



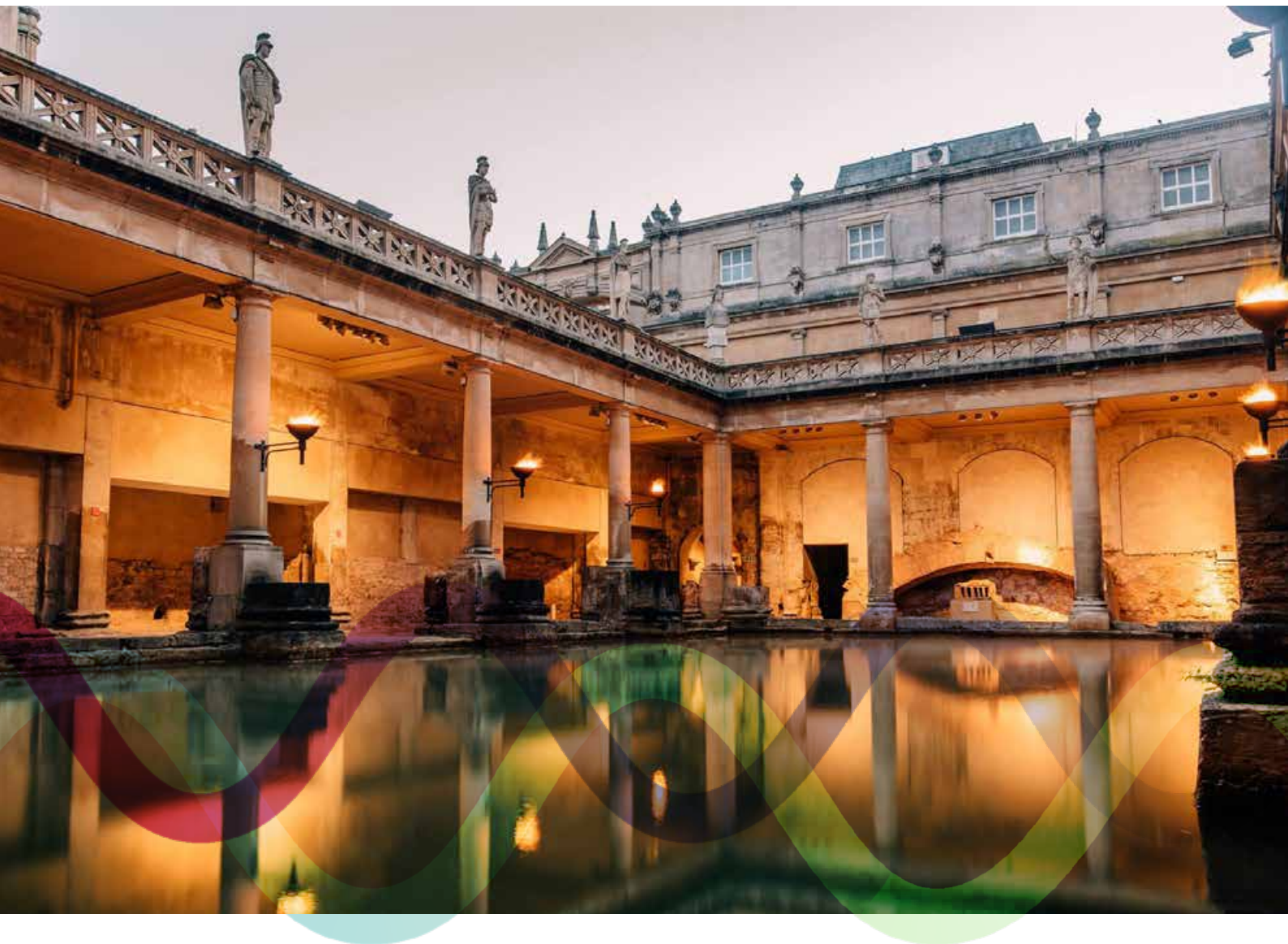
# ICUA2024

International Conference on  
Underwater Acoustics

17-20 June 2024, Bath, UK

## PROGRAMME

University of Bath, Chancellors' Building, Bath BA2 7AY UK





## Welcome!

The Institute of Acoustics has the great pleasure of holding the International Conference on Underwater Acoustics ICUA-2024 in Bath (UK). This follows on the well-attended ICUA-2022 in Southampton (UK) and the ICUA-2020 virtual conference. This also follows the previous Institute of Acoustics Seabed Acoustic conferences at Bath: 1983 and 1993 (organised by Nick Pace), 2005 (organised by Nick Pace and Philippe Blondel) and 2015 (Philippe Blondel and the IOA committee). We are very pleased to welcome you all again to our world-heritage city!

The ICUA-2024 conference has a series of oral sessions covering the broad spectrum of international research in underwater acoustics. We have two keynote plenary sessions:

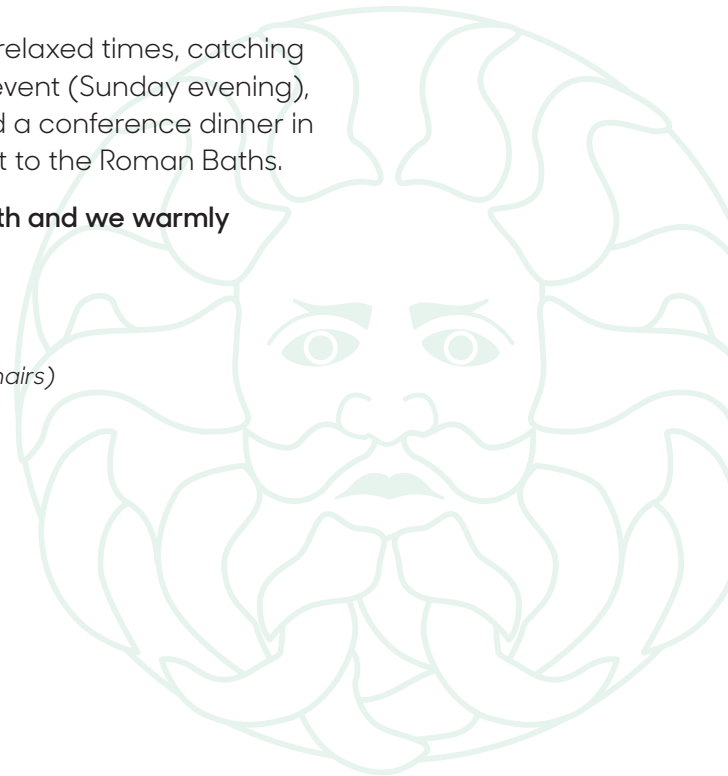
Hanne Sagen will be presenting her world-leading research in the Arctic and Hans Slabbekoorn will be talking about animal communication and the environment, We are also very pleased to welcome the latest two AB Wood Medal recipients, David Barclay and H. Özkan Sertlek, who will be explaining their award-winning research in underwater acoustics.

