

CREWES NEWS

The Consortium for Research in Elastic Wave Exploration Seismology

CREWES Welcomes New Staff

CREWES is pleased to welcome three new members of staff who will be active in helping colleagues and students in the coming months.

Dave Henley joins us as **Senior Geophysicist** after retiring from Shell Canada last year. Dave has been in contact with CREWES for most of its existence, both as a sponsor representative for Shell, and as a member of the IAB for several years. He joins us after working with Shell for 29 years as a geophysicist, mostly researching and developing seismic techniques, both at Shell Canada, and earlier at Shell Oil in the US.



Dave acquired his B.Sc. in Physics from Colorado State University in 1967 and his M.Sc. from the University of Michigan in 1968. Following some early Shell experience assigned to a seismic crew, Dave spent two years in the US Army stationed at White Sands Missile Range assisting in research on atmospheric dust. Upon his return to Shell, he worked in Houston before accepting a permanent transfer to Shell Canada as a research geophysicist. During his Shell career, Dave investigated a variety of topics including: aspects of deterministic deconvolution, restoration of the low-frequency "trend" to seismic data from moveout information (inversion), sign-bit velocity analysis, solving for residual statics in the F-K domain, Tau-P domain velocity analysis, cross-well differential imaging, multi-offset GPR data imaging, and techniques for improving imaging in data "wipeout" zones.

Dave's most immediate interests at CREWES are linear noise rejection and linear wavefield separation, using a technique learned from studying data in wipeout zones, as well as various aspects of acquisition technology, particularly as applied to poor data areas.

Linping Dong comes to CREWES as a **Visiting Scholar**. Linping graduated from the University of



Petroleum in China with a B.Sc. in Seismology. He worked as a lecturer at the South-western Petroleum Institute for ten years, during which time he taught courses in seismology, digital signal analysis and C++. From 1993, Linping worked at the Exploration Research Centre of the Bureau of Tarim Petroleum Exploration and Development as a senior engineer for three years, in charge of seismic data processing. In 1997 he became Associate Professor at the Department of Geology in Xi'an Petroleum Institute. With CREWES, Linping will be focussing on increasing resolution by digital and physical modelling. He will be working closely with Zhengsheng Yao and Gary Margrave.

Zhengsheng Yao joins us as a **Post-doctoral Fellow**. Zhengsheng completed his Ph.D. entitled "Seismic Tomography: algorithms and applications" at the Earth Sciences Department of Uppsala University, Sweden last year. During the time in Uppsala as a research fellow, Zhengsheng participated in several research programs, including 3-C seismic data analysing and migration from controlled sources, seismic tomography, and inverse modelling of large profiles of Airborne Tensor VLF data. Zhengsheng received his B.Sc. in Physics from Anhui Labour University, China and his M.Sc. from the Lanzhou Seismological Institute, State Seismological Bureau, China. He has also programmed various geophysical applications in Fortran, C, and C++.



Air Noise Reduction Tests Go Ahead

Can microphone recordings of air waves, recorded close to a geophone, be used to suppress air-wave noise on the geophone? We set out to answer this question by staging a small experiment. We placed microphones at the beginning, middle, and end of a small 9 phone, 16m-long spread. Using an accelerated mass thumper as a source, our 3-C geophones picked up considerable air-wave noise.

We'll be analysing these data to see what kind of correlation exists between the microphones and the geophones. Stay tuned!



CREWES Undertakes 4-C OBC Modelling Study

CREWES met with a number of oil & gas companies in Calgary on December 15th, 1998 to discuss the possibility of acquiring a 4-C ocean bottom cable (OBC) survey offshore eastern Canada. Given the cost of an OBC survey and the present economic conditions, the companies were reluctant to commit to a survey at the present time.

However, CREWES has committed itself to an OBC modelling study of one of the Jeanne d'Arc discoveries in order to better rationalise the survey expense. This modelling is presently being completed and we hope to re-convene with the companies in early April to present our results and encourage them to pursue this new and exciting marine seismic technology here in Canada.

