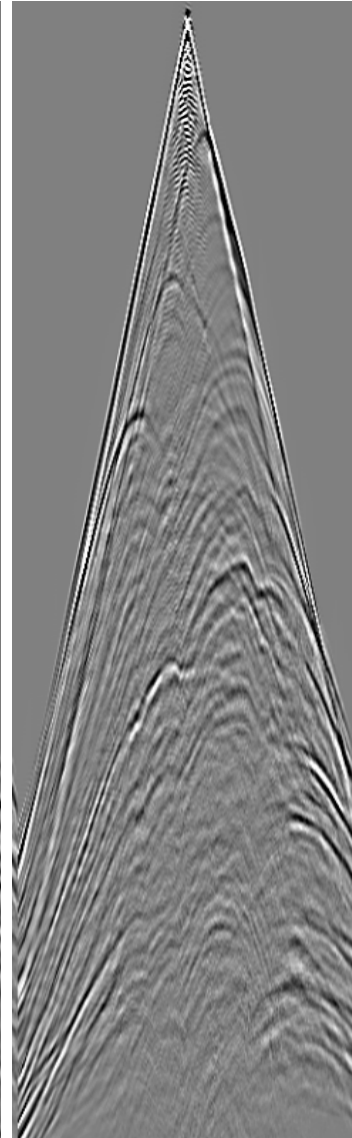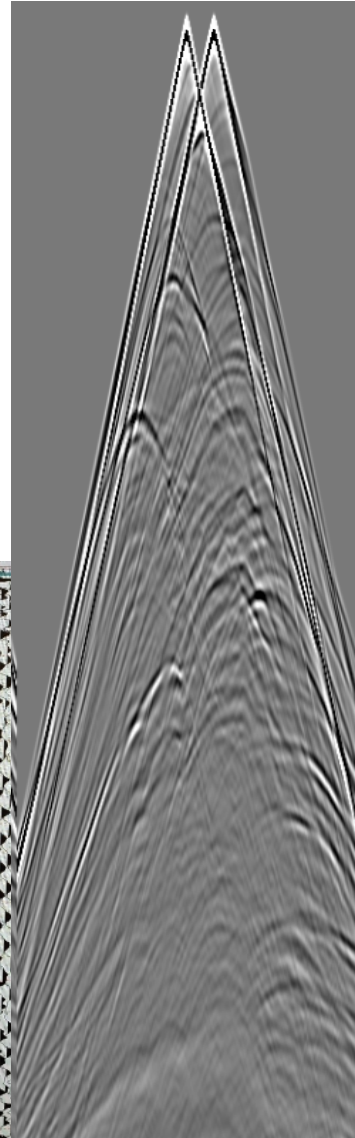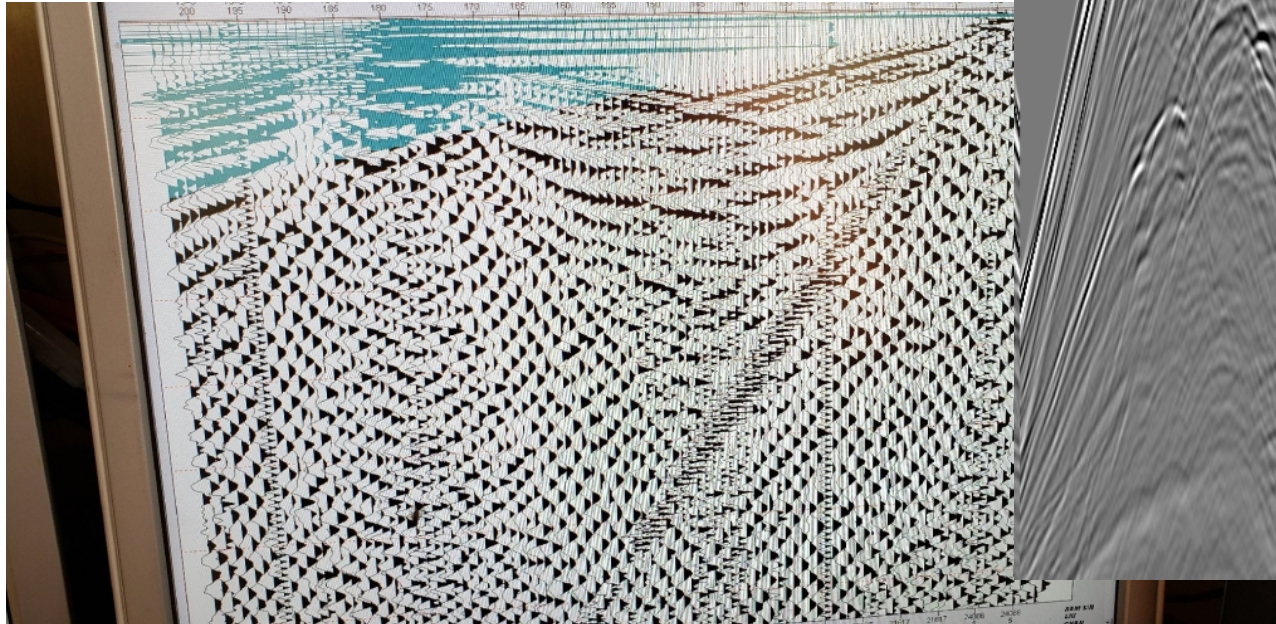"Full waveform sensing of reservoir structures, stresses, fluids, and fractures: integrating acquisition, imaging/inversion, and geocomputation" (2019-2024)

Field experiment to support CS research – seeking input & partners!