Bath is a UNESCO World Heritage City, famous for its Roman Baths and its Georgian buildings. It had many scientific celebrities, from Adelard of Bath in the Middle Ages to William and Caroline Herschel, but also international royalty (from Ethiopia to Belgium and of course Britain) and famous authors like Jane Austen or Charles Dickens. It is also known for its many restaurants, the famous Sally Lunn Bun and its independent shops in Walcot, as well as the Bath Fringe Festival (the week before the conference) and the Jane Austen- themed events throughout the year. Situated at the edge of the Cotswolds Area of Outstanding Beauty, it has seen activity since the Stone Age, and it is now solidly anchored in the space industry too.

We have planned several social events for informal and relaxed times, catching up with friends and colleagues around an Ice Breaking event (Sunday evening), a visit to SS Great Britain in Bristol (Tuesday evening) and a conference dinner in the prestigious Pump Rooms (Wednesday evening), next to the Roman Baths.

**We are delighted that you are coming to ICUA-2024 in Bath and we warmly welcome you all!**

*Philippe Blondel (Chair), Andrew Holden and Nikhil Banda (Co-Chairs)  
and the local Organising Committee*



# General Information

## Catering

All refreshments will be available in the Chancellors' Building Foyer.  
Lunch each day will be available in the Lime Tree Restaurant.

## Speaker Preview

If you are a speaker, and you want to check or change your presentation, please go to the Speaker Preview Desk in Chancellors' Building Foyer.

## Posters

Posters will be located in the Chancellors' Building Foyer. Different posters will be displayed each day during the refreshment and lunch breaks.

## ICUA 2024 Buddy Scheme

Delegates will be able to recognise "Buddies" by their red lanyards and badges. Buddies can answer questions, provide information about the conference and the UK research landscape, help make new connections, and help with general integration into the community.

## Student Prizes (Sponsored by UKAN+)

If you have ticked the box on the registration form your paper will be considered.

The prize winners will be selected by a panel of judges consisting of ICUA2024 Committee members and the SIGUA committee of UKAN+, based upon the originality, clarity and quality of research and its presentation.

The prizes will be presented at the close of the conference on Thursday.

## Quiet Space

A quiet room is available on the second floor of the Chancellors' Building. When using this space please consider other users. No telephone calls please.

# Social Programme

## Sunday 16 June 2024 – Welcome Reception

Chancellors' Building, Claverton Down Campus, University of Bath  
17:00 – 19:00

All delegates are welcome to attend this reception, a chance to meet up with friends and colleagues at the conference venue and register in advance.

## Monday 17 June 2024 – Early Careers Group Event

Chancellors' Building, Claverton Down Campus, University of Bath  
17:00 – 19:00

## Tuesday 18 June 2024 – A visit to the SS Great Britain, Bristol

Great Western Dockyard, Bristol BS1 6TY  
Depart University 17:30  
Depart SS Gt Britain 20:30 and return to Bath City Centre

## Wednesday 19 June 2024 – Conference Reception and Dinner

Roman Baths and Pump Room  
Abbey Church Yard, Bath BA1 1LZ

Reception 19:00  
Dinner 20:00  
Depart 23:00

## Sponsors



## Exhibitors



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Stephen P Robinson  
Principal Scientist for Underwater Acoustics/Underwater Acoustics Group  
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## Local Organising Committee

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Philippe Blondel, University of Bath, Chair

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Andrew Holden, Dstl, Co-Chair

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Nikhil Banda, Leonardo Ltd, Co-Chair

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Kevin Hamson, Frazer-Nash Consulting (Underwater Acoustics Group Chair)

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Linda Canty, Institute of Acoustics

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Michael Ainslie, Jasco Applied Sciences

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Alex Brooker, Clarke Saunders Acoustics

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Chris Capus, Ultra CSS

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Alan Curtis, Thales

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Gary Heald, Heriot Watt University

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Toby Hill, QinetiQ

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Paul Lepper, Loughborough University

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Agnieszka Pietrzak, Sweco

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Stephen Robinson, NPL

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Ilaria Sartori, Mott MacDonald

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Duncan Williams, Dstl

# POSTERS

## MONDAY

### 63. Experimental testing of a double-octave piezoelectric transducer for large-band underwater communication

Alice Aubry, PYTHEAS Technology, France

### 64. Acoustic impact of wave energy converts

Jose Antonio Garcia Gambin, CTN, Spain

### 118. Underwater Acoustic Measurement, characterisation and modelling of nova tidal energy converters at Bluemull Sound, Shetland

Daniel Jervis, Seiche, UK

### 155. A sensitivity analysis on acoustically-significant parameters of an agent-based model

Dominic Lagrois, Universite du Quebec en Outaouais, Canada

## TUESDAY

### 3. Assessing effects of seismic surveys on marine life in South African waters

Kuhle Hlati, Department of Forestry, Fisheries and the Environment, South Africa

### 69. Bio-acoustic characteristics and spatio-temporal distribution of finless porpoise and snapping shrimp in the west and south coast of Korea

