

IEEE/OES China Ocean Acoustics Conference
COA 2021

July 14-17, 2021

Harbin, China

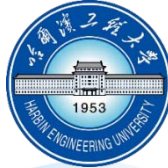
Book of Program and Abstracts

COA 2021





IEEE Oceanic
Engineering Society



IEEE



- Acoustic science and technology laboratory
- Science and technology on sonar laboratory
- National key laboratory of science and technology on underwater acoustic antagonizing
- Science and technology on underwater test and control
- National key laboratory on ship vibration and noise



State key laboratory
of acoustics, Institute
of acoustics, Chinese
academy of science



Key laboratory of
marine information
acquisition and
security, Ministry of
industry and
information
technology



Key laboratory of
underwater acoustic
environment,
Chinese academy
sciences



Heilongjiang
provincial key
laboratory of ocean
information
technology



TABLE OF CONTENTS

Notice for attending the meeting.....	1
Venue & Restaurant.....	3
Online Room ID, Transportation and Dining.....	5
Contact Details.....	6
Welcome	7
Organization Committee	8
Sponsor.....	8
Organizer.....	8
Co-organizers	8
Scientific Committee.....	9
Topics.....	12
Program.....	15
Schedule	17
Other Activities.....	21
H2O Award	22
Keynote Speech Chairs	25
Keynote Speech List	27
Session Chairs and Invitation Talk List	43
Oral Session list.....	69
Poster Session list	87
Abstract	89
Oral session I-1 (Thursday, Afternoon)	89
Oral session II-1 (Thursday, Afternoon)	93
Oral session III-1 (Thursday, Afternoon)	96
Oral session X-1 (Thursday, Afternoon)	100
Oral session VIII-1 (Thursday, Afternoon).....	101

Oral session VI-1 (Thursday, Afternoon).....	102
Oral session VII-1 (Thursday, Afternoon).....	105
Oral session I-2 (Friday, Morning)	109
Oral session V-1 (Friday, Morning).....	114
Oral session III-2 (Friday, Morning).....	118
Oral session XI-1 (Friday, Morning).....	119
Oral session IV-1 (Friday, Morning).....	120
Oral session VI-2 (Friday, Morning).....	124
Oral session VII-2 (Friday, Morning).....	128
OBOR session (Friday, Morning)	132
Oral session V-2 (Friday, Morning).....	136
Oral session IX-1 (Friday, Morning).....	138
Oral session VII-4 (Friday, Morning).....	141
Oral session VI-3 (Friday, Morning).....	144
Oral session VII-3 (Friday, Morning).....	147
Poster Session 1 (Thursday, Afternoon).....	151
Poster Session 2 (Thursday, Afternoon).....	166
Poster Session 3 (Friday, Morning)	180
Poster Session 4 (Friday, Morning)	194
Exhibition	209

Notice for attending the meeting

To ensure the smooth holding of the 2021 IEEE / OES China Ocean Acoustics conference, please read these instructions carefully.

1. Date and venue of the meeting

July 14-17, 2021, 4th floor, Qihang Activity Center, Harbin Engineering University.

Register on July 14, 2021, exchange report on July 15-16, and return on July 17.

2. Check in, meeting room, exhibition and dining place

- Each designated hotel has a check-in office.
- Conference room: multi-function hall, Donghai hall, Nanhai hall, Xihai hall, Beihai hall, Bohai hall and Huanghai hall.
- The poster and exhibition are in the teacher salon on the 4th floor of Qihang activity center.
- Dining in the international exchange center of Harbin Engineering University.

3. Conference traffic

- Conference will arrange the transportation between the venue and the hotel (see transportation)
- From the venue to the international exchange center, the participants can take a bus or walk to have a meal.

4. Meeting requirements

(1) According to the school's epidemic prevention management regulations, the participants are requested to provide personal information at least one day in advance according to the application requirements and report to the management department for approval, otherwise, they cannot enter the school. Please wear masks throughout the meeting.

(2) According to the relevant notice of Harbin municipal government of Heilongjiang Province, people from high-risk areas and those who have been to relevant areas within 21 days are forbidden to attend the meeting.

(3) Please enter the venue 10 minutes in advance and wear the representative card. Please don't walk around or speak loudly during the meeting. Turn off your mobile phone or put it in vibration state to keep the meeting place quiet and orderly.

(4) Experts and authors who make reports at the meeting, please indicate whether PPT document of the report is copied to the conference secretary when reporting in.

(5) Please refer to the meeting program for the relevant arrangement of the meeting. If there is any adjustment in the communication time and order, the schedule announced by the conference secretary on the same day shall prevail.

(6) Please abide by the schedule of the conference. Attend meeting, take bus and have dinner on time.

(7) The representatives of the meeting shall have a meal (buffet) with the meal voucher of the meeting.

5. Online meeting



The conference is hybrid. The opening ceremony and keynote speech will be broadcast live on July 15 on the platform:

<http://wx.vzan.com/live/tvchat-118883450?v=637616360214415982>.

Tecent meeting software is used for paper communication and invitation talk, online room ID is attached.

6. Meeting contact

Yingzi Wu 18846070800

Shi Jiang 18846092763

Hechun Zhang 15846609252

Venue

Qi-hang Activity Center (QAC)

Address: 145 Nantong Street, Harbin Engineering University (HEU)

Restaurant

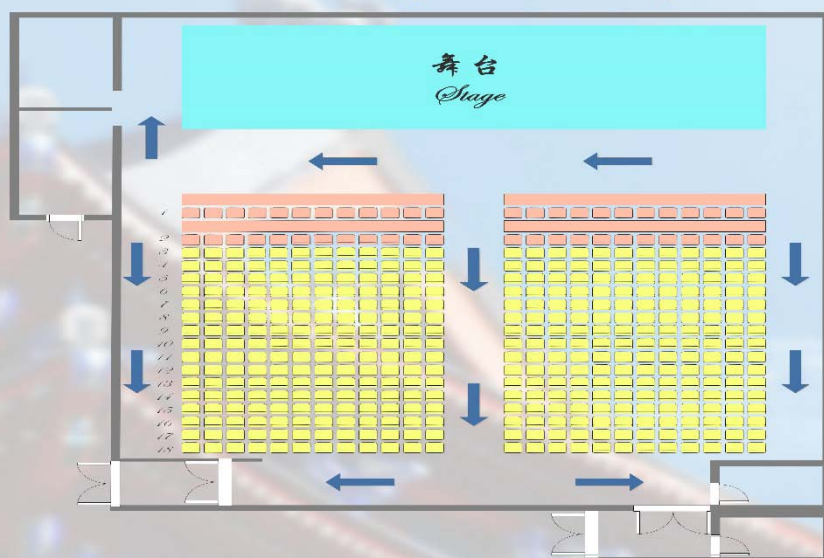
International Exchange Center (IEC)



启航活动中心四层平面图
4th Floor Plan of Qihang
Activity Center



多功能厅座位图
Multifunction Activity Hall Seating Plan



Online Room ID, Transportation and Dining

Room	Online Meeting ID		Contact
	July 15	July 16	
Multifunction Activity Hall	339 807 020		Xinyi Ma 13738130971
Donghai Hall	792 960 506	673 761 513	Yucong Hong 18845597351
Nanghai Hall	554 774 463	349 210 145	Jingwen Zhang 15545121588
Xihai Hall	683 288 162	116 912 836	Binghe Zhu 15227569803
Beihai Hall	283 752 912	293 108 064	Ziyue Yan 17857409533
Bohai Hall	138 684 441	575 313 882	Xu Gao 17702227674
Huanghai Hall	167 340 668	723 797 797	Longfei Zhao 18846131918



Transportation		
Departure Date/Time	From	To
July 15 07:15	Rujia, Lifeng, Gangcheng Hotels, International Exchange Center	Qi-hang Activity Center
July 15 20:00	International Exchange Center	Rujia Hotel, Lifeng Hotel, Gangcheng Hotel
July 16 07:30	Rujia, Lifeng, Gangcheng Hotels, International Exchange Center	Qi-hang Activity Center
July 16 14:20	Qihang Activity Center	City
July 16 20:20	Modern Hotel	Rujia Hotel, Lifeng Hotel, Gangcheng Hotel, International Exchange Center

Dining place		
July 15 12:00-13:30	Lunch, Buffet	International Exchange Center
July 15 17:30-20:00	Dinner, Banquet	International Exchange Center
July 16 12:00-13:30	Lunch, Buffet	International Exchange Center
July 16 17:30-20:00	Dinner, Banquet	Modern Hotel

Contact Details

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	吕 芳	15124509442
	李 杰	18245144188
	王艳新	15045012583

Welcome

Dear Friends,

Welcome to the second IEEE/OES China Ocean Acoustics Conference (COA2021) on innovative applications and professional research of ocean acoustics. The purpose of this conference is to exchange experience and identify state of the art scientific developments in the study of underwater acoustics and acoustical oceanography, covering the fundamentals of ocean sound propagation, marine sediment acoustics, and also problems of ocean noise and reverberation, sonar modeling, signal detection and estimation, as well as the research progress of acoustical sensors and arrays, underwater acoustic communication, polar acoustics and other related themes.

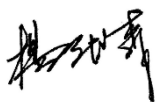
The conference provides a platform for researchers and practitioners involved in different but related domains to share the research findings and discuss key problems on hot topics. It is also expected to integrate the efforts of scientists, engineers and designers to facilitate potential cooperation to promote research and technological development. Here, I also want to honour the memory of Professor Jean-Pierre Hermand, who left us for a sudden illness in 2018. Without his far-sightedness and multilateral coordination, there would have been no success of COA2016 and the continuation of COA2021.

Due to the impact of COVID-19 pandemic, COA was postponed from 2020 to 2021. It was a difficult decision, but the safety and well-being of our participants is our utmost priority. We would like to express our sincere gratitude to IEEE/OES for the support and coordination. We would also like to thank the members of the program committee, reviewers and all those who have contributed their hard work in order to ensure that COA2021 is conducted in an excellent form. Special thanks are due to the authors who contributed excellent papers to this conference. This conference would not have been possible without your dedication and support.

