

# **Seabed and Sediment Acoustics: Measurements and Modelling 2015**

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# SEABED AND SEDIMENT ACOUSTICS 2015

## SUNDAY 6 SEPTEMBER 2015

18.00 – 20.00 Ice Breaker and Registration, University of Bath

## MONDAY 7 SEPTEMBER 2015

08.00 Registration and Refreshments

08.30 Welcome

### SEDIMENT ACOUSTICS

08.40 In situ direct measurements of sediment compressional and shear wave properties in Currituck Sound

Kevin M Lee, Megan S Ballard, Andrew R McNeese, Thomas G Muir, Preston S Wilson, The University of Texas at Austin, USA, R Daniel Costley, US Army Engineer Research and Development Center, USA

09.00 The sedimentary and acoustic properties of deep sediments from different oceans

Thierry Garlan, Eléonore Köng, Patrick Guyomard, Xavier Mathias, Sébastien Zaragosi, SHOM, France

09.20 Shear-wave velocity estimation using seismic interface waves generated by a shear source

Hefeng Dong, Norwegian University of Science, Kenneth Dufaut, Statoil ASA, Norway

09.40 An improved high-spectral-resolution water-filled impedance tube measurement method.

Laurence North, Angus Best, National Oceanography Centre, Southampton, UK

10.00 Acoustic propagation in sediments containing ice-hydrate shelled gas bubbles

Hakan Dogan, Paul White, Timothy Leighton, University of Southampton, UK

10.20 Refreshments

10.50 In-situ acoustic measurements of water saturated beach sands

Xavier Demoulin, MAREE, Thierry Garlan, SHOM, Laurent Guillon, French Naval Academy, Patrick Guyomard SHOM, Romain Jan, RTSYS, France

11.10 Estimation of sediment geoacoustic properties using data collected by a distributed network of sonobuoys

Subramaniam Rajan, Scientific Solutions, USA, George Frisk, Florida Atlantic University, USA

11.30 Examining the relationship between flocculent structure and shear wave speed in muddy sediments

Megan Ballard, Kevin Lee, Preston Wilson, Thomas Muir, University of Texas, USA

### ACOUSTIC SCATTERING FROM THE SEABED

11.50 High-frequency scattering from a muddy sand sediment with an overlying mud layer

Brian Hefner, Anatoliy Ivakin, Darrell Jackson, University of Washington, USA

12.10 Estimation of scattering mechanisms and scales from waveguide reverberation measurements

Charles Holland, ARL-Penn State, USA

12.30 Lunch

13.30 Imaging of calibrated acoustic backscatter data from the seafloor

Kenneth Foote, Woods Hole Oceanographic Institution, USA, Stephen Robinson, Peter Theobald, NPL, UK

13.50 Backscatter stability and influence of water column conditions: estimation by multibeam echosounder and repeated oceanographic measurements, Belgian part of the North Sea

Marc Roche, Koen Degrendele, Lies De Mol, FPS Economy, Belgium, Vera Van Lancker, Matthias Baeye, Jan De Bisschop, Royal Belgian Institute of Natural Sciences, Belgium, Sonia Papili, Belgian Navy, Belgium, Olga Lopera, RMA, Belgium

14.10 Using the Filtering Ocean Noise Eigenvalues (FONES) algorithm to improve the seabed reflection loss estimate derived from ambient ocean data

Ben Papandreou, Tim Clarke, Dstl, UK, Peter Nielsen, NATO STO CMRE, Italy

14.30 High-redundancy multibeam echosounder backscatter coverage over strongly contrasted relief

Jean-Marie Augustin, Xavier Lurton, IFREMER, France, Geoffroy Lamarche, Arne Pallentin, NIWA, New Zealand

### SEABED INFLUENCE ON ACOUSTIC PROPAGATION

14.50 Low frequency sound propagation experiments in Currituck Sound

R Daniel Costley, Kent Hathaway, Eric Smith, US Army Engineer Research & Development Center, Andrew McNeese, Megan Ballard, Kevin Lee, Thomas Muir, Preston Wilson, The University of Texas, USA

15.10 Refreshments

15.40 Assessing effects of sea-bed and sea-surface scattering on acoustic propagation

Sven Ivansson, Trond Jenserud, Swedish Defense Research Agency, Sweden

16.00 Wideband wavenumber tracking in a dispersive environment

Florent Le Courtois, Julien Bonnel, Université Européenne de Bretagne, France

16.20 A spectral decomposition procedure for determining the fields at the boundaries in a PE-based reverberation model

David Thomson, Gary Brooke, Craig Hamm, Dale Ellis, DRDC Atlantic, Canada

16.40 An approximate technique for estimating complex eigenvalues and associated eigenfunctions of the acoustic field in shallow water over an elastic half-space.