Jognchan Lee, GeoSystem Research Corporation, South Korea

### 85. The effects of anthropogenic noise on freshwater soundscapes and organisms

Jess Lister, Edinburgh Napier University, UK

## WEDNESDAY

### 80. Converting ocean seismic reflection sections into temperature and salinity: A new approach

Yao Meng, University of Exeter, UK

### 196. Validated shipping noise maps of the Red Sea and Gulf of Aden based on field measurement

Rihab Larayedh, AMCS, CEMSE, KAUST, Saudi Arabia

### 176. Physics-constrained iterative inverse method for sound speed profile reconstruction

Adam Woolley, Thales University of Southampton, UK

## THURSDAY

### 34. A study on passive sound source depth estimation based on broad-band signal modeling in the deep sea

Sunhyo Kim, Korea Institute of Ocean Science & Technology, South Korea

### 46. Solutions for protection and performance enhancement of underwater sonar systems

Raymond Browne, Tods Technology, UK

### 179. Sparse MIMO sonar underwater imaging of low-submergence targets

Oleksandr Malyuskin, ECIT, Queen's University Belfast, Ireland

### 192. Signal processing criteria for single hydrophone sound source ranging in shallow waters

Sung-Hoon Byun, Korea Research Institute of Ships & Ocean Engineering (KRISO), South Korea



# PROGRAMME

## Sunday 16th June

### CHANCELLORS' BUILDING FOYER

17:00–19:00 Registration & Welcome reception

## Monday 17th June

08:00–09:00 Registration and Refreshments, Chancellors' Building Foyer

### ROOM 1

09:00 Welcome, Philippe Blondel, Conference Chair

09:10 **Keynote Speaker:**  
**The evolution of multipurpose acoustic networks in the Arctic Ocean**  
*Hanne Sagen, Nansen Environmental and Remote Sensing Center, Norway*

09:55 **Refreshments**

### ROOM 1

#### POLAR ACOUSTICS

Chair: Espen Storheim & Lora van Uffelen

10:25 **113. Acoustic signals for geo-positioning in the Arctic**  
*Lora Van Uffelen, University of Rhode Island, USA*

10:45 **105. Improved earthquake monitoring in the High Arctic by combining acoustic and seismological data**  
*Marianna Anichini, University of Bergen, Norway*

11:05 **117. Exploring the recordings of a magnitude 5.1 earthquake in the CAATEX data**  
*Espen Storheim, Nansen Environmental and Remote Sensing Center, Norway*

11:25 **13. Seeking meaningful observables in long-range polar transmissions**  
*Emmanuel K Skarsoulis, Institute of Applied and Computational Mathematics, Greece*

11:45 **51. Automatic identification of biophonics and sea ice processes in large datasets from the High Arctic Ocean**  
*Jonathan G Cleverly, University of Bath, UK*

12:05 **145. Anthropogenic sounds and MSFD "shipping bands" in Arctic waters**  
*Philippe Blondel, University of Bath, UK*

12:25 **Lunch**



## SONAR, VECTOR SENSORS & TRANSDUCER TECHNOLOGY

Chair: Victor Humphrey

- |       |   |
|-------|---|
| 13:25 | <b>37. Underwater acoustic radiation of plane surfaces with an active coating</b><br><i>Kevin Hostombe, Helmut-Schmidt-University, Germany</i>                  |
| 13:45 | <b>114. Developments in calibrations of acoustic recorders and digital systems</b><br><i>Freya Malcher, National Physical Laboratory, UK</i>                    |
| 14:05 | <b>182. Low-frequency plane traveling wave generation in a cylindrical waveguide</b><br><i>William Slater, US Navy Underwater Sound Reference Division, USA</i> |
| 14:25 | <b>24. Development of a hexagonal head tonpiz transducer for underwater applications</b><br><i>Nemani Satya Prasad, NSTL, DRDO, Ministry of Defence, India</i>  |
| 14:45 | <b>90. Localization of ship noise using underwater Acoustic Vector Sensor (AVS)</b><br><i>Malarkodi Amirthalingam, Scientist, India</i>                         |
| 15:05 | <b>195. Computations of electro-acoustic efficiency of underwater Tonpiz Transducers</b><br><i>Ajesh Kumar Mani, NPOL, DRDO, Ministry of Defence, India</i>     |
| 15:25 | <b>Refreshments</b>   |

## POLAR ACOUSTICS

Chair: Espen Storheim & Lora van Uffelen

- |             |   |
|-------------|---|
| 15:55       | <b>19. Laboratory acoustic pulse tube studies for seafloor and sea ice greenhouse gas quantification</b><br><i>Angus Best, National Oceanography Centre, UK</i> |
| 16:15       | <b>93. Acoustic inference of sea ice mechanical properties</b><br><i>D Benjamin Reeder, Naval Postgraduate School, USA</i>                                      |
| 16:35       | <b>9. Simulation of acoustic transmission through a random distribution of ice blocks</b><br><i>Nicholas P Chotiros, The University of Texas at Austin, USA</i> |
| 17:00-19:00 | <b>Early Careers Group Event, Chancellors' Building Foyer</b>   |

## ROOM 2

### MACHINE LEARNING IN UNDERWATER ACOUSTICS

Chair: Nikhil Banda

- |       |  |
|-------|--|
| 10:25 | <b>22. Evaluation of a machine learning approach for underwater target classification with low-frequency active sonar robust to environment differences</b><br><i>Hugo J Kujff, TNO, Netherlands</i> |
| 10:45 | <b>26. On vision transformers for classification tasks in side-scan sonar imagery</b><br><i>Brandon Sheffield, Naval Surface Warfare Center, USA</i>   |
| 11:05 | <b>42. Proxy-label semi-supervised deep learning for detection and mapping in synthetic aperture sonar imagery</b><br><i>Shannon-Morgan Steele, Kraken Robotics, Canada</i>                          |
| 11:25 | <b>66. Vision transformers (ViT) for sonar image classification</b><br><i>Narada Warakagoda, Norwegian Research Establishment, Norway</i>  |
| 11:45 | <b>68. Improving SAS automatic object recognition with sub-aperture imagery from circular SAS</b><br><i>Matthew Emigh, NSWC PCD, USA</i>   |
| 12:05 | <b>108. A deep segmentation approach for multibeam echo sounder backscatter data based on seafloor type</b><br><i>Hugues Moreau, lab-STICC - ENSTA Bretagne, France</i>                              |