Finally, we believe that all the delegates will benefit substantially from this conference, both through the presentations of the eminent speakers, and through the exchanges of ideas with one another. We hope you enjoy the conference and wish you all a wonderful time in Harbin.

Best Regards,

Chairman
YANG Desen



Organization Committee

Honorary chair	YANG Shi-e
Chairman	YANG Desen
Technical program chairs	YIN Jingwei, QIAO Gang, MAZHAR Suleman
Finance chair	HU Bo, BAI Linlang
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Publication chair	ZHOU Tian, REN Qunyan
Social events	MENG Yu, ZENG Juan

Sponsor

IEEE Oceanic Engineering Society

Organizer

Harbin Engineering University (HEU)

Co-organizers

Acoustic science and technology laboratory • Science and technology on sonar laboratory • National key laboratory of science and technology on underwater acoustic antagonizing • Science and technology on underwater test and control National key laboratory on ship vibration and noise • State key laboratory of acoustics, Institute of acoustics, Chinese academy of science • Key laboratory of marine information acquisition and security, Ministry of industry and information technology • Key laboratory of underwater acoustic environment, Chinese academy sciences • Heilongjiang provincial key laboratory of ocean information technology

Scientific Committee



David L. Bradley	<i>Applied Research Laboratories (ARL), Applied Research Laboratory, Penn State University</i>
Philippe Blondel	<i>University of Bath</i>
Daniel Rouseff	<i>Applied Physics Laboratory (APL), University of Washington</i>
Sergio Jesus	<i>Univ.Algarve, Faro, Portugal</i>
T. C. Yang	<i>Zhejiang University</i>
Chi-Fang Chen	<i>Department of Engineering Science and Ocean Engineering, Ocean Technology Research Center, College of Engineering, National Taiwan University, Taiwan</i>
Yahong Rosa Zheng	<i>Electronical & Computer Engineering, Lehigh University</i>
Bruce Howe	<i>Ocean and Resources Engineering (ORE), the school of ocean and earth science and technology, University of Hawaii at Manoa</i>
Sverre Holm	<i>Centre for Imaging, Department of Informatics, University of Oslo</i>
Ching-Ren Lin	<i>Institute of Earth Sciences. Academia Sinica</i>
Michael B. Porter	<i>HLS Research</i>
Ross Chapman	<i>University of Victoria, Canada</i>
Shane Guan	<i>the Catholic University of America</i>
David A. Brown	<i>ATMC/ECE, University of Massachusetts Dartmouth</i>
Likun Zhang	<i>Physics and Astronomy, The University of Mississippi</i>
Zheguang Zhou	<i>Physics and Astronomy, The University of Mississippi</i>
Paul Lepper	<i>Loughborough University, UK</i>
Torsten Braun	<i>Institute of Computer Science, University of Bern, Switzerland</i>
Hongbo Sun	<i>Technology and Research Agency of Singapore</i>
Guiqing Sun	<i>Ocean College, Zhejiang University</i>
Xiaodong Yin	<i>Dalian Navy Academy</i>
Shuanping Du	<i>Hangzhou Applied Acoustics Research Institute</i>

Fangyong Wang	<i>Hangzhou Applied Acoustics Research Institute</i>
Yunfei Chen	<i>Science and Technology on Underwater Test and Control Laboratory, China</i>
Ping Li	<i>Hong Kong Polytechnic University</i>
Dajun Sun	<i>Harbin Engineering University</i>
Qingyu Liu	<i>Naval Research Academy</i>
Qing Ling	<i>Naval Research Academy</i>
Qi Li	<i>Harbin Engineering University</i>
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Gang Qiao	<i>Harbin Engineering University</i>
Tian Zhou	<i>Harbin Engineering University</i>
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Shengguo Shi	<i>Harbin Engineering University</i>
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Ying Shen	<i>Harbin Engineering University</i>
Junqi Gao	<i>Harbin Engineering University</i>
Jidan Mei	<i>Harbin Engineering University</i>
Jin Fu	<i>Harbin Engineering University</i>
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Yu Lan	<i>Harbin Engineering University</i>
Yiwang Huang	<i>Harbin Engineering University</i>
Haigang Zhang	<i>Harbin Engineering University</i>
Haisen Li	<i>Harbin Engineering University</i>

Anbang Zhao	<i>Harbin Engineering University</i>
Juan Hui	<i>Harbin Engineering University</i>
Bo Hu	<i>Harbin Engineering University</i>
Guangpu Zhang	<i>Harbin Engineering University</i>
Suleman Mazhar	<i>Harbin Engineering University</i>
Longxiang Guo	<i>Harbin Engineering University</i>
Feng Zhou	<i>Harbin Engineering University</i>
Jie Shi	<i>Harbin Engineering University</i>
Xiao Han	<i>Harbin Engineering University</i>
Wei Lu	<i>Harbin Engineering University</i>



COA 2021

Topics

➤I. Underwater acoustics and acoustical oceanography

- 1.1 Sonar and transducers
- 1.2 Sound propagation and scattering
- 1.3 Acoustical oceanography
- 1.4 Geoacoustic inversion
- 1.5 Bioacoustics
- 1.6 Seismo-acoustics
- 1.7 Signal coherence and fluctuation
- 1.8 Air / sea interaction acoustics
- 1.9 Modeling techniques for underwater acoustic scattering and propagation

➤II. Ocean acoustic observatories and ocean acoustic instruments, systems and platforms

- 2.1 Oceanographic acoustic instrumentation and sensors
- 2.2 Calibration of acoustic systems and metrology
- 2.3 Acoustic systems design, navigation, performance of AUV, MUV, ROV
- 2.4 Buoy technology
- 2.5 Design of new experimental facilities to address future problems in underwater acoustics

➤III. Ocean sound propagation modeling and experiments

- 3.1 Sound propagation in shallow and deep water
- 3.2 Non-linear acoustic field modeling and analysis
- 3.3 Sound field fluctuations in the ocean
- 3.4 Statistic properties of ocean sound field
- 3.5 Three-dimensional sound propagation modeling

➤IV. Marine sediment acoustics

- 4.1 Multibeam echo sounding: Bathymetry and sediment classification
- 4.2 Geoacoustic parameters inversion

- 4.3 Acoustic properties of marine sediments: modeling and measuring
- 4.4 Gas effects and detection in marine sediments
- V. Ocean noise and reverberation
 - 5.1 Acoustic Monitoring of Ocean Environments and Processes: Biology, Ecology, Geophysics and Man-made activities
 - 5.2 Underwater Noise - Modelling and Measurements
 - 5.3 Underwater structural vibration and noise radiation
 - 5.4 Novel material and device for underwater noise control
 - 5.5 Methodology of underwater noise data processing
 - 5.6 Ocean reverberation – models and data
- VI. Underwater acoustic communication and networking
 - 6.1 Underwater Acoustic Communication
 - 6.2 Marine Mammal Acoustics and bionics
- VII. Signal processing: Sonar modeling, signal detection and estimation, target tracking and recognition
 - 7.1 Sonar signal processing
 - 7.2 Array signal processing
 - 7.3 Model-based signal processing techniques
 - 7.4 Vector sensor processing
 - 7.5 Synthetic aperture sonar (active and passive)
 - 7.6 Object classification and pattern recognition (parametric and non-parametric)
 - 7.7 Sonar imaging processing
 - 7.8 Acoustic telemetry and communication
 - 7.9 Biologically inspired processing
 - 7.10 Large Time-Bandwidth acoustic signals for target detection and tracking
 - 7.11 Machine learning, compressive sensing and signal processing
 - 7.12 Neural networks and info processing
- VIII. Design, development, testing and calibrations for acoustical sensor and array

- 8.1 Vector hydrophone research
- 8.2 Wideband transducer
- IX. Polar acoustics and under-ice propagation
 - 9.1 Waveguide propagation in Arctic sea ice
 - 9.2 Ambient noise of Arctic sea
 - 9.3 Under-ice communication and acoustic signal processing
 - 9.4 Under-ice acoustical experimentation
 - 9.5 Other Polar acoustical related studies
- X. Underwater non-acoustic detection and communication
 - 10.1 Marine optics technology and optical sensors
 - 10.2 Underwater Wireless Optical Communication
 - 10.3 E-M sensing
 - 10.4 Magneto Inductive Communication for UWSN
 - 10.5 Multi-sensing technology fusion and measurement
- XI. Underwater acoustics in extreme and special environments: discovery, observation and application
 - 11.1 Applications and Observations related with Oceanic front, thermocline, vortex, water mass
 - 11.2 Propagation, channel and noise background characteristics in very shallow water
 - 11.3 Expedition and discovery for the endeavor with the acoustics
 - 11.4 Acoustic characteristics in estuary, mixed-zone, monsoon season, and other period or location with special acoustic feature or phenomenon