Michael Taroudakis, John Mastrokalos, University of Crete & Hellas Institute of Applied and Computational Mathematics, Greece

17.00 Recommendations on modelling mid-low frequency acoustic interactions with the seabed

Gary Heald, Timothy Clarke, Joe Woodward, Dstl, UK

- 17.20 Low-frequency sound propagation and sediment characterization in Lake Kinneret  
Boris Katsnelson, Regina Katsman, University of Haifa, Israel, Andrey Lunkov, General Physics Institute, Russia  
Ilya Ostrovsky, Israel Oceanography and Limnology Research, Israel

17.40 Close

## TUESDAY 8 SEPTEMBER 2015

08.35 Announcements

### GEOACOUSTIC INVERSION

- 08.40 Single receiver geoacoustic inversion using warping and matched mode processing  
Julien Bonnel, ENSTA France, N Ross Chapman, Stan Dosso, University of Victoria, Victoria, Canada
- 09.00 Geoacoustic inversion of broadband signals in shallow water using matched mode processing  
Hefeng Dong, Norwegian University of Science and Technology, Norway, Mohsen Badiy, University of Delaware, USA, N Ross Chapman, University of Victoria, Canada
- 09.20 Bayesian image source method for geoacoustic inversion  
Laurent Guillon, French Naval Academy, France, Stan Dosso, N Ross Chapman, University of Victoria, Canada
- 09.40 Can high-resolution marine geophysical data be inverted for soil properties?  
Mark Vardy, Timothy Henstock, National Oceanography Centre, UK, Maarten Vanneste, Norwegian Geotechnical Institute, Norway, Eugene Morgan, Penn State University, USA, Luke Pinson, SAND Geophysics, UK
- 10.00 Impact of ambient noise and ship tonals on the inversion of seafloor reflectivity from range-frequency striations in shallow oceans  
Adrian Jones, David Bartel, Paul Clarke, Defence Science and Technology Organisation, Australia

10.20 Refreshments

### NICK PACE'S CONTRIBUTION TO SEABED ACOUSTICS

- 10.50 Scientific overview of the contributions of Nick Pace to underwater acoustics: research and applications  
Philippe Blondel, University of Bath, UK
- 11.05 A tribute to Professor Nick Pace: Acoustics backscatter, imaging and classification of the sea floor  
Gary Heald, Dstl, UK
- 11.20 Presentation to Nick Pace
- 11.35 Mapping of sub-seabed anomalies in seismically heterogeneous marine soils  
Jacques Yves Guigne, University of Bath, Acoustic Zoom Inc, Canada

12.00 Lunch

### SYNTHETIC APERTURE SONAR

- 13.00 Exploiting the temporal coherence of seabed backscattering for repeat-pass SAS micro-navigation  
Alan Hunter, University of Bath, UK, Samantha Dugelay, NATO Science and Technology Organization, Italy
- 13.20 Estimation of seafloor height fields with side-looking sonar systems  
Anthony Lyons, Derek Olon, Roy Edgar Hansen, Torstein Olsmo Saebo, Norwegian Defence Research Establishment, Norway
- 13.40 Through-the-sonar seafloor characterization using lacunarity  
David Williams, NATO Science and Technology Organization, Italy
- 14.00 Estimating the seafloor scattering cross section where the sonar equation is inapplicable  
Derek Olsen, The Pennsylvania State University, USA
- 14.20 Evaluation of multipath effects on sas imaginary  
Jan Ehrlich, Holger Schmaljohann, Wolfgang Jans, Bundeswehr Technical Centre for Ships and Naval Weapons, Germany
- 14.40 Interference rejection for sonars via low complexity adaptive beamforming  
Tor Inge Birkenes Lønmo, Kongsberg Maritime, Norway, Andreas Austeng, Roy Edgar Hansen, University of Oslo, Norway

15.00 Refreshments

### BIO AND THE SEA FLOOR

- 15.30 Modelling seafloor bioturbation  
Shawn Johnson, Daniel Brown, The Pennsylvania State University, Dajun Tang, Darrell Jackson, University of Washington
- 15.50 Simulation of measured seafloor roughness spectrum time series using a coupled ripple bioturbation model  
Allison Penko, Shawn Johnson, Joe Calantoni, Naval Research Laboratory, USA
- 16.10 Sensitivity of macroinvertebrates to substrate borne vibration  
Louise Roberts, Institute of Estuarine and Coastal Studies (IECS), University of Hull, UK

### HABITAT MAPPING

- 16.30 Seafloor backscatter acquisition and processing: best practice and recommendations by the GEOHAB backscatter working group  
Xavier Lurton, Institut Français de Recherche pour l'Exploitation de la Mer (Ifremer), France, Geoffroy Lamarche, National Institute of Water and Atmospheric Research (NIWA), New Zealand, Craig Brown, Nova Scotia Community College, Canada, Erin Heffron, QPS Inc, USA, Vanessa Lucieer, University of Tasmania, Australia, Glen Rice, NOAA, USA, Alexandre Schimel, Deakin University, Australia, Tom Weber, University of New Hampshire, USA