12:25 Lunch

## MACHINE LEARNING IN UNDERWATER ACOUSTICS

Chair: Philippe Blondel

13:25 **162. Marine vessel detection and classification using underwater acoustic data**  
*Wout Decrop, Flanders Marine Institute (VLIZ), Belgium*

13:45 **167. Using machine learning for the detection of propeller cavitation**  
*Dale Smith, QinetiQ, UK*

14:05 **67. Classification of ships from underwater sound using a deep learning network**  
*Jari Kataja, Patria, Finland*

14:25 **185. Detecting and clustering unknown sound events using transfer learning for marine soundscape analysis**  
*Clea Parcerisas, Flanders Marine Institute (VLIZ), Belgium*

14:45 **157. An open-source bowhead whale detector**  
*Fabio Frazao, Dalhousie University, Canada*

15:05 **158. Comparing acoustic representations for deep learning-based classification of underwater acoustic signals: a case study with Orca vocalizations**  
*Fabio Frazao, Dalhousie University, Canada*

15:25 Refreshments

## MACHINE LEARNING IN UNDERWATER ACOUSTICS

Chair: Nikhil Banda

15:55 **187. Merging water column parameters with Gaussian processes**  
*Finley Boulton, University of Liverpool, UK*

16:15 **56. Machine learning for classifying the underwater environment from transmission loss data**  
*Marcus Donnelly, Systems Engineering & Assessment, UK*

16:35 **61. Knowledge transfer for deep-learning gas-bubble detection in underwater acoustic data: exploring data in the Mozambique Channel**  
*Tymeia Perret, Ifremer, France*

16:55 **78. Direct measurements and retrieval of deep-sea current speeds up to 1 m/s at 2500–3000m water depth utilizing acoustic flow noise and neural networks**  
*TsuWei Tan, ROC Naval Academy, Taiwan*

17:10 **99. Bayesian optimization for geoacoustic inversion in shallow water**  
*William Jenkins, Scripps Institution of Oceanography, USA*

17:00–19:00 Early Careers Group Event, Chancellors' Building Foyer

## ROOM 3

## UNDERWATER PROPAGATION

Chair: Adrian Brown

- 10:25      **14. Diffraction effects in a sound beam propagating through a non-uniform flowing fluid**  
*Daudel Tchatat Ngaha, Western Norway University of Applied Sciences (HVL), Norway*
- 10:45      **41. Numerical modelling of propagation for underwater radiated noise sources close to a wavy free surface**  
*Yundong He, University College London, UK*
- 11:05      **153. Injection of analytical waves near target and propagation of the backscattering to the far-field**  
*Matthew McKinley, Georgia Institute of Technology, USA*
- 11:25      **73. Acoustic propagation in the vicinity of the Atlantis II Seamounts**  
*Thomas S Jerome, The University of Texas at Austin, USA*
- 11:45      **83. The challenges of full-wave propagation modeling in marine environments – Example of seismo-acoustic propagation generated by the UXO detonation in shallow waters**  
*Nathalie Favretto-Cristini, CNRS, France*
- 12:05      **103. Sound pulse propagation in horizontally inhomogeneous shallow water waveguide. Vertical modes and space-time horizontal rays**  
*Boris Katsnelson, University of Haifa, Israel*
- 12:25      **Lunch**

## UNDERWATER PROPAGATION

Chair: Adrian Brown

- 13:25      **104. Full-wave numerical simulations in the time domain for underwater acoustics: some examples based on a spectral-element method for a better handling of sediment elasticity**  
*Paul Cristini, CNRS-LMA, France*
- 13:45      **94. The effect of mesoscale eddies on sound channels**  
*Rebecca Perks, Atlas Elektronik, UK*
- 14:05      **152. Influence of the high-resolution Ocean Circulation Modelling on sub-mesoscale dynamics, thermohaline structures, and acoustic propagation**  
*Matthew McKinley, Georgia Institute of Technology, USA*
- 14:25      **166. Characterization of acoustic propagation variability near the Atlantis II Seamount using a high-resolution sub-mesoscale resolving Ocean Circulation Model**  
*Alessandro Monti, NATO STO CMRE, Italy*
- 14:45      **156. High order isogeometric analysis for numerical solutions of the Helmholtz Equation in heterogeneous domains**  
*M Shadi Mohamed, Heriot-Watt University, UK*
- 15:25      **Refreshments**

## MARINE RENEWABLES

Chair: Michael Bellman &amp; Federica Pace

- 15:55      **28. Experimentations using S-Wave velocities and attenuations to correlate strength properties associated with Offshore Windfarm Drilling Interactions**  
*Jacques Guigné, Acoustic Zoom Inc and Subsea Micropiles, Canada*

## NOISE AND VIBRATION FROM PILE DRIVING

Chair: Michael Bellman & Federica Pace

- |       |   |
|-------|---|
| 16:15 | <b>168. R&amp;D project VISSKA: Measurements and modelling of underwater noise during vibro-piling within the OWF KASKASI II</b><br><i>Michael A Bellmann, itap GmbH, Germany</i> |
| 16:35 | <b>189. Scaling offshore pile driving noise: Application to frequency weighted sound levels</b><br><i>Jonas von Pein, DHI WASY GmbH, Germany</i>                                  |