Program

Date	Time	Activity	Location
Wednesday July 14	09:00-19:00	Registration	Lobby of Hotels, Gangcheng, Lifeng, Rujia, International Exchange Center (IFC)
Thursday July 15	08:00-12:00	Registration	4 th floor, Qi-hang Activity Center (QAC)
Thursday July 15	08:00-08:10	Photo Taking	Outside of QAC
	08:10-08:30	Opening Ceremony	4th floor, Multifunction Activity Hall (MAH)
	08:30-08:40	<i>Tea/Coffee Break</i>	Teacher Salon
	08:40-10:10	Keynote Speeches 1, 2, 3	Multifunction Activity Hall
	10:10-10:40	<i>Tea/Coffee Break</i>	Teacher Salon
	10:40-11:40	Keynote Speeches 4, 5	Multifunction Activity Hall
	11:40-13:30	<i>Lunch Break</i>	2nd floor, International Exchange Center
	13:30-15:00	Keynote Speeches 6, 7, 8	Multifunction Activity Hall
	15:00-15:20	<i>Tea/Coffee Break</i>	Teacher Salon
	15:20-17:40	Session Talks and Oral Session---A	Donghai, Nanhai Hall, Xihai Hall, Beihai Hall, Bohai Hall, Huanghai
	10:10-17:00	<i>Poster Session 1-2 and Exhibition</i>	Teacher Salon
	17:40-20:00	<i>Welcome Dinner</i>	International Exchange Center
Friday July 16	08:00-10:20	Session Talks and Oral Session---B	Donghai Hall, Nanhai Hall, Xihai Hall, Beihai Hall, Bohai Hall, Huanghai Hall
	10:20-10:40	<i>Tea/Coffee Break</i>	Teacher Salon
	10:40-12:30	Session Talks and Oral Session---C	Nanhai Hall, Xihai Hall, Beihai Hall, Bohai Hall, Huanghai Hall
	10:40-12:30	OBOR Session	Donghai Hall
	08:00-12:00	<i>Poster Session 3-4 and Exhibition</i>	Teacher Salon
	12:30-14:00	<i>Lunch Break</i>	International Exchange Center
	13:30-15:30	H2O Technology Innovation Contest	Donghai Hall
	14:00-15:30	Campus visit	Harbin Engineering University
	15:30-17:30	City tour	Harbin Sightseeing
	17:30-20:00	<i>Closing Ceremony and Award</i>	Dining Hall



Schedule

Time	Content		Place
July 14, Wednesday			
09:00 - 19:00	Registration		Lobby of Hotels
July 15, Thursday			
08:00 - 12:00	Registration		Corridor of QAC
08:00 - 08:10	Photo Taking		Outside of QAC
08:10 - 08:30	Opening Ceremony - Host by QIAO gang	Address by Chairman YANG Desen, IEEE, Vice President YIN Jingwei	MAH
08:30 - 08:40	Tea/Coffee Break		Teacher Salon
Chair: Qiao Gang			
08:40 - 09:10	Keynote Speech 1		MAH
	Design and demonstration of underwater acoustic carpet cloaks Prof. Jun Yang Institute of Acoustics, Chinese Academy of Sciences		
09:10 - 09:40	Keynote Speech 2		
	Multicarrier Acoustic Communication in Interference-limited Regimes Prof. Milica Stojanovic Northeastern University		
09:40 - 10:10	Keynote Speech 3		
	Advances in broadband underwater acoustic transducers and navigation Prof. David A. Brown University of Massachusetts Dartmouth		
10:10- 10:40	Tea/Coffee Break, Exhibition, Poster Session 1		Teacher Salon
Chair: PIAO Shengchun			
10:40 - 11:10	Keynote Speech 4		MAH
	Passive Acoustic Study in Taiwan Prof. Chi-Fang Chen National Taiwan University		
11:10 - 11:40	Keynote Speech 5		
	Joint target detection and tracking with distributed underwater acoustic arrays Prof. Wen Xu Zhejiang University		
11:40 - 13:30	Lunch Break		IEC
Chair: YIN Jingwei and CHEN Yongyao			
13:30 -14:00	Keynote Speech 6		MAH
	The technique of passive positioning based on vector hydrophones Prof. Shiqi Mo Harbin Engineering University		
14:00 - 14:30	Keynote Speech 7		
	The best way to predict the future is to invent it - Some emerging game-changers in marine sensing Prof. John Potter Norwegian University of Science and Technology		
14:30 - 15:00	Keynote Speech 8		
	Tracking for dolphin whistles Prof. Paul White University of Southampton, UK		
15:00 - 15:20	Tea/Coffee Break		Teacher Salon
15:00 - 17:00	Exhibition, Poster Session 2		Teacher Salon

Time	Content	Place
Session Chairs: Jinrong Wu, Lijia Gong		
Invitation talk and Oral Session I-1		
15:20 - 15:40	Modeling and Characteristic of Coupled Scattering for the Distant Ocean Reverberation Prof. Bo Gao Ocean University of China	Donghai Hall
15:40 - 17:40	Oral Session I-1	
Session Chairs: Yanming Yang, Zhiliang Qin		
Invitation talk and Oral Session II-1		
15:20 - 15:40	Ambient noise observation system and data analysis based on seabed base station Prof. Xuegang Zhang Dalian Institute of Measurement and Control Technology	Nanhai Hall
15:40 – 17:10	Oral Session II-1	
17:10 -17:30	CTBTO IMS and Its Applications Prof. Yanming Yang Third institute of oceanography, Ministry of natural resources	
Session Chairs: Zhendong Zhao, Haigang Zhang		
Invitation talk and Oral Session III-1		
15:20 - 15:40	Pseudodifferential mode parabolic equations and their application to the modelling of sound propagation in shallow water Dr. Pavel S. Petrov Pacific Oceanological Institute	Xihai Hall
15:40 - 17:40	Oral Session III-1	
Session Chairs: Niaz Ahmed, Ying Shen		
Invitation talk and Oral Session X-1		
15:20 - 15:40	Fluxgate Magnetometer Calibration Method and Its Application in the Field of Magnetic Detection Dr. Zhengxiang Chen No.710 research and development institute, CSSC	Beihai Hall
15:40 - 16:00	Blue Energy and Self-powered Ocean Sensing Floats Dr. Junyi Zhai Beijing Institute of Nanoenergy and Nanosystems, CAS	
16:00 - 16:15	Oral Session X-1	
16:15 - 16:35	Presentation title: From Model, Algorithms to Knowledge: Novel Magnetic Sensors for Underwater Magnetic Anomaly Detection and Localization Dr. Ying Shen Harbin Engineering University	
Session Chairs: Bin Liang, Wei Lu		
Invitation talk and Session VIII		
16:35 - 16:55	Acoustic metamaterials for sound manipulation and beyond Dr. Bin Liang Nan Jing University	Beihai Hall
16:55 - 17:10	Oral Session VIII-1	
17:10 - 17:30	Several New Explorations for Low Frequency, Small Size Transducer Dr. Yong Chai Institute of Acoustics, Chinese Academy of Sciences	
Session Chairs: Jianghui Li, Songzuo Liu		
Invitation talk and Oral Session VI-1		
15:20 - 15:40	Multipath and Doppler Compensation in Underwater Acoustic Communications Dr. Charalampos Tsimenidis Newcastle University, UK	Bohai Hall
15:40 - 17:10	Oral Session VI-1	
17:10 - 17:30	Trajectory Planning for Autonomous Underwater Vehicles Dr. Julian Cheng University of British Columbia	

Time	Content	Place
Session Chairs: Fengxiang Ge, Xueli Sheng		
Invitation talk and Oral Session VII-1		
15:20 - 15:40	Generic FRI-based DOA Estimation: A Model-Fitting Method <i>Dr. Hangfang Zhao</i> <i>Zhejiang University</i>	HuanghaiHall
15:40 - 17:40	Oral Session VII-1	
17:40 - 20:00	Welcome Dinner	IEC

July 16, Friday		
08:00 - 10:40	Exhibition, Poster Session 3	Teacher Salon
Session Chairs: Jingrong Wu, Lijia Gong		
08:00 - 10:15	Oral Session I-2	Donghai Hall
Session Chairs: Zhenglin Li, Jie Shi		
Invitation talk and Oral Session V-1		
08:00 - 08:20	Modeling and experiment of ocean reverberation in the range-dependent environment Dr. Jixing Qin Institute of Acoustics, Chinese Academy of Sciences	Nanhai Hall
08:20 - 10:20	Oral Session V-1	
Session Chairs: Zhendong Zhao, Haigang Zhang		
Invitation talk and Oral Session III-2		
08:00 - 08:20	Modeling of Green's Function with bottom reflection parameters and its applications Dr. Zhendong Zhao Key Laboratory of Underwater Acoustic Environment, Institute of Acoustics, Chinese Academy of Sciences	Xihai Hall
08:20 - 08:50	Oral Session III-2	
Session Chairs: Kunde Yang, Longxiang Guo		
Invitation talk and Oral Session XI-1		
08:50 - 09:10	Prediction models of Underwater Ambient Noise Prof. Kunde Yang Northwestern Polytechnical University	Xihai Hall
09:10 - 09:55	Oral Session XI-1	
09:55 - 10:15	Arctic Marine Environment Observation and Artificial Intelligence Prediction Prof. Na Liu First Institute of Oceanography, Ministry of Natural Resources	
Session Chairs: Qunyan Ren, Yiwang Huang		
Invitation talk and Oral Session IV-1		
08:00 - 08:20	Sediment characterization using multiple systems: experimental and numerical results Dr. Qunyan Ren Institute of Acoustics, Chinese Academy of Sciences	Beihai Hall
08:20 - 10:20	Oral Session IV-1	
Session Chairs: Jianghui Li, Songzuo Liu		
Invitation talk and Oral Session VI-2		
08:00 - 08:20	Underwater Acoustic Signal Modulation Recognition Technology based on Feature Fusion and Lightweight Neural Network Dr. Jingjing Wang Qingdao University of Science and Technology	Bohai Hall
08:20 - 10:20	Oral Session VI-2	