CREWES 2018 Annual Meeting Technical Program

Thurs Nov 29

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08:30	Acquisition	Welcome	K. Innanen
08:50		A shear wave land streamer	D. Lawton
09:10		CREWES 2018 3C+DAS WVSP experiment	K. Hall
09:30		Design and deployment of a prototype 6C DAS sensor	K. Innanen
09:50		MS + SWD lab experiments	N. Igonin
10:10		CS: processing and acquisition	D. Trad
10:30		*COFFEE*	
11:10	Monitoring	Seismic monitoring with permanent sources	T. Spackman
11:30		Ambient noise monitoring at CaMI	M. Macquet
11:50		Near surface methane monitoring	T. Cary
12:10		*LUNCH*	
01:30		Marine thermal probe applications	R. Lauer
01:50		New DAS data processing results	H. Hardeman
02:10		Inverting for stress and fluids in randomly-oriented fractures	H. Chen
02:30	Processing	Wrinkle reduction in 3D source ensembles	D. Henley
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03:10		Integration of reflection & microseismic data	R. Weir
03:30		Processing of geophone vs DAS data	A. Gordon
03:50		Multiple prediction and generator spectra	A. Iverson

Fri Nov 30

Time	Session	Talk Title	Speaker
08:30	FWI on land	Land FWI with log validation	S. Romahn
08:50		Viscoelastic FWI: V_P, V_S, Q_P, Q_S, ρ	S. Keating
09:10		FWI combining DAS and multicomponent data	M. Eaid
09:30		Practical steps for land FWI	R. Cova
09:50		*COFFEE*	
10:10		Connecting FWI and LSRTM	S. Keating
10:30	Machine Learning	Deep learning and FWI	J. Sun
10:50		Machine learning for facies classification and salt target identification	M. Guarido
11:10		Velocity model building with slope tomography	B. Law
11:30		Viscoacoustic RTM in TTI media	A. Fathalian
11:50		*LUNCH*	
01:00		P- and S-wave elastic reverse time migration	J. Monsegny
01:20		The next generation in drillstring imaging	R. Shor
01:40		LSRTM of a seismic-while-drilling dataset	N. Kazemi
02:00	New ideas & applications	*COFFEE*	
02:20		Geophysics and medicine	L. Lines
02:40		Quantum computing in exploration and monitoring seismology	S. Moradi
03:00		New monitoring modes: time boundaries and elastic bracing	K. Innanen
03:20		Deep neural networks for prediction of reservoir properties	J. Downton

Sat Dec 01

Time	Talk Title
9:00am-3:00pm	Short Course: Ideas, algorithms and applications of Machine Learning in geophysics

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10:30	Machine Learning	Deep learning and FWI	J. Sun
10:50		Machine learning for facies classification and salt target identification	M. Guarido
11:10		Velocity model building with slope tomography	B. Law
11:30		Viscoacoustic RTM in TTI media	A. Fathalian
11:50		*LUNCH*	
01:00		P- and S-wave elastic reverse time migration	J. Monsegny
01:20		The next generation in drillstring imaging	R. Shor
01:40		LSRTM of a seismic-while-drilling dataset	N. Kazemi
02:00	New ideas & applications	*COFFEE*	
02:20		Geophysics and medicine	L. Lines
02:40		Quantum computing in exploration and monitoring seismology	S. Moradi
03:00		New monitoring modes: time boundaries and elastic bracing	K. Innanen
03:20		**Deep neural networks for prediction of reservoir properties**	**J. Downton**

Sat Dec 01

9:00am-3:00pm	Short Course: Ideas, algorithms and applications of Machine Learning in geophysics

CREWES 2018 Annual Meeting Technical Program

Thurs Nov 29

Time	Session	Talk Title	Speaker
08:30	Acquisition	Welcome	K. Innanen
08:50		A shear wave land streamer	D. Lawton
09:10		CREWES 2018 3C+DAS WVSP experiment	K. Hall
09:30		Design and deployment of a prototype 6C DAS sensor	K. Innanen
09:50		MS + SWD lab experiments	N. Igonin
10:10		CS: processing and acquisition	D. Trad
10:30		*COFFEE*	
11:10	Monitoring	Seismic monitoring with permanent sources	T. Spackman
11:30		Ambient noise monitoring at CaMI	M. Macquet
11:50		Near surface methane monitoring	T. Cary
12:10		*LUNCH*	
01:30		Marine thermal probe applications	R. Lauer
01:50		New DAS data processing results	H. Hardeman
02:10		Inverting for stress and fluids in randomly-oriented fractures	H. Chen
02:30	Processing	Wrinkle reduction in 3D source ensembles	D. Henley
02:50		*COFFEE*	
03:10		Integration of reflection & microseismic data	R. Weir
03:30		Processing of geophone vs DAS data	A. Gordon
03:50		Multiple prediction and generator spectra	A. Iverson

Fri Nov 30

Time	Session	Talk Title	Speaker
08:30	FWI on land	Land FWI with log validation	S. Romahn
08:50		Viscoelastic FWI: V_P, V_S, Q_P, Q_S, ρ	S. Keating
09:10		FWI combining DAS and multicomponent data	M. Eaid
09:30		Practical steps for land FWI	R. Cova
09:50		*COFFEE*	
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Sat Dec 01

9:00am-3:00pm **Short Course: Ideas, algorithms and applications of Machine Learning in geophysics**

Your support is critical!

Training (new academic and industry)

New seismic data-sets acquired for purpose

Creating and validating the next generation of technology

Increasing the value and the profile of geophysics