17:00–19:00 Early Careers Group Event, Chancellors' Building Foyer

## Tuesday 18th June

08:00–09:00 Registration & Refreshments

### ROOM 1

- |       |  |
|-------|--|
| 09:00 | Welcome  |
| 09:10 | <b>Keynote Speaker:</b><br><b>Acoustic climate change: a fish perspective on the Anthropocene</b><br><i>Hans Slabbekoorn, Leiden University, Netherlands</i> |
| 09:55 | Refreshments   |

### ROOM 1

## EFFECT OF SOUND ON MARINE LIFE

Chair: Chris Capus

- |       |  |
|-------|--|
| 10:25 | <b>82. SEASOUNDS – A Doctoral network focusing on anthropogenic underwater noise pollution and its impact on the marine ecosystem</b><br><i>Nathalie Favretto-Cristini, CNRS, France</i>                     |
| 10:45 | <b>84. Modeling animal avoidance from acoustic sound sources within the Navy Acoustic Effects Model (NAEMO)</b><br><i>Kevin Nelson, US Department of the Navy, Naval Undersea Warfare Center (NUWC), USA</i> |
| 11:05 | <b>134. How loud is rain noise underwater to a harbour porpoise?</b><br><i>Charlotte R Findlay, Aarhus University, Denmark</i>   |
| 11:25 | <b>40. Acoustic monitoring of low-order deflagration clearance of unexploded ordnance at the Moray West offshore wind farm site</b><br><i>Simon J Stephenson, Seiche Ltd, UK</i>                             |
| 12:25 | Lunch  |

## MACHINE LEARNING IN UNDERWATER ACOUSTICS

Chair: Philippe Blondel

- |       |   |
|-------|---|
| 13:25 | <b>126. Data augmentation and pre-processing techniques for enhanced underwater detection and classification</b><br><i>Karl Thomas Hjelmervik, University of South-Eastern Norway, Norway</i> |
| 13:45 | <b>183. Normalizing flow-based Hilbert map fusion for multi-view underwater target reconstruction</b><br><i>Sushrut Sudarshan Surve, Cornell University, USA</i>                              |
| 14:05 | <b>138. Expect the unexpected: A human-made object detection algorithm for underwater operations in unknown environments.</b><br><i>Thomas Guerneve, SeeByte, UK</i>                          |
| 14:25 | <b>147. Temporal and spatial variation in sound speed profiles for use in autonomous vehicle tactical planning</b><br><i>Edward Clark, University of Bath, UK</i>                             |
| 14:45 | <b>137. Can one model do it all? Introducing Project MARLIN, artificial intelligence for protecting the marine environment</b><br><i>Ellen White, University of Southampton, UK</i>           |
| 15:05 | <b>163. Quantum assisted factorisation machine for underwater coating optimisation</b><br><i>Pascal de Koster, TNO, Netherlands</i>   |
| 15:25 | <b>Refreshments</b>   |

## BIOACOUSTICS AND BIOSONAR

Chair: Paul Lepper

- |       |  |
|-------|--|
| 15:55 | <b>11. Potential functions of mechanoreceptors found on trilobite larva and adults of Limulus Polyphemus (Linnaeus, 1758)</b><br><i>John A Fornshell, US National Museum of Natural History, USA</i> |
| 16:15 | <b>101. Acoustic mimicry of plastics with the prey of deep-diving cetaceans: an experimental approach</b><br><i>Laura Redaelli, MARE - Marine and Environmental Sciences Centre, Portugal</i>        |
| 16:35 | <b>132. Who goes there? Evaluating deep learning as a tool for delphinid conservation in diverse marine soundscapes</b><br><i>Ellen White, University of Southampton, UK</i>                         |
| 16:55 | <b>171. Using the Acoustic Complexity Index to explore delphinid mixed-species groups</b><br><i>Yasmin Viana, Universidade Federal de Juiz de Fora, Brazil</i>                                       |
| 17:30 | <b>Visit to the SS Great Britain, Bristol</b>  |

## ROOM 2

### SYNTHETIC APERTURE SONAR

Chair: Alan Hunter

- |       |  |
|-------|--|
| 10:25 | <b>31. Application-driven partner leg pairing using a geospatial database</b><br><i>Kaushikk V NarayanPrasad, Helmut Schmidt University, Germany</i>                                 |
| 10:45 | <b>39. Utility of modeling and simulation in data-starved scenarios for Underwater Machine Learning Applications</b><br><i>J Daniel Park, The Pennsylvania State University, USA</i> |
| 11:05 | <b>43. Coherence of interferometric synthetic aperture sonar ensembles estimates</b><br><i>Shannon-Morgan Steele, Kraken Robotic, Canada</i>   |

11:25	<b>49. Compensating amplitude differences of synthetic aperture sonar images acquired at different frequencies</b> <i>Bastien Lyonnet, Exail Robotics, France</i>
11:45	<b>86. Depth estimation from synthetic aperture sonar images using deep learning</b> <i>Oscar Bryan, University of Bath, UK</i>
12:05	<b>91. Understanding model fidelity for training synthetic aperture sonar image classifiers</b> <i>Thomas Blanford, University of New Hampshire, USA</i>
12:25	<b>Lunch</b>

## SYNTHETIC APERTURE SONAR

Chair: Alan Hunter

13:25	<b>109. Effect of deviations from an ideal trajectory on stripmap SAS images</b> <i>Holger Schmaljohann, WTD 71, Germany</i>
13:45	<b>111. Design of an open-source sonar simulation framework</b> <i>Blair Bonnett, Helmut Schmidt University, Germany</i>
14:05	<b>119. Undersampled long-range synthetic aperture sonar imaging and interferometry</b> <i>Torstein Olsmo Saebo, Norwegian Defence Research Establishment (FFI), Norway</i>
14:25	<b>123. The effect of grating lobes in synthetic aperture sonar imaging</b> <i>Maria Opperud, University of Oslo, Norway</i>
14:45	<b>136. Aperture synthesis with physics-informed neural networks</b> <i>Angeliki Xenaki, STO-CMRE, NATO, Italy</i>
15:05	<b>140. A methodology for assessing classifier performance with synthetic training data</b> <i>Ciaran Sanford, University of Bath, UK</i>
15:25	<b>Refreshments</b>

