

AGENDA – ROSE meeting 23rd-26th April 2018

Location: P1 in PTS1, S.P. Andersens veg 15, Trondheim.

Monday 23rd April

09:00 Coffee and registration

09:30 Welcome

Session 1: Rock physics

09:40 Understanding pore compliance and poroelasticity in reservoir (and beyond): A geophysical approach, *Jared Atkinson, Colorado School of Mines*

10:00 Rock Physics models for fractured rocks saturated with two immiscible fluids, *Mark Chapman, University of Edinburgh*

10:20 From B to A – the influence of subsurface injection or depletion on pore pressure in surrounding rocks, *Rune M Holt, NTNU*

10:40 Rock physics characterization of a deep overburden shale, *Audun Bakk, SINTEF*

11:00 On some unsolved issues in shale rock physics - How do we model compaction, cementation and uplift of shales?, *Per Avseth, NTNU/G&G Resources*

11:20 Can controlled laboratory experiments be linked to uplift estimation?, *Sondre Torset, NTNU*

11:35 Relating static and dynamic stiffnesses of shales: effects of frequency and stress, *Serhii Lozovyi, NTNU*

11:50 Laboratory measurements of seismic attenuation, *Stian Rørheim, NTNU*

12:00 **LUNCH**

Session 2: Modeling, Processing and Anisotropy

13:00 Elimination of time dispersion from wave equation modelling in elastic and anelastic media, *Lasse Amundsen, NTNU/Statoil and Ørjan Pedersen, Statoil*

13:20 S-waves in acoustic TTI media, *Jin Song, NTNU*

13:40 Normal modes in an orthorhombic medium, *Yuriy Ivanov, NTNU*

14:00 A new parameterization in acoustic orthorhombic media, *Shibo Xu, NTNU*

14:20 Interaction of wave modes in layered orthorhombic media, *Alexey Stovas, NTNU*

14:40 **Coffee break**

15:10 Drift and attenuation on the NCS: A new look at an old approach, *Andrew Carter*

15:30 Estimating velocities and layer thickness changes from diving waves, *Izzie Y. Liu, NTNU*

Session 3: Seismic acquisition and broadband seismic

15:50 TopSeis, results of the 2017 Barents Sea campaign, *Vetle Vinje, CGG*

16:10 Signal-apparition based simultaneous source decoding, *Johan Robertsson, ETH Zurich*

16:30 Comparing video recordings of ghost cavitation to cavity modeling, *Babak Khodabandeloo, NTNU*

19:00 Dinner, To rom og kjøkken

Tuesday 24th April

Session 4 Time lapse and reservoir characterization

- 09:00 Calculation, measurement and evaluation of time-lapse time-shifts, *Colin MacBeth, HWU*
- 09:20 Gas leakage through shallow sediments – laboratory experiments compared to passive and active seismic field data, *Martin Landrø, NTNU*
- 09:40 Time-lapse refraction analysis monitoring shallow gas migration, *Nora Løw Løhre, NTNU*
- 09:55 Using diving waves for time-lapse seismic studies and overburden characterization, *Bjarte Foseide, NTNU*
- 10:10 **Coffee break**
- 10:40 Estimating S-wave velocities and changes from tube waves, *Daniel Wehner, NTNU*
- 11:00 Identifying depleted areas and potential HSE-situations using overburden 4D time shifts, *Thomas Røste, Statoil*
- 11:20 Time lapse analysis of overburden water injection in Ekofisk, *Filipe Borges, NTNU/Petrobras*
- 11:40 Net exhumation estimation using an effective-medium technique based on seismic traveltimes, *R. J. Martinez and Kenneth Duffaut, NTNU*
- 12:00 **LUNCH**

Session 5: Imaging and inversion

- 13:00 Full Waveform Ambient Noise Inversion, *Korbinian Sager, ETH Zurich*
- 13:20 Inversion of density from seismic data, *Børge Arntsen, NTNU*
- 13:40 3D Elastic seismic modeling using CUDA unified memory and gaming GPUs
Tore Sivertsen Bergslid, NTNU
- 14:00 Ensemble based seismic inversion methods, *Jo Eidsvik, NTNU*
- 14:20 **Coffee break**
- 14:50 Sensitivity Analysis and Uncertainty in EFWI Using the Hessian Matrix,
Vegard Stenhjem Hagen, NTNU
- 15:10 Sewing the Born approximation into the finite difference scheme with interpolation to model small-scale structures, *Ivan Karpov, NTNU*
- 15:30 Sensitivity and cross-talk for Q-estimation, *Marco D'Oleire, NTNU*
- 15:50 Ocean ambient noise for seabed characterization, *Hefeng Dong, NTNU*
- 16:10 Iterative signal decomposition and time-frequency representation using singular spectrum analysis,
Bjørn Ursin, NTNU
- 16:30 Summary and adjourn

25th -26th April: Course on Seismic Characterization of Shales by Per Avseth and Rune M. Holt, Course ends afternoon 26th April

Two-day course on Rock Physics and Seismic Characterization of Shales

Lecturers: Per Avseth and Rune M Holt; 25th-26th April 2018, aud. P1, S.P. Andersens veg 15A

Note that the course ends at 15:30, Thursday 26th April

Rock Physics and Seismic Characterization of Shales

Professor Per Avseth (NTNU and G&G; email: per.aage.avseth@gmail.com)

Professor Rune M Holt (NTNU, email: rune.holt@ntnu.no)

Course objective

The main objective of this course is to link experimental and theoretical rock physics to seismic response of shales as source rocks, within the overburden and as reservoir rocks.

Course schedule

Time plan (day 1, Wednesday):

08:30	Lecture	13:15	Lecture
10:15	Coffee	15:00	Coffee
10:45	Lecture	15:30	Lecture
12:15	Lunch	17:00	End

Time plan (day 2, Thursday):

08:30	Lecture	13:15	Lecture
10:15	Coffee	15:00	Wrap-up
10:45	Lecture	15:30	End
12:15	Lunch		

Course contents

Language: English. Presentation material and articles by the instructors will be provided.

Day 1

Morning:

Challenges and opportunities of shales in the oil industry. Introduction to shale rock physics: Observations of elastic wave velocities in shales, and how they relate to porosity, mineralogy, stress, temperature and frequency. Shale compaction and rock physics depth trends, application to uplift estimates and pore pressure estimates.

Afternoon:

Shale rock physics modelling. Anisotropy and shale behaviour.

The role of shale rock physics in AVO analysis (with North Sea demonstrations).

Day 2

Morning:

Overburden 4D seismic response: Effect of stress and pore pressure changes.

Organic rich shales, gas / oil shales: Rock physics templates, seismic characterization of source rocks with examples from the Norwegian Continental Shelf.

Afternoon:

Effects of shales / clays in heterogeneous reservoirs on seismic signatures.

Static vs dynamic properties of shales: Impact on geomechanical engineering applications.