Time	Content	Place
Session Chairs: Fengxiang Ge, Xueli Sheng		
Invitation talk and Oral Session VII-2		
08:00 - 08:20	Deep Learning for separating surface waves from seismic reflection events <i>Dr. Weichang Li</i> <i>Aramco Houston Research Center, USA.</i>	Huanghai Hall
08:20 - 10:20	Oral Session VII-2	
10:20 - 10:40	Tea/Coffee Break	Teacher Salon
10:40 - 12:00	Exhibition, Poster Session 4	Teacher Salon
Session Chairs: Suleman Mazhar, Yongyao Chen		
10:40 - 12:30	OBOR Session	Donghai Hall
Session Chairs: Zhenglin Li, Jie Shi		
Invitation talk and Oral Session V-2		
10:40 - 11:00	Deep Ocean Ambient Noise Observation and Investigation <i>Dr. Yang Shi</i> <i>Northwestern Polytechnical University</i>	Nanhai Hall
11:00 - 12:15	Oral Session V-2	
Session Chairs: Hongtao Wen, Xiao Han		
Invitation talk and Oral Session IX-1		
10:40 - 11:00	Research progress of underwater noise characteristics in key sea areas of Arctic Pacific sector <i>Dr. Hongtao Wen</i> <i>Third Institute of Oceanography, Ministry of Natural Resources</i>	Xihai Hall
11:00 - 12:15	Oral Session IX-1	
Session Chairs: Peng Xiao, Longxiang Guo		
10:40 - 12:10	Oral Session VII-4	Beihai Hall
Session Chairs: Jianghui Li, Songzuo Liu		
Invitation talk and Oral Session VI-3		
10:40 - 11:00	Efficient Use of Space-time Clustering for Underwater Acoustic Communications <i>Dr. Jianghui Li</i> <i>University of Southampton, UK</i>	Bohai Hall
11:00 - 12:15	Oral Session VI-3	
Session Chairs: Fengxiang Ge, Xueli Sheng		
Invitation talk and Oral Session VII-3		
10:40 - 11:00	1-bit Compressive Sensing: Theory and Applications <i>Dr. Peng Xiao</i> <i>Sun Yat-sen University</i>	Huanghai Hall
11:00 - 12:30	Oral Session VII-3	
12:30 - 14:00	Lunch Break	IEC
Session Chairs: Suleman Mazhar, Yongyao Chen		
13:30 - 15:30	H2O Technology Innovation Contest	Donghai Hall
15:30 - 17:30	Campus visit, City Tour	HEU, Harbin
17:30 - 20:00	Award, Closing Ceremony	Dining

Other Activities

1. OBOR Session

Time & Place: 16th July 2021, 10:30-12:00

It is with immense pleasure that we invite you to join "One Belt One Road" special session, focused on Ocean, Water Informatics and Underwater Acoustics research in the context of One Belt One Road initiative. The session will be held as part of the main program of the Chinese Ocean Acoustics conference (COA) 2021. Papers accepted for this session will be included in the proceedings of COA 2021 and will be published at IEEE-Xplore. Papers in this session will be focused on underwater acoustics and ocean engineering research related to OBOR initiatives.

Timeline for submissions to the OBOR session / COA 2021:

Abstract submission date: April. 20, 2021

Full paper submission date: May. 10, 2021

Notification of acceptance date: May. 30, 2021

Final paper submission date: June. 10, 2021

Looking forward to your active participation in the OBOR session and the COA 2021!

2. Student Career Session: Career Routs in Ocean Engineering

Research in the field of ocean engineering and underwater acoustics has observed rapid advances in the last century. With recent developments in shipbuilding, big data and analytics, underwater robotics, maritime sensing and communications, there is an increasing demand for skilled workforce in the ocean engineering and related fields and there are many jobs in this field with new challenges and opportunities and catering to a range of interests and professional goals. Whether you are interested in policy making regarding water management or want to get your hands dirty as an underwater robotics engineer, whichever route you choose can offer a pathway towards an exciting career in the ocean engineering and underwater acoustics. This session will include experience sharing anecdotes from senior mentors in the field so that new generation of ocean engineers and acousticians can well plan their future hunt for such exciting opportunities.

Looking forward to your active participation in the Student Career session!

Time: 8pm-9:30pm

Venue: Room 315, Shuisheng Building

Speakers

Dr Chen Yongyao, HEU

Dr. Lou Yi, HEU

Dr. Affan Syed, PhD USC & Director Clouds & Networks Solutions, Emumba

Dr. Xin Qing, HEU

Dr. Yunjiang Zhao, HEU

Moderator: Dr Suleman Mazhar, HEU & Senior Member IEEE-OES

H2O Award

H2O (HEU Hydro-acoustics and Oceans) Technology Innovation Contest and Award

Announcement and Call for participation

The COA participants are welcome to the H2O Contest, and the outstanding participants will be rewarded with a bonus.

The competition will be held as an accompanying event of IEEE OES COA 2021 from July 14-17, 2021.

Projects/products related to applications in the fields of Ocean Engineering, Water Informatics and Underwater Acoustics are particularly welcome. This international competition has following two categories:

Category – I (Student Competition)

First category is student competition and invites teams of Ph.D., Master and undergraduate students to present demos of their innovative ideas/projects/products for applications in the fields of Ocean Engineering, Water Informatics and Underwater Acoustics.

Students willing to participate the contest will need to prepare following

- A technical abstract (1000~1500 words) describing the contest entry.

The technical abstract may include the technical description, the significance of the application addressed, implementation (software/hardware/algorithmic) details, any experimental results, and the technical references.

- A video demo (MUST) and a poster/physical demo (RECOMMENDED for mainland participants)

Video demo will be used for evaluation and will also be shared on the online page of the H2O competition. The poster/physical demo is strongly recommended for the interest of general audience. Poster/physical demo will be held in the same place as conference poster sessions.

- A video demo (for international participant)

Due to COVID-19 in the world, international participants may not be available to attend live demonstration session. Video demo will be used for evaluation and will also be shared on the online page of the H2O competition.

Category – II (Industry Competition)

Second category is industry competition and invites companies and startups to present demos of their innovative ideas/projects/products for applications in the field of Ocean Engineering, Water Informatics and Underwater Acoustics. Those willing to participate will need to prepare following:

- A technical abstract (1000~1500 words) describing the contest entry.

The technical abstract may include the technical description, the significance of the application addressed, implementation (software/hardware/algorithmic) details, any experimental results, and the technical references.

- A video demo (MUST) and a poster/physical demo (RECOMMENDED for mainland participants)

Video demo will be used for evaluation and will also be shared on the online page of the H2O competition. The poster/physical demo is strongly recommended for the interest of general audience. Poster/physical demo will be held in the same place as conference poster sessions.

- A video demo (for international participant)

Due to COVID-19 in the world, international participants may not be available to attend live demonstration session. Video demo will be used for evaluation and will also be shared on the online page of the H2O competition.

How to submit

Submission package is a single pdf file, emailed to:

H2OCompetitionCOA@gmail.com and should include:

- a. Technical Abstract (1000~1500 words);
- b. Names and affiliation of the team members
- c. Link to the demo video of your submission (suggested duration of video is less than 5 minutes)
- d. Will you bring physical demo or poster (**Yes/No**, with a description of your demo/poster e.g. space needed, poster size etc **if the answer is Yes**)

Evaluation Criteria

The organizing committee will evaluate the contest entries based on engineering complexity, novelty, potential impact and the quality of the video demo and the submitted materials.

Participants will be notified about the evaluation outcome during the IEEE OES COA.

Submission Deadline: July 13th, 2021

Contact (for details): H2OCompetitionCOA@gmail.com





Keynote Speech Chairs

Prof. YIN Jingwei



Jingwei Yin received his B.S., M.S., and Ph.D. degrees in underwater acoustic engineering from Harbin Engineering University, China in 1999, 2006, and 2007, respectively. He is currently a professor and vice president of Harbin Engineering University, China. He is the deputy director of the underwater acoustic branch of the Acoustical Society of China. He is also a director of the Key Laboratory of Marine Information Acquisition and Security (Harbin Engineering University), Ministry of Industry and Information Technology. He has published two monographs and more than 100 papers. He holds more than 20 patents. His current research interests include underwater acoustic communication and polar acoustics.

He serves as the chairman of the Scientific Committee of 2021 IEEE/OES China Ocean Acoustics Conference (COA2021).

Prof. QIAO Gang



Gang Qiao received the B.S., M.S., and Ph.D. degrees in underwater acoustic engineering from the Harbin Engineering University (HEU), Harbin, China, in 1996, 1999, and 2004, respectively.

He visited the Department of Electrical Engineering, University of Washington, Seattle, WA, USA, as a Senior Visiting Scholar in 2015. He has been a full Professor with HEU since 2007. His research interests lie in the areas of underwater acoustic communication and networking, and underwater acoustic target detection and localization. He has served as Dean of College of Underwater Acoustic Engineering and the Director of National Key Laboratory of

Underwater Acoustic Science and Technology with HEU since 2020. He also serves as the editorial member of Journal of Ordnance Equipment Engineering and Torpedo Technology. He achieves a candidate for "Countless Talents Project". He serves as the chairman of the Scientific Committee of 2021 IEEE/OES China Ocean Acoustics Conference (COA2021).

Prof. PIAO Shengchun



Shengchun Piao received the M.E. and the Ph. D degrees in underwater acoustic engineering from Harbin Engineering University in 1994 and 1999, respectively. He is currently a professor with Harbin Engineering University. His research focuses on underwater sound propagation, ocean acoustic, and underwater acoustic signal processing.

Prof. CHEN Yongyao



He received the B. Eng and M.S. degrees from Tianjin University, China, respectively in 2003 and 2007. He got Ph.D. degree in electrical engineering from Oklahoma State University, USA, in 2012. He was a Research Associate and Assistant Research Professor at the University of Maryland (College Park, USA), and in 2018 joined Harbin Engineering University, China, where he is currently a Professor of Underwater Acoustic Engineering. His research interests include acoustic/optical functional materials and sensors, micro/nano and additive manufacturing, and their applications to ocean technologies. He has published

high-impact papers in prestigious international journals, such as Nature Communications, Applied Physics Letters, Optics Express, etc., and serve as a senior reviewer for many high-rank international journals. He serves as a program Chair of the IEEE/OES China Ocean Acoustics Conference.



COA 2021

Keynote Speech List

Keynote Speech 1

Prof. Jun Yang, Institute of Acoustics, Chinese Academy of Sciences (IACAS)

Presentation title: Design and demonstration of underwater acoustic carpet cloaks

Abstract: The carpet cloak, which is designed to hide the objects placed on a reflecting surface, has become a topic of considerable interest. Here, we design and fabricate realizable 2D and 3D underwater acoustic carpet cloaks. By introducing scaling factors, a modest impedance mismatch is brought in to simplify the structure of these carpet cloaks. We investigate their effectiveness through experiments in the anechoic water tank. The experimental results demonstrate that these carpet cloaks can hide the information of the bump on the reflecting plane in a wide frequency range. This may bring great potential engineering applications in the practical underwater devices.