## SYNTHETIC APERTURE SONAR

Chair: Alan Hunter

15:55	<b>148. Comparison of methods for detection of point scatterers in SAS images</b> <i>Marc Geilhufe, Norwegian Defence Research Establishment (FFI), Norway</i>
16:15	<b>161. Modelling and simulation of two-dimensional spatial coherence of side-looking sonars</b> <i>Fabien Novella, DGA Naval Systems, France</i>
16:35	<b>173. Content generation for SAS change detection simulations</b> <i>Shawn F Johnson, Penn State University, USA</i>
17:30	<b>Visit to the SS Great Britain, Bristol</b>

## ROOM 3

### RADIATED NOISE

Chair: Tom Smith

10:25	<b>17. Directivity of radiated noise from commercial ferries and implications for measurement approaches</b> <i>Jesse Spence, Noise Control Engineering, USA</i>
10:45	<b>23. Shipping noise trends in UK waters: 2018-2022</b> <i>Nathan Merchant, Cefas, UK</i>

11:05	<b>32. Model tuning of a vibrating plate in contact with water</b> <i>Giovanni Rognoni, University of Trieste, Italy</i>
11:25	<b>33. Small craft noise: Influence of speed and running attitude on radiated noise levels</b> <i>Laura Star, BMT, UK</i>
11:45	<b>38. Vessel noise detection through modified frequency amplitude variation technique in Canadian Arctic waters</b> <i>Farid Jedari-Eyvazi, Dalhousie University, Canada</i>
12:05	<b>52. Measurement of source level in shallow water using an enhanced seabed critical angle method</b> <i>Michael A Ainslie, JASCO Applied Sciences, Netherlands</i>
12:25	<b>Lunch</b>

## RADIATED NOISE FROM SHIPS

Chair: Alex MacGillivray

13:25	<b>58. Testing a prototype digital hydrophone for use at QinetiQ's maritime acoustic ranges</b> <i>Sebastian Woodhams, QinetiQ, UK</i>
13:45	<b>60. Finite element analysis approach to determine underwater sound contribution of machinery for a road ferry</b> <i>Renaud Gaudel, Damen, Netherlands</i>
14:05	<b>76. Supporting standards to characterise vessels' underwater radiated noise. Objective evaluation based on the SATURN project measurements</b> <i>Roberto Yubero, TSI SL, Spain</i>
14:25	<b>35. Quiet and green: Exploring opportunities to enhance energy efficiency while simultaneously addressing underwater noise in commercial shipping</b> <i>Seyedvahid Vakili, University of Southampton, UK</i>
14:45	<b>98. Correlation analysis of noise signal using two vertical arrays and retrieval of modal dispersion curves in shallow water</b> <i>Marina Yarina, University of Haifa, Israel</i>
15:25	<b>Refreshments</b>

## MEASUREMENT AND MODELLING OF ACOUSTIC PARTICLE MOTION

Chair: Sophie Nedelec

15:55	<b>172. A discussion of the equivalence of scalar-pressure and vector-based acoustic dosage measures derived from realistic, finite-bandwidth, signal waveforms</b> <i>Peter H Dahl, University of Washington, USA</i>
16:15	<b>125. Particle motion in passive acoustic monitoring</b> <i>Sophie L Nedelec, University of Exeter, UK</i>
16:35	<b>174. Vector acoustic observations and modeling and interpretation of a underwater noise from a ship closing towards, and opening from, the sensor location over a 20 km range</b> <i>Peter H Dahl, University of Washington, USA</i>
17:30	<b>Visit to the SS Great Britain, Bristol</b>



# Wednesday 19th June

08:30-09:00 Registration & Refreshments

## ROOM 1

### SEABED AND SEDIMENT ACOUSTICS

Chair: Gary Heald

- |       |   |
|-------|---|
| 09:00 | <b>08. Unification of poro- and visco-elastic models for sandy and muddy seabeds</b><br><i>Nicholas P Chotiros, The University of Texas at Austin, USA</i>        |
| 09:20 | <b>12. Sound propagation over a layered seabed with a weak shear rigidity</b><br><i>Oleg A Godin, Naval Postgraduate School, USA</i>                              |
| 09:40 | <b>15. Towards sub-bottom imaging in 3 dimensions at 2-9 kHz</b><br><i>Charles W Holland, Portland State University, USA</i>                                      |
| 10:00 | <b>16. Acoustic interrogation and seismic fusion Imaging of complex sub-surface seabed buried debris</b><br><i>Jacques Guigné, Kraken Robotics Inc, Canada</i>    |
| 10:20 | <b>72. Angular dependence of seafloor scattering and its temporal variability: measurements and models</b><br><i>Jenna Hare, University of New Hampshire, USA</i> |
| 10:40 | <b>Refreshments</b>   |

### NICK PACE MEMORIAL SESSION

Chair: Gary Heald

- |       |   |
|-------|---|
| 11:10 | <b>From PhD supervisor to NATO collaboration</b><br><i>Gary Heald, Heriot Watt University, UK</i>   |
| 11:30 | <b>88. Working with Nick Pace at Bath - Bistatic sonars and beyond</b><br><i>Phillipe Blondel, University of Bath, UK</i>                                 |
| 11:50 | <b>142. A Professor's journey into acoustics: from bugs in the mud to fingers of sound in Space</b><br><i>Jacques Guigné, Kraken Robotics Inc, Canada</i> |
| 12:10 | <b>Memories of former colleagues</b>  |
| 12:30 | <b>Lunch</b>  |

### A B WOOD MEDAL LECTURES

Chair: Kevin Hamson

- |       |  |
|-------|--|
| 13:40 | <b>141. Passive acoustic oceanography</b><br><i>David Barclay, Dalhousie University, Canada</i>  |
| 14:25 | <b>188. Sound energy density and its applications to underwater sound mapping</b><br><i>H Özkan Sertlek, JASCO Applied Sciences, Netherlands</i> |
| 15:10 | <b>Refreshments</b>  |