CREWES Involved in PanCanadian Survey

The Blackfoot Glauconite Channel reservoir is located east of Calgary in Southern Alberta, Canada. The reservoir is a compound incised-valley with upper and lower valley producing reservoirs separated by an impermeable lithic valley. The reservoir is located approximately 1550 m below ground level, has a combined maximum thickness of 35 m, an average porosity of 18.3% and an average intrinsic permeability of 450 mD.

Production began in 1994 and in order to maintain reservoir pressure, water injection began in August, 1995. Water is being injected across both producing intervals. Production records show that pressure has been maintained in the upper valley, but the lower valley has shown significant pressure depletion.

The reservoir engineering question that has been raised is "Where has the water gone?" CREWES and PanCanadian are investigating the feasibility of using time-lapse seismic surveying to answer the question. In November, 1995, the CREWES project shot a 3-C, 3-D seismic survey over the reservoir. In addition we have several well logs and VSP data. At the present time we are collating the petrophysical and fluid property data in order to analyse the anticipated change in acoustic response due to replacing oil and gas with water. If the feasibility study looks promising, CREWES will investigate shooting a new 3-C, 3-D survey over the producing reservoir in 1999.

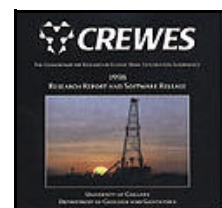
Landmark Donates Latest Software to CREWES

CREWES was delighted to receive the latest versions of MIMIC+/QUIK+, QuikWell+, and VESPA from Landmark Graphics Corporation. This software is being put to good use and will help us greatly in our research in the coming years.

Hardbound 1998 CREWES Research Report

Hardbound copies of the 1998 CREWES Research Report are available to Sponsors at a cost of \$75.00 (Canadian).

Orders should be preferably emailed to crewes@geo.ucalgary.ca or mailed to our address overleaf, to arrive by March 28th 1999.



Students at CREWES - Ayon Kumar Dey

This month's CREWES NEWS Student Profile focusses on Ayon Dey, who graduates this spring with an M.Sc.

Ayon joined CREWES in 1997. He originally entered Memorial University of Newfoundland (M.U.N.) with a view to studying medicine, but after some academic exploration, he graduated with a B.Sc. in Applied Mathematics. During his 2nd year, Ayon was awarded an National Science and Engineering Research Council (N.S.E.R.C.) of Canada summer research scholarship in Mathematical Geophysics with the Memorial University Seismic Imaging Consortium (M.U.S.I.C.) project. Under the supervision of Larry Lines, at that time also at M.U.N., Ayon completed a project that related minimum spanning tree algorithms from graph theory to shortest time ray tracing in seismic wave propagation. For the first time he was able to apply his theoretical mathematics background to a real world application and became "hooked" on Geophysics.



Ayon Dey

Since then Ayon has worked on diverse projects, including the development of a sustainable harvesting model for sheep, modelling tidal waves using second order elliptical equations, and investigating mathematical wavelet filtering of noise from seismic data. After completing his undergraduate studies, he enrolled in graduate school under Larry's supervision. Ayon then followed Larry when he came to Calgary to join CREWES and take up the Chair of Exploration Geophysics.

Ayon's research for his M.Sc. thesis centres on statistical wavelet deconvolution and its validity. Specifically, he is investigating the assumption that reflectivities are random and also investigating the phase assumptions made about wavelets generated from different sources. To date, this work has yielded a fairly simple test by which one can evaluate the randomness assumption for a particular geological region. In addition to this work, he has developed a method by which to evaluate the uncertainty in an AVO response so as to have a quantitative index for AVO risk assessment.

In his limited free time, Ayon enjoys reading, travelling the world, and drinking a good cup of dark roast coffee.

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