Personal profile: Dr. Jun Yang is the Distinguished Professor of Chinese Academy of Sciences (CAS) and the



Deputy Director of Institute of Acoustics, Chinese Academy of Sciences (IACAS). He obtained the Ph.D. degree in acoustics from Nanjing University, China in 1996. He was with Nanyang Technological University (NTU), Singapore, as a research fellow, a teaching fellow, an assistant professor, and an associate professor in 1999, 2001, 2003, and 2005, respectively. Since Nov. 2004, he has been a professor at IACAS.

Dr. Jun Yang has contributed significantly to acoustics research and education. He has published over 400 journal and proceeding papers, and has been granted more than 40 patents. Many of his research results have been used in practical applications. He won the IES Prestigious Engineering Achievement Award in 2001, Gold Award in Technology Exhibition at NTU for developing “Audio Beam Loudspeaker” in 2004, Excellent Paper Award for 5 times. And the Award of Excellence in the final evaluation of “CAS Hundred Talents Program” in 2008. Recently, he obtained the Pollyanna Chu Outstanding Teacher Prize in 2014 and 2020 respectively, Excellent Scientist Award by the Chinese Institute of Electronics in 2015, Excellent Graduate Advisor Award by CAS in 2016, the title of “State Council Expert for Special Allowance” in 2018, and the second prize of Beijing Science and Technology Progress Award in 2020.

Dr. Jun Yang is a Fellow of the International Institute of Acoustics and Vibration (IIAV), Acoustic Society of China (ASC), and Chinese Institute of Electronics (CIE). He is an Executive Director and Vice Secretary-General of ASC, and chairs the Audio Engineering Society of China (AESC).



COA 2021

Keynote Speech 2 (On-line)

Professor Milica Stojanovic, Northeastern University

Presentation title: Multicarrier Acoustic Communication in Interference-limited Regimes

Abstract: Interference-limited regimes occur in underwater acoustic communication scenarios for a variety of reasons: ambient noise levels can be elevated in certain environments, intentional interference can be present in adversarial situations, the signal level can be reduced deliberately so as to achieve security, and multi-user interference can be present in networked systems. In this lecture, we focus on signal detection in such situations, employing a structured coding technique alongside multi-carrier modulation in the form of orthogonal frequency division multiplexing (OFDM). We outline methods for coherent detection, where custom-tailored channel estimation is employed, and for differentially coherent detection, where no channel estimation is needed. Doppler compensation accompanies either method to account for the motion-induced frequency shifting. Upon presenting theoretical considerations that inspire the system design, we discuss the system performance using real data obtained during a mobile acoustic communications experiment.

Personal profile: Milica Stojanovic graduated from the University of Belgrade, Serbia, in 1988, and received the M.S. and Ph.D. degrees in electrical engineering from Northeastern University in Boston, in 1991 and 1993, respectively. She was a Principal Scientist at the Massachusetts Institute of Technology, and in 2008 joined Northeastern University, where she is currently a Professor of Electrical and Computer Engineering. She is also a Guest Investigator at the Woods Hole Oceanographic Institution. Her research interests include digital communications theory, statistical signal processing and wireless networks, and their applications to underwater acoustic systems. Milica is a Fellow of the IEEE, an Associate Editor for the IEEE Journal of Oceanic Engineering, and the Chair of the IEEE Ocean Engineering Society's Technical Committee for Underwater Communication, Navigation and Positioning. She also serves on the Editorial Board of the IEEE Signal Processing Magazine and has in past served on the Advisory Board of the IEEE Communication Letters, as an Associate Editor for the IEEE Transactions on Signal Processing, and Associate Editor for the IEEE Transactions on Vehicular Technology. Milica is the recipient of the 2015 IEEE/OES Distinguished Technical Achievement Award, 2018 IEEE/OES Distinguished Lectureship, and the 2019 IEEE WICE Outstanding Achievement Award.





Keynote Speech 3 (On-line)

David A. Brown, University of Massachusetts Dartmouth

Presentation title: Advances in broadband underwater acoustic transducers and navigation

Abstract: Advances in underwater piezoelectric ceramic transducers are presented for application of underwater communication, navigation, and other sonar. Careful design is a blend of science, engineering and art. Example designs, modeling and results.

Personal profile: Dr. Prof. David A. Brown, University of Massachusetts Dartmouth





Keynote Speech 4 (On-line)

Prof. Chi-Fang Chen, National Taiwan University

Presentation title: Passive Acoustic Study in Taiwan

Abstract: Recent years, due to the development of offshore wind farms in Taiwan, environmental impact assessment of the development is underway. Among all impact factors, underwater noise becomes a major concern for the offshore wind farm sites are very close to the habitats of *Sousa chinensis* (Chinese Humpback Dolphin). To assess the noise impact, underwater acoustic listening stations were deployed in the regions. These underwater acoustic measurements include one seven-year data collected before-during-after OWF installation enhance the understandings of the underwater soundscape in western Taiwan. A series of papers are published from the analysis of these huge data sets. This report presents these findings and future plan for better understanding of the bio-acoustic ecology in the west coastal waters of Taiwan. This work is supported by the Ministry of Science and Technology, Council of Agriculture, Ocean Affairs Council of Taiwan, ITRI, Unitech Inc., Formosa Plastics Group, Swancor Inc. since 2009.

Personal profile: Dr. Chi-Fang Chen received her Ph.D. in the Department of Ocean Engineering, Massachusetts



Institute of Technology in 1991, and started her career as the faculty member of the Department of Naval Architecture of National Taiwan University from 1991 till now. (Department of Naval Architecture was renamed as Department of Engineering Science and Ocean Engineering in 2000). Her research focus and interests are underwater acoustics and passive acoustic monitoring (PAM). She is conducting passive acoustic monitoring (PAM) research in recognizing sounds from different species in the ocean which includes *Sousa chinensis* in offshore regions west of Taiwan. Her goal in the near future is to establish a PAM network in the west coast of Taiwan to monitor the endangered species, namely the Chinese White Dolphin (*Sousa chinensis*), and other

marine lives. The PAM network is a major component in the integrated dolphin monitoring network, and is composed of fixed stations (bottom-mounted, moored hydrophones, or sonobuoys) and mobile platforms with acoustic payloads such as ASVs.



Keynote speech 5

Prof. Wen Xu, Zhenjiang University

Presentation title: Joint target detection and tracking with distributed underwater acoustic arrays





Keynote speech 6

Prof. Shiqi Mo, Harbin Engineering University

Presentation title: The technique of passive positioning based on vector hydrophones

Abstract: Direction-of-arrivals (DOAs) estimations have received considerable interests, with most of the existing techniques still relying on scalar hydrophones. One requiring further research is the vector-based positioning technique. Based on the vector-based DOA, this paper investigates poisoning and tracking techniques using vector hydrophones and discusses the observability of motion parameters of moving targets with only the azimuth information of the targets known. The interference pattern of the waveguide field is stable, dependent on several factors including sound speed profiles and source and receiver depths. This paper develops an algorithm to estimate the motion parameters of moving targets using the vector waveguide invariant associated with the inference pattern. Simulations and experiments validate the proposed algorithm.

Personal profile: Shiqi Mo is Professor of Underwater Acoustics within College of Underwater Acoustic Engineering at Harbin Engineering University. Professor Mo is the Deputy Dean of College of Underwater Acoustic Engineering, the Associated Director of Key Laboratory of Underwater Acoustic Technology, the Associated Director of Management Center of Deep-Sea Space Station, and a member of Academic Committee of Key Laboratory of Underwater Acoustic Technology. He has particular research interests in the areas of vector signal processing and measurements and analyses of underwater noises. He has played an important role in the development of such areas and is author of more than 50 core journal articles. So far, he has participated in several national scientific research projects and has applied for more than 20 authorized patents. Also, he has won three times of first prize for National Defense Science and Technology Progress and two times of second prize for National Science and Technology Progress.





COA 2021

Keynote speech 7 (On-line)

Professor John Potter, Norwegian University of Science and Technology

Presentation title: The best way to predict the future is to invent it - Some emerging game-changers in marine sensing

Abstract: We live in a special moment in time. While many would claim this is always true in some sense, it is undeniable that there is an accelerating confluence of technologies that are revolutionising the way that we sense and manage the marine environment. We are now seeing the end of the century of under-sampling, the conclusion of an age where data were few and costly to obtain, allowing us only short and narrow glimpses into the workings of our vast global ocean-atmosphere system. With the growing maturity of autonomous maritime systems, the fusion of in-situ and remote sensing capabilities and the advent of new sensing modalities such as Distributed Acoustic Sensing, we are entering a new age of Big Marine Data, automated data collection and near-real-time processing and cloud-based virtual observatories.

Personal profile: Prof. Potter is a marine scientist with degrees in mathematics, physics, polar oceanography and glaciology from Bristol and Cambridge Universities in the UK. An IEEE and MTS Fellow and International Fellow of the Explorers Club, he has extensive senior management & technology development experience and a holistic 'big picture' vision with a focus on environmental conservation and sustainability. His specialisations include underwater acoustics, Internet of Underwater Things (IoUT), polar oceanography, ambient noise and marine mammals. Prof. Potter is the founder of the Acoustic Research Laboratory in the National University of Singapore, has received numerous international awards for his marine research and technology projects and is an IEEE OES Distinguished Lecturer. It is no longer true that he neither owns nor operates a television.



COA 2021



Keynote speech 8 (On-line)

Paul White, University of Southampton, UK

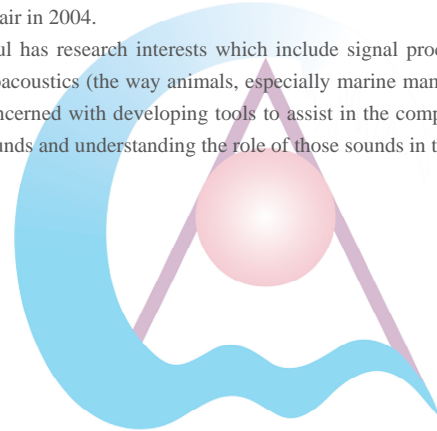
Presentation title: Tracking for dolphin whistles

Abstract: Dolphins emit several types of sound, including echolocation clicks and narrow band frequency modulated calls, termed whistles. When using passive acoustics to monitor and area the presence of dolphins can be determined using these whistles, however it is challenging to identify the specific species from them. This is because the whistles are frequently emitted by many animals simultaneously and are overlaid by echolocation clicks. This paper will discuss processing methods which aim to follow the whistles, treating the problem as a one of multi-target tracking applied to a modified spectrogram. We describe the pre-processing steps applied to generate the modified spectrogram and the approach to MTT undertaken, specifically the particle hypothesis tracker (PHD) filter.

Personal profile: Professor Paul White is Professor of Statistical Signal Processing within Engineering and Physical Sciences at the University of Southampton. He obtained a BSc in Mathematics in 1985, then moved along the south coast to Southampton to undertake his PhD at the University of Southampton, becoming a lecturer in ISVR in 1988 and was awarded his Chair in 2004.



Paul has research interests which include signal processing, underwater acoustics and bioacoustics (the way animals, especially marine mammals, use sound). He is primarily concerned with developing tools to assist in the computer-aided analysis of underwater sounds and understanding the role of those sounds in the marine environment.



COA 2021



Session Chairs and Invitation Talk List

I. Underwater acoustics and acoustical oceanography

Prof. Jinrong Wu



He received the B.E. degree in electrical engineering from Northeast Normal University, Changchun, China, in 1999, the M.S. degree in acoustics from Harbin Engineering University, Harbin, China, in 2002, and the Ph.D. degree in acoustics from the Institute of Acoustics, Chinese Academy of Sciences (CAS), Beijing, China, in 2005. Since 2005, he worked at the Institute of Acoustics, CAS. He worked as an exchange scientist at Curtin University in Australia 2006, and worked as a visiting scholar at Leibniz Institute of Marine Sciences at the University of Kiel (IFM-GEOMAR) in Germany 2010. He is currently a Professor with the Institute of Acoustics, CAS, and with University of CAS. His research interests include

underwater reverberation experiment, signal processing and modeling, boundary acoustic reflection/scattering, and geoacoustic inversion. He is a fellow of Chinese Society of Acoustics. Dr. Wu has published more than 60 academic papers in the journals and proceedings.

Dr. Lijia Gong



He received the Ph.D degree in acoustics from the Laboratoire d'Acoustique d'Université du Mans (LAUM) in France in 2018. He is working in College of Underwater Acoustic Engineering, Harbin Engineering University from 2018. His research interests include digital holography interferometry, underwater acoustic propagation and modeling, and thermo-acoustics. Dr. Gong has published more than 15 academic papers in the journals and proceedings.

Dr. Bo Gao, Ocean University of China (Invitation talk)

Presentation title: Modeling and Characteristic of Coupled Scattering for the Distant Ocean Reverberation

Abstract: Ocean reverberation is known as the main limitation of active detection. Meanwhile, it is also a kind of brilliant marine information carrier. This presentation would start with the coupled mode reverberation model, and the environmental effects on distant reverberation, such as fluctuation of sea surface, perturbation of water volume, was investigated by mode coupling analysis. It is shown that although bottom reverberation is the dominate factor for the ocean reverberation, the non-determinacy of reverberation is affected seriously by the upper boundary and the water medium. The separation of deterministic and diffuse part of ocean reverberation is the key point of reverberation estimation、suppression and inversion.

Personal profile: Bo Gao, was born in the city of Weifang, Shandong province, in 1985. He received the B. E. degree in Electronic Information Engineering (underwater acoustics) and the Ph.D. degree in underwater acoustic engineering from the college of underwater acoustic engineering, Harbin Engineering University, China, in 2007 and in 2013, respectively. His Ph.D. dissertation focused on modeling and mechanism of low frequency reverberation and propagation in shallow water.



He is currently an Assistant Professor at the department of marine technology, the Ocean University of China, Qingdao. His main research interests are in ocean reverberation, stochastic propagation, and high frequency sediment acoustics. His investigation was

supported by N.S.F.C. and Shandong Provincial Natural Science Foundation of young scientists, and his papers were mainly published at JASA-EL, J.C.A, SCIENCE CHINA G, Acta Acustica, Acta Phys.Sin.



II. Ocean acoustic observatories and ocean acoustic instruments, systems and platforms

Prof. Zhiliang Qin



Zhiliang Qin is a Professor, Ph.D. Supervisor. 2009-2012 Marine geology PH.D. Institute of Oceanology, Chinese Academy of Sciences. 2012-2015, Assistant Researcher National Marine Hazard Mitigation Service, Beijing, China. 2015-2017, Associate Professor Tianjin Research Institute for Water Transport Engineering, M. O. T. 2017-Professor College of Underwater Acoustic Engineering of Harbin Engineering University, Harbin, China & Associate Dean in Harbin Engineering University Qingdao Graduate School.

Research interests include Acoustic oceanography theory and application, Sub-marine Boundary Layer detection technology and marine emergency equipment technology, Island and reef defense and underwater battlefield environmental support, etc.

Prof. Yanming Yang, Third institute of oceanography, Ministry of natural resources (Invitation talk)

Presentation title: CTBTO IMS and its Applications

Abstract: The International Monitoring System (IMS) of Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) is briefly overviewed. The application cases of the hydroacoustic observation system in the monitoring of North Korean nuclear tests, the search for sunken Argentine submarine and the observation of submarine volcano are presented. The capabilities of the system are prospected.

Personal profile: Yanming Yang (born in 1966) received the Ph.D. degree of Xiamen University in 1996. He is a research Prof. and the director of ocean acoustics and remote sensing Lab. in third institute of oceanography, ministry of natural resources, China. He is a member of expert committees of two state special task projects. He is a member of editorial board of Chinese Journal of applied oceanography.



He has undertaken dozens of the National Natural Science Foundation of China, national key research and development plan, national major task project and provincial and ministerial projects. He has published dozens of scientific papers and two monographs. He has won seven times of provincial and ministerial level awards of science and technology progress, including one time outstanding award, four times first grade awards and two times second grade awards. He was authorized several national invention patents and practical new model patents on ocean acoustic technology.

Prof. Xuegang Zhang, Dalian Institute of Measurement and Control Technology (Invitation talk)

Presentation title: Ambient noise observation system and data analysis based on seabed base station

Abstract: There are many influencing factors of ambient noise, so it is necessary to establish long-term and multi-factor observation methods for research. The report introduces the ambient noise and synchronous environmental observation system based on seabed base station, analyzes the measured data of a sea area for 20 consecutive days, gives the spectral characteristics/statistical characteristics of ambient noise in the test sea area and the correlation between ambient noise and wind, current and other factors, and gives some correlation analysis results when Typhoon Lichma transits.



Personal profile: Dr. Zhang Xuegang is the deputy director of the National Key Laboratory of Underwater Measurement and Control Technology, professor, master tutor, doctoral candidate, mainly engaged in Marine acoustic environment characteristics.

As the chief scientist, he has presided over the completion of 4 major national special tasks. As the project leader, he has undertaken a number of projects such as foundation strengthening, national key research and development plan, and pre-research of the "13th Five-Year Plan". It has won 10 provincial and ministerial awards, 11 authorized

invention patents and 1 utility model patent. Currently, he is a member of an expert group in the Innovation Special Zone, an expert of "Marine Environment Expert Database", a member of the Academic Committee of the Key Laboratory of Underwater Acoustic Environmental Characteristics, Chinese Academy of Sciences, the Key Laboratory of Marine Exploration Technology, Ministry of Natural Resources, and a member of the Military Oceanography Committee of the Chinese Society of Oceanography.



III. Ocean sound propagation modeling and experiments

Prof. Haigang Zhang



Zhang Haigang is Professor / doctoral supervisor, deputy dean of College of underwater acoustic engineering. He obtained his bachelor's degree in 2003, obtained his master's degree in 2006, obtained his doctor's degree in underwater acoustic engineering from Harbin Engineering University in 2010. His research interests are ocean acoustics and underwater acoustic propagation.

Dr. Zhendong Zhao, Key Laboratory of Underwater Acoustic Environment, Institute of Acoustics, Chinese Academy of Sciences (Invitation talk)

Presentation title: Modeling of Green's Function with bottom reflection parameters and its applications

Abstract: The modeling of Green's Function with bottom reflection parameters (P, Q) is introduced, and based on which some practical applications including bottom intrinsic parameter extraction and bottom tomography are also discussed. The usage of model-free bottom reflection parameters instead of commonly used geoacoustic parameters may solve a series of problems, such as bottom model mismatching, distortion of parameter character in bottom inversion and extra uncertainty in sound field prediction.

Personal profile: Zhendong Zhao was born in Shandong, China, in 1984. He received the M.S. degree from the Ocean University of China in 2010, and the Ph.D degree in acoustics from the University of Chinese Academy of Sciences in 2014. Since 2014 he has been with the Institute of Acoustics, Chinese Academy of Sciences firstly as Research Assistant, and as Associate Professor since 2018. His current research interests include coherent phenomena in underwater sound field, acoustic modeling and parameter inversion.

Email: zhaozhendong@aliyun.com; zhaozhendong@mail.ioa.ac.cn



Dr. Pavel S. Petrov, Il'ichev Pacific Oceanological Institute (Invitation talk) (On-line)

Presentation title: Pseudodifferential mode parabolic equations and their application to the modelling of sound propagation in shallow water

Abstract: The modelling of sound propagation in the ocean by the solution of mode parabolic equations is discussed. Mode parabolic equations can be obtained as the one-way approximation to horizontal refraction equations for modal amplitudes. Their wide-angle capabilities depend on the order of the Pade approximation of the involved pseudo-differential operators. Various aspects of numerical solution methods for pseudodifferential mode parabolic equations are considered in detail, including artificial domain truncation and Cauchy initial data for the point source field approximation. The capabilities of the discussed numerical approaches are demonstrated in several important test cases, including the problems of sound propagation in a penetrable wedge and in a sea with an underwater canyon. Applications of pseudodifferential mode parabolic equations to the problems of monitoring of anthropogenic acoustic noise on the shelf are described.



Personal profile: Dr. Pavel S. Petrov is the head of laboratory of geophysical fluid dynamics at Pacific Oceanological Institute (Vladivostok, Russia). His work is related to the problems of sound propagation in complex marine environment with particular emphasis on various 3D effects, including horizontal refraction. His group develops mathematical methods for the modelling of wave propagation using such approaches as normal modes theory, parabolic equations and asymptotic methods. Practical applications of the group's research output include acoustic navigation and acoustical monitoring of the marine environment. Dr. Petrov received V.I.Ilichev award (by Russian Academy of Sciences) for a series of papers dedicated to the development of 3D numerical methods for sound propagation modelling. He is the only Russian member of the UACE meeting scientific committee, and he also serves as a topic editor (underwater acoustics) of Journal of Marine Science and Engineering



IV. Marine sediment acoustics

Prof. Yinwang Huang

He received his bachelor's degree, master's degree and PhD degree in underwater acoustic engineering from Harbin Engineering University. His current research interests are acoustic properties of seafloor sediments and spatial correlation modeling of ocean ambient noise.

Dr. Qunyan Ren, Institute of Acoustics, Chinese Academy of Sciences (Invitation talk)

Presentation title: Sediment characterization using multiple systems: experimental and numerical results

Abstract: This paper presents the characterization of sediment properties using multiple hydrographic systems. Different processing techniques are adapted to process at-sea experiment data from a single-beam echosounder (SBES), and a sub-bottom profiler. A sequential processing algorithm is used to estimate the impedance index of surface sediment through processing the SBES backscattering echoes. A hybrid image processing method is used to extract the underlying sediment layering structure from sub-bottom profiling image. A Bayesian framework is adapted to characterize the sediment layering structure and associated geoacoustic parameters. Experimental processing results and numerical analysis suggest the using multiple systems can provide more comprehensive sediment properties than traditional approaches.

Personal profile: He has been working in the fields of underwater acoustic modelling, underwater acoustic signal processing, geoacoustic inversion, Bayesian parameter estimation, using artificial intelligence for underwater target identifying, etc. He has noticeable experience in study and research, numerical simulation, and experimental data processing. He has published more than 100 papers in top journals and academic conferences, and applied 28 invention patents. He is current one member of the expert group of CAS-Artificial Intelligence Research (CAS-AIR), the branch of computational acoustics of Acoustic society of China, key R & D plan of the Ministry of science and technology. He is in charge of more than 10 national and ministerial level projects, and is the chief scientist of one key strengthening project.





COA 2021

V. Ocean noise and reverberation

Prof. Zhenglin Li

Professor Zhenglin Li received the Ph. D. degree on Ocean Acoustics from Institute of Acoustics, Chinese Academy of Sciences (CAS), in 2002. Since then, he joined in the Institute of Acoustics, CAS. Now he is the vice director of the State Key Laboratory of Acoustics. His research interests include sound propagation, temporal and spatial correlation of sound field, ambient noise and reverberation, ocean tomography and geo-acoustic inversion, and source localization. He has published more than 100 papers and one book on ocean acoustics.

Dr. Jie Shi

She is a member of the Program for Scientific and Innovative Research Team of Ministry of Education of China in the area of the vibration and noise testing and source identification of underwater structures. She has been engaged in research work related to vibration and noise reduction of underwater structures. Her research mainly focuses on new sonar technology, submarine acoustic stealth technology, submarine vibration and noise measurement, noise source identification and so on, which is an urgent need for national defense.

Dr. Jixing Qin, Institute of Acoustics, Chinese Academy of Sciences (Invitation talk) (On-line)

Presentation title: Modeling and experiment of ocean reverberation in the range-dependent environment

Abstract: Ocean reverberation is an important issue in underwater acoustics due to the significant influence on the working performance of active sonar. A coherent reverberation model based on the adiabatic-mode theory for range-dependent shallow-water environment is developed. The presented model is verified by reverberation observation in the shallow-water experiment. In deep water, we develop a reverberation model based on the ray theory, which can accurately calculate monostatic and bistatic reverberation intensity. The non-stationary characteristic of deep-water reverberation loss is well explained by the model.

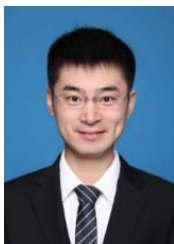
Personal profile: Jixing Qin received the B. S. degree in electronic and information science and technology from Harbin Engineering University, in 2009, and the Ph. D. degree from the University of Chinese Academy of Sciences, in 2014. From 2015 to 2016, he was a Post-Doctoral Fellow in the University of Haifa, Israel. He is an Associate Professor in the Institute of Acoustics, Chinese Academy of Sciences, and a member in the Youth Innovation Promotion Association of the Chinese Academy of Sciences. He is also the Chief Scientist of a major project. His research interests include ocean acoustics, with special emphasis on wave propagation theory (2D and 3D), ocean reverberation, internal wave, acoustic tomography, and geoaoustic inversion. He published about 50 journal and conference papers, and published one book as a coauthor. He accomplished more than 10 research projects supported by National Natural Science Foundation of China, Chinese Academy of Sciences, and other national departments.



Dr. Shi Yang, Northwestern Polytechnical University (Invitation talk) (On-line)

Presentation title: Deep Ocean Ambient Noise Observation and Investigation

Abstract: Ocean ambient noise is an important interfering ambient field of the ocean and has significant impacts on sonar systems. Investigating characteristics of deep ocean ambient noise is of great importance for scientific significance and application value. The characteristics and spatial and temporal variations of ocean ambient noise are investigated base on the experiments conducted in the South China Sea and the West Pacific Ocean.



Personal profile: Shi Yang is now the associate professor at the School of Marine Science and Technology in Northwestern Polytechnical University. His research interests are ocean ambient noise, dynamic ocean acoustics and Maritime information transmission. He is now undertaking a number of scientific research projects, including National Natural Science

Foundation of China and China Postdoctoral Science Foundation. More than 20 journal and conference papers have been published including Journal of the Acoustical Society of America and JGR Oceans.



VI. Underwater acoustic communication and networking

Prof. Songzuo Liu



Songzuo Liu is currently a professor in College of Underwater Acoustic Engineering, Harbin Engineering University, China. Between 2015 and 2017, he did Postdoc research with Underwater Wireless Sensor Networking (UWSN) group in SE_{NSE} lab, Sapienza University of Rome. His research interests lie in the areas of underwater acoustic communication, Marine mammal bioacoustic, underwater acoustic modem and release.

Prof. Jianghui Li, University of Southampton, UK (Invitation talk)

Presentation title: Efficient Use of Space-time Clustering for Underwater Acoustic Communications

Abstract: Underwater acoustic communication channels are characterized by the spreading of received signals in space and time. The spread is often limited to a small number of space-time clusters. In the study, the space-time clustering is exploited in a proposed receiver designed for guard-free orthogonal frequency-division multiplexing (OFDM) with superimposed data and pilot signals. For separation of space clusters, the receiver utilizes a vertical linear array (VLA) of hydrophones, whereas for combining delay-spread signals within a space cluster, a time-domain equalizer is used. We show that techniques exploiting the space-time clustering demonstrate an improved detection performance. The comparison is done using signals transmitted by a moving transducer, and recorded on a 14-element non-uniform VLA in sea trials at distances of 46 km and 105 km.

Personal profile: Prof. Jianghui Li received the B.S. degree in communications engineering from Huazhong University of Science and Technology, Wuhan, China in 2011, the M.Sc. degree in communications engineering, and the Ph.D. degree with receiving the K. M. Stott Prize for excellent research in electronics engineering from the University of York, U.K., in 2013 and 2017, respectively. He has been the first researcher receiving the IEEE OES scholarship in U.K.



From 2011 to 2012, he served as a Research Assistant with the Chinese Academy of Sciences, Beijing, China. From 2017 to 2021, he served as a Research Fellow with the University of Southampton, U.K. Since 2021, he has been a Full Professor in Marine

Science. His current research interests include global warming, ocean engineering, and underwater acoustics.

Prof. Charalampos Tsimenidis, Newcastle University, UK (Invitation talk) (On-line)

Presentation title: Multipath and Doppler Compensation in Underwater Acoustic Communications

Abstract: In recent years, there has been an immense interest in developing underwater acoustic communication systems, most of which are related to remote control and telemetry applications. Other applications include ocean-bottom survey and collection of scientific data acquired by sub-sea sensors without the need for retrieving the equipment. However, for all these applications the principal function is to achieve reliable communication both in point-to-point links, and in network scenarios. In practice, the only feasible method to achieve sub-sea communications is by means of acoustic signals. Such acoustic links are exposed to adverse physical phenomena governing acoustic wave propagation in the sea. These include ambient noise, frequency-dependent attenuation, temperature and pressure variations, reverberation, and extended multi-path. Any successful acoustic modem design must consider all these effects in order to select an appropriate configuration for system-related parameters. The focus of this presentation will be on the state-of-the-art methods that compensate for these effects for single and multi-carrier underwater acoustic communications systems. The design of receiver algorithms will be considered that utilize adaptive equalizers for multi-path compensation and receiver arrays for spatial diversity and beam-forming, synchronization issues such as carrier-phase and symbol timing recovery and Doppler compensation

methodologies. Block and iterative based methodologies will be introduced and their performance will be demonstrated using experimental results to give inside on their utilization and optimization of their parameters.