## SEABED AND SEDIMENT ACOUSTICS

Chair: Gary Heald

- |       |  |
|-------|--|
| 15:40 | <b>146. Quantifying the temporal variability of high-frequency acoustic backscatter from the seafloor</b><br><i>Kaan Cav, University of New Hampshire, USA</i>   |
| 16:00 | <b>54. Metrology of the seafloor acoustic response: how to accurately estimate backscatter and its intrinsic uncertainty using single-beam echosounder</b><br><i>Irène Mopin, ENSTA Bretagne, France</i> |
| 16:20 | <b>110. Accurate processing and representation of multibeam echosounder backscatter based on statistical analysis of snippets data</b><br><i>Sabrina Homrani, ENSTA Bretagne, France</i>                 |
| 19:00 | <b>Reception and Dinner</b><br>Roman Baths and Pump Room   |

## ROOM 2

### AMBIENT OCEAN SOUND

Chair: Martin Siderius

- |       |   |
|-------|---|
| 09:00 | <b>70. Experience report on operational noise: Cross-project evaluation of underwater noise measurements during the operational phase of offshore wind farms (OWF NOISE)</b><br><i>Michael A Bellmann, itap GmbH, Germany</i> |
| 09:20 | <b>89. Shipping sound maps and sound energy densities for all European seas from 2016 to 2050</b><br><i>H Özkan Sertlek, JASCO Applied Sciences, Germany</i>  |
| 09:40 | <b>139. Deep learning and assessment of shipping levels in Arctic waters</b><br><i>Phillippe Blondel, University of Bath, UK</i>  |
| 10:00 | <b>100. Relative impact of location, season and signal type on common acoustic indices in the West of Scotland</b><br><i>Paul R White, University of Southampton, UK</i>  |
| 10:20 | <b>197. Observation of Tidal Presence in Multi-Year Ocean Noise Records</b><br><i>David Bradley, US Department of Defense, USA</i>  |
| 10:40 | <b>Refreshments</b>   |

### AMBIENT OCEAN SOUND

Chair: David Barclay

- |       |   |
|-------|---|
| 11:10 | <b>92. Regional contributors to ocean noise in killer whale habitat</b><br><i>Alexander MacGillivray, JASCO Applied Sciences, Canada</i>                    |
| 11:30 | <b>175. Modeling techniques for wind-generated ambient sound with comparisons to measurements</b><br><i>Martin Siderius, Portland State University, USA</i> |
| 11:50 | <b>177. Analysis of deep-ocean sound in the Pacific and the influence of sea temperature</b><br><i>Stephen Robinson, NPL UK</i>                             |
| 12:30 | <b>Lunch</b>  |
| 19:00 | <b>Reception and Dinner</b><br>Roman Baths and Pump Room  |

## ROOM 3

## RADIATED NOISE FROM SHIPS

Session Chair: Alex MacGillivray

- 09:00 **184. Realistic ship noise synthesis for augmenting passive sonar data to train machine learning for vessel detection and classification**  
*Ronald Kessel, Seamount Analytics, Canada*
- 09:20 **164. Underwater radiated noise of fast craft – analysis of noise radiation mechanisms and potential concepts for noise mitigation**  
*Max Schuster, DW-ShipConsult, Germany*
- 09:40 **121. Transport Canada recent advancements on underwater vessel noise reduction targets**  
*Aurelie Cosandey-Godin, Transport Canada, Canada*
- 10:00 **124. Measuring ship underwater radiated noise in shallow waters – why not in the near field?**  
*Carl Andersson, IVL Swedish Environmental Research Institute, Sweden*
- 10:20 **133. Changes to the underwater soundscape caused by rerouting a major shipping lane in the Baltic Sea**  
*Charlotte R Findlay, Aarhus University, Denmark*
- 10:40 **Refreshments**

## RADIATED NOISE FROM SHIPS

Chair: Tom Smith

- 11:10 **149. Underwater radiated noise of a battery-electric tugboat**  
*Jennifer Wladichuk, JASCO Applied Sciences, Germany*
- 11:30 **160. Reducing radiated shipping noise using active noise cancellation**  
*Paul C Hines, Hines Ocean S&T, Dalhousie University, Canada*
- 11:50 **106. Underwater noise reduction using active vibration control for a transverse thruster**  
*Philipp Zech, Wölfel Engineering GmbH + Co, Germany*
- 12:10 **180. Prediction of underwater radiated noise induced by cavitation flow using wavenumber-frequency analysis of pressure on the wall**  
*Sangheon Lee, Pusan National University school of Mechanical Engineering, South Korea*
- 12:30 **Lunch**

## GENERAL UNDERWATER ACOUSTICS

Chair: Andrew Holden

- 15:40 **25. Real-time monitoring of coastal & offshore construction noise for immediate decision making**  
*Corentin Troussard, RTSYS, France*

- 19:00 **Reception and Dinner**  
Roman Baths and Pump Room

# Thursday 20th June

08:30 Registration & Refreshments

## ROOM 1

### TARGET SCATTERING

Chair: Dave Nunn

- 09:00 **20. Hierarchical algebraic compression for acoustic hybrid integral equations**  
*Meydan Kaplan, Ben-Gurion University of the Negev, Israel*
- 09:20 **107. Exploring viscoelastic materials for absorption in submarine environments**  
*Christian Wurl, ThyssenKrupp Marine Systems, Germany*
- 09:40 **129. Plate scattering measurement in TNO basin**  
*Dennis W van der Burg, TNO, The Netherlands*
- 10:00 **159. Low-frequency wideband measurements of small to medium scale objects in open water - Challenges faced and results so far**  
*Zuhayr Rymansaib, University of Bath, UK*
- 10:20 Refreshments