# SEABED AND SEDIMENT ACOUSTICS 2015

- 16.50 Acoustic textures and multibeam mapping of shallow marine habitats – examples from Eastern Malta

Philippe Blondel, University of Bath, UK, Mariacristina Prampolini, Università degli Studi di Modena e Reggio Emilia, Italy, Federica Fogliani, Istituto di Scienze Marine, Italy

17.10 Close

19.00 Reception and Conference Dinner

The historic Roman Baths



## WEDNESDAY 9 SEPTEMBER 2015

08.55 Announcements

### SEDIMENT ACOUSTICS

- 09.00 Sub-bottom imaging with variable beam widths

Bjornar Langli, Kongsberg Maritime, Norway

- 09.20 Sensing the seabed vibrations - especially the interface waves

Richard Hazelwood, Consultant, UK

- 09.40 The effect of bathymetric measurement uncertainties on multi-beam echo-sounder sediment classification

Mirjam Snellen, Kerstin Siemes, Jeroen Janmaat, Dick Simons, Delft University of Technology, The Netherlands

- 10.00 Ambient noise measurements from hydrophones buried in a mixed-gravel beach

David Barclay, Alex Hay, Dalhousie University, Canada, Len Zedel, Memorial University of Newfoundland, Canada, Ying-Tsong Lin, Woods Hole Oceanographic Institution, USA

10.20 Refreshments

10.40 A B Wood Medal Lecture

3D Shallow water acoustics

Ying-Tsong Lin, Woods Hole Oceanographic Institution, USA

### ACOUSTIC SCATTERING FROM THE SEABED

- 11.20 3D modeling of spherical wave reflection on layered media with rough interfaces

Samuel Pinson, Julio Cordioli, Universidade Federal de Santa Catarina, Brazil

- 11.40 Autonomous assessment of seabed ripple geometry from bistatic acoustic scattering data

Erin M Fischell, Henrik Schmidt, Massachusetts Institute of Technology, USA

- 12.00 Influence of shells and shell debris on backscatter strength: investigation using modeling, sonar measurements and sampling on the Belgian Continental Shelf

Sonia Papili, Belgian Navy, Belgium, Chris Jenkins, INSTAAR, University of Colorado, USA, Marc Roche, FPS Economy, Belgium, Vera Van Lancker, Royal Belgian Institute of Natural Sciences, Belgium, Thomas Wever, WTD, Germany, Olga Lopera, RMA, Belgium

- 12.20 Multibeam echosounder calibration for backscatter measurements on seafloor surveys: definition of natural reference areas

Xavier Lurton, Dimitrios Eleftherakis, Institut Français de Recherche pour l'Exploitation de la Mer (Ifremer), France, Marc Roche, FPS Economy, Continental Shelf Service, Belgium, Tim LeBas, National Oceanography Centre, Southampton, UK, Christophe Vignaud, SHOM, France

12.40 Lunch

12.50 IOA Underwater Acoustics Group AGM

### SEDIMENT TRANSPORT

- 13.50 A swath Doppler system for measuring bedload movement

Mahdi Razaz, Len Zedel, Memorial University of Newfoundland, Canada, Alex Hay, Richard Cheel, Dalhousie University, Canada

- 14.10 Predicting mass concentrations of flocculating sediments using acoustic and optical backscatter

Sarah Bass, Andrew Manning, HR Wallingford, UK, Chris Vincent, University of East Anglia, UK

- 14.30 Modelling Doppler sonar measurement of bedload transport: what exactly are we looking at?

Len Zedel, Memorial University of Newfoundland, Canada, Dave Barclay, Alex Hay, Dalhousie University, Canada

- 14.50 Passive acoustic measurement of bedload discharge features on a sandy seafloor.

Olivier Blanpain, Thierry Garlan, Patrick Guyomard, SHOM, France, Xavier Demoulin, MAREE, France, Benoit Waeles, BW-CGC, France, Morgane Ravilly, CREOCEAN, France

- 15.10 Acoustic measurement of mobile layer velocity and thickness in avalanching sub-aqueous granular flow

Jenna Hare, Alex Hay, Dalhousie University, Canada, Len Zedel, Memorial University of Newfoundland, Canada

- 15.30 Measuring multi-phase flow with a multi-frequency acoustic profiler

Greg Wilson, Alex Hay, Dalhousie University, Canada

- 15.50 Detection and description of sand dunes using a geomorphometric approach

Julien Ogor, Nathalie Debese, Benoit Zerr, ENSTA France, Thierry Garlan, SHOM, France

16.10 Closing comments