Personal profile: Prof. Charalampos C. Tsimenidis is the leader in Digital Communications in the School



Engineering at Newcastle University. He received his PhD in Communications and Signal Processing from Newcastle University in 2002. His main research expertise and interests are in the area of adaptive array receivers for wireless communications including demodulation algorithms, error control and network coding, and protocol design for radio frequency and underwater acoustic channels. He has published over 220 conference and journal papers, supervised successfully 3 MPhil and 50 PhD Students and made contributions over more than

20 years in the area of arrayed receiver design for doubly-spread multipath fading channels to several UK and European funded research projects. He is now the Head for the Intelligent Sensing and Communications Group at Newcastle University. He is a senior member of the IEEE and a member of the IET.

Prof. Julian Cheng, Applied Science, Electrical, School of Engineering, University of British Columbia (Okanagan campus) (Invitation talk) (On-line)

Presentation title: Trajectory Planning for Autonomous Underwater Vehicles

Abstract: Marine science and Internet of underwater things applications rely significantly on collecting data from underwater sensors. These battery-powered sensors can consume large energy for long-distance underwater acoustic communication. Instead, autonomous underwater vehicle (AUV) can be used to move in the vicinity of sensor nodes and establish high-speed communication at low energy consumption. We consider a dynamic trajectory design for AUVs with prior knowledge is unavailable for the locations of the sensor nodes, and compare the proposed dynamic trajectory design with the existing trajectory planning algorithms in terms of data collection performance.

Personal profile: Julian Cheng received a B. Eng. Degree (First Class) in electrical engineering from the University of Victoria, Victoria, BC, Canada in 1995, a M.Sc. (Eng.) degree in mathematics and engineering from Queen's University, Kingston, ON, Canada in 1997, and a PhD degree in electrical engineering from the University of Alberta, Edmonton, AB, Canada, in 2003.



In July 2006, He joined the School of Engineering, Faculty of Applied Science, The University of British Columbia (Okanagan campus) as an Assistant Professor. He is now a Full Professor in the same School. Previously, Dr. Cheng worked for Bell Northern Research (BNR) and Northern Telecom (later known as NORTEL Networks), and taught at both University of Alberta and Lakehead University. His current research interests include digital

communications over wireless channels, orthogonal frequency division multiplexing, spread spectrum communications, statistical signal processing for wireless applications, and optical wireless communications. Dr. Cheng co-chaired the 12th Canadian Workshop on Information Theory (CWIT 2011), the 6th EAI International Conference on Game Theory for Networks (GameNet 2016), and the 28th Biennial Symposium on Communications (BSC 2016). In 2012, he chaired the 2012 Wireless Communications, which was held July 3-5, 2012 in Banff, Canada. Currently, he serves as an Area Editor for *IEEE Transactions on Communications*. In the past, he served as an Editor for *IEEE Transactions on Communications*, *IEEE Transactions on Wireless Communications*, *IEEE Communications Letters*, and *IEEE Access*. He also served as a Guest Editor for a special issue of *IEEE Journal on Selected Areas in Communications* on optical wireless communications. Dr. Cheng is also a Senior Member of IEEE.

Dr. Cheng was the recipient of numerous scholarships during his undergraduate and graduate studies, which included a President Scholarship from the University of Victoria and a postgraduate scholarship from the Natural Sciences and Engineering Research Council of Canada (NSERC). He was also a winner of the 2002 NSERC Postdoctoral Fellowship competition.

Dr. Cheng held an Adjunct Professor position with the University of Alberta (2005-2010). He is a registered Professional Engineer in British Columbia. Dr. Cheng was also the founding chair of IEEE Okanagan Subsection. Currently, he is serving as the President for the Canadian Society of Information Theory (CSIT) as well as the

Secretary of Radio Communication Committee (RCC) of IEEE Communications Society.

Prof. Jingjing Wang, Qingdao University of Science and Technology (Invitation talk)

Presentation title: Underwater Acoustic Signal Modulation Recognition Technology based on Feature Fusion and Lightweight Neural Network

Abstract: In order to make full use of the channel resources of underwater acoustic communication, the transmitters often use adaptive modulation and coding technology, which require the receivers to use automatic modulation recognition technology. However, the complex and changeable underwater channel environment with serious noise interference brings great challenges to the receiver to identify the modulation mode correctly. In addition, the real-time communication and the diversity of modulation mode put forward higher requirements for the modulation mode recognition technology. In order to solve the above problems, combined with the classical theory of multi-source specific feature extraction of underwater acoustic signal and the automatic abstract feature extraction method of neural network, we propose the underwater acoustic signal modulation recognition technology based on feature fusion and lightweight Neural Network. We extract the multi-source specific features of underwater acoustic signals according to the inherent differences of different modulation modes, and use the automatic feature extraction ability of lightweight hybrid neural network to extract the abstract features of underwater acoustic signals. Based on the feature fusion theory, the two kinds of features are fused into a more complete and more effective feature set.

Personal profile: Jingjing Wang is a professor and doctoral supervisor of Qingdao University of Science and Technology. She presides over one key national defense science and technology innovation project of the Science and Technology Commission of the Central military Commission; presided over one key project of the NSFC- Shandong Joint Funds, one General Program and one Youth Program of National Natural Science Foundation of China. She has published more than 50 papers in high-level academic journals and important academic conferences, of which 27 SCI papers were published as the first author and corresponding author. 34 Chinese invention patents have been applied by her team. She serves as the vice chairman of Qingdao Branch of the International Computer Association (ACM). She has won the Second Prize of Shandong Province Science and Technology Progress Award (ranking 1), the First Prize of Science and Technology Award of Shandong Province Higher Institutions (ranking 1), the Academic Innovation Award of Natural Science of Shandong Province (ranking 1) and the Youth Science and Technology Award of Qingdao. Her research interests include marine internet of things, intelligent underwater acoustic communications and equipment.





VII. Signal processing: Sonar modeling, signal detection and estimation, target tracking and recognition (parametric and non-parametric)

Dr. Fengxiang Ge



He received the B.S. and M.S. degrees in underwater acoustic and electronic engineering from Harbin Engineering University, Harbin, China, in 1996 and 1999, respectively, and the Ph.D. degree in communication and information system from Tsinghua University, Beijing, China, in 2003. From 2003 to 2005, he was a Postdoctoral Research Associate in the Department of Electrical and Electronic Engineering, University of Hong Kong. In 2005, he joined the Intel China Research Center, Beijing, China, as a Senior Researcher, and then he was promoted to an Architect and was transferred to Intel Corporation, Folsom, CA, USA.

In November 2011, he joined the College of Information Science and Technology, Beijing Normal University, China, where he is now an Associate Professor. His research interests include signal processing with applications in Sonar, Radar, and Wireless Communications and Location, Mobile Platform, etc.

Prof. Xueli Sheng



Dr. Xueli Sheng received the B.S., M.S., and Ph.D. degrees in underwater acoustic engineering, signal and information processing and underwater acoustic engineering from Harbin Engineering University, China, in 1999, 2001, and 2005, respectively. From 2013 to 2014, she was a visiting Professor with the University of Delaware, USA. She is currently a Professor and a Doctoral Adviser of the College of Underwater Acoustic Engineering, Harbin Engineering University. She is also the Deputy Director of the Key Laboratory of Marine Information Acquisition and Security, Harbin Engineering

University, Ministry of Industry and Information Technology. She has published a monograph, over 50 papers, and over 10 inventions. Her research interests mainly include underwater acoustic signal processing, multi-platform/bionic sonar technology, and semi-physical simulation of complex acoustic systems.

Dr. Peng Xiao, School of Marine Engineering and Technology, Sun Yat-sen University (Invitation talk)

Presentation title: 1-bit Compressive Sensing: Theory and Applications

Abstract: 1-bit compressive sensing has been widely concerned in recent years. It reduces the complexity of system hardware modules by reducing quantization precision and is suitable for constructing and deploying the large-scale arrays and the distributed systems. However, how to recover or reconstruct the original signal with high accuracy using 1-bit data is still an open subject. This talk will introduce the the latest research results of the speaker for 1-bit compressive sensing and its applications in hydroacoustic area.

Personal profile:

Xiao Peng is an Associate Professor with School of Marine Engineering and Technology, Sun



Yat-sen University. He is also a master's tutor, member of IEEE, and is recognized as Overseas High-Caliber Personnel (Level C) in Shenzhen. In 2011, he obtained his bachelor's degree from the Honor School of Northwestern Polytechnic University. In 2017, he obtained his PhD degree in underwater acoustic engineering from the school of Marine Science and Technology of Northwestern Polytechnic University. From December 2017 to December 2019, he was a postdoctoral researcher in the College of Information Engineering, Shenzhen University. From July 2019 to August 2020, he conducted postdoctoral research in the Vrije

Universiteit Brussel, Belgium. His research fields include underwater acoustic modeling, signal processing theory and interpretable deep learning network. He has authored 30+ papers in the top-tier journals (e.g., IEEE Transactions on Signal Processing, Elsevier Signal Processing, etc) and in the international conferences (e.g., ICASSP, EUSIPCO, etc). He served as a reviewer for authoritative academic journals such as IEEE TAES, IEEE JOE, IEEE TIT, Elsevier SP, and chairperson of several international signal processing conferences such as

the International Radar Conference. He has undertaken a project of National Natural Science Foundation of China and participated in a number of national and provincial key projects

Prof. Hangfang Zhao, Zhejiang University (Invitation talk)

Presentation title: Generic FRI-based DOA Estimation: A Model-Fitting Method

Abstract: The bandlimited signals can be acquired through sampling and perfectly recovered from the measured samples in accordance with Shannon sampling theorem. What are less obvious are sampling schemes utilizing some sort of sparsity in the nonbandlimited signal, and this is the central theme of the finite rate of innovation (FRI). It is possible to evade Nyquist sample and recover signals exploiting sparse sampling. It is a dual problem to find the DOA estimation and the innovation rate of signals with infinite bandwidth.

Personal profile: Hang-fang Zhao received the B.E. degree in electronic engineering from Xidian University, Xi'an, China, in 1991, the M.E. degree in underwater engineering from Harbin Engineering University, Harbin, China, in 1997, and the Ph.D. degree in communication and information systems from Zhejiang University, Hangzhou, China, in 2010. From 1991 to 2012, she was with the Hangzhou Applied Acoustics Research