### TARGET SCATTERING

Chair: Dave Nunn

- 10:50 **36. Submarine acoustic signature reduction through Metamaterials Assistance**  
*Carmen Álvarez García, Centro Tecnológico Naval y del Mar (CTN), Spain*
- 11:10 **62. Simulation of acoustic scattering by hollow elastic shells immersed in water**  
*Evgeny Chernokozhin, Tel Aviv University, Israel*
- 12:10 Lunch

### UNEXPLODED ORDNANCE

Chair: José Barradas

- 13:10 **27. Advances in underwater buried munitions detection through ultra-high-resolution 2D and 3D acoustic sub-bottom profiling in controlled test environments**  
*Jose Felipe Barradas, Flanders Marine Institute (VLIZ), Belgium*
- 13:30 **96. Studying deep learning based co-registration for incoherent change detection**  
*Yannik Steiniger, German Aerospace Center (DLR), Germany*
- 13:50 **198. Munitions response: program update and discussion of acoustic color as a method of identification**  
*David Bradley, US Department of Defense, USA*

14:35 Closing Remarks & Student Prizes

## ROOM 2

## SONAR PERFORMANCE MEASUREMENT AND MODELLING

Session Chair: Mathieu Colin

- |       |  |
|-------|--|
| 09:00 | <b>07. Modeling multiple-measurement sonar performance using Jdivergence</b><br><i>Douglas Abraham, University of Washington, USA</i>  |
| 09:20 | <b>55. A simplified passive acoustic simulation to research empathetic Artificial Intelligence (AI) in Human-AI teaming</b><br><i>Madalin Facino, University of Bath, UK</i>                         |
| 09:40 | <b>59. The impact of climate change on sonar performance: a case study in the North Atlantic</b><br><i>Victor O Oppeneer, TNO, Netherlands</i>   |
| 10:00 | <b>71. Inverting the sound speed profile from multi-beam echo sounder data and historical measurements – a simulation study</b><br><i>Gourret Yohann, University of South-Eastern Norway, Norway</i> |
| 10:20 | <b>Refreshments</b>  |

## SONAR PERFORMANCE MEASUREMENT AND MODELLING

Session Chair: Mathieu Colin

- |       |  |
|-------|--|
| 10:50 | <b>97. Synthesizing hydrophone data for applications in active sonar</b><br><i>Stian Thomas Heimdal Hartman, Norwegian Defence Research Establishment (FFI), Norway</i>  |
| 11:10 | <b>131. Acoustic SNR modelling for underwater communications</b><br><i>Paul van Walree, FFI, Norway</i>  |
| 11:30 | <b>143. Variability in modelled sonar and target depth distributions</b><br><i>Kristoffer Engedal Andreassen, Norwegian Defence Research Establishment (FFI), Norway</i> |
| 11:50 | <b>151. Predicting greenhouse gas seepage detectability for acoustical AUV-mounted sensors</b><br><i>Seçkin Polat, The University of Oslo, Norway</i>                    |
| 12:10 | <b>Lunch</b>   |

## GEOACOUSTIC INVERSION

Session Chair: Hefeng Dong

- |       |   |
|-------|---|
| 13:10 | <b>6. Source localization and geoacoustic inversion with virtual arrays</b><br><i>Zoi-Heleni Michalopoulou, New Jersey Institute of Technology, USA</i>                       |
| 13:30 | <b>18. A machine learning based approach for geoacoustic inversion</b><br><i>Hefeng Dong, Norwegian University of Science and Technology, Norway</i>                          |
| 13:50 | <b>144. Inversion of passive deep-sea wind-driven noise for pH</b><br><i>Ernst Uzhansky, Dalhousie University, Canada</i>   |
| 14:10 | <b>181. Insights into how data information content changes with range and frequency using the model manifold</b><br><i>Tracianne B Neilsen, Brigham Young University, USA</i> |
| 14:35 | <b>Closing Remarks &amp; Student Prizes, ROOM 1</b>   |

## ROOM 3

## SIGNAL PROCESSING

Session Chair: Nikhil Banda

- 09:00      **44. Case specific adaptive beamformer design for a multi beam echo sounder survey scenario**  
*Gabor Gereb, University of Oslo, Norway*
- 
- 09:20      **45. MAMBAT: a framework to track and localize multiple marine mammals with wide baseline, stationary arrays**  
*Pina Gruden, Cooperative Institute for Marine and Atmospheric Research, USA*
- 
- 09:40      **95. Robust magnetic dipole trajectory estimation handling false alarms and with noisy measurements**  
*Joep de Jong, NATO-STO Centre for Maritime Research and Experimentation (CMRE), Italy*
- 
- 10:00      **120. Pulse form optimization for MIMO sonar systems**  
*Sven Schröder, German Aerospace Center, Germany*
- 
- 10:20      **Refreshments**

## SIGNAL PROCESSING

Session Chair: Nikhil Banda

- 10:50      **170. Depth estimation of narrowband sources without using prior knowledge of ocean environment**  
*Wei Shao, University of Chinese Academy of Sciences, China*
- 
- 12:10      **Lunch**

## GUA - HABITAT MAPPING

Session Chair: Angeliki Xenaki

- 13:10      **81. Acoustic measurements of photosynthetically formed gas bubble distributions in Posidonia oceanica seagrass meadows**  
*Anthony Lyons, University of New Hampshire, USA*
- 
- 13:30      **128. Habitat mapping and acoustic backscatter for the future - community identification of research priorities**  
*Phillippe Blondel, University of Bath, UK*

## GUA - TOMOGRAPHY

Session Chair: Andrew Holden

- 13:50      **102. Investigating the potential of zigzag scheme monitoring using the fluvial acoustic tomography system**  
*Mohamad Basel AlSawaf, Kitami Institute of Technology, Japan*
- 
- 14:10      **169. Ocean current observation with Mirror-type underwater acoustic tomography sensing network**  
*Guangming Li, National Innovation Institute of Defense Technology, China*

- 14:35      **Closing Remarks & Student Prizes, ROOM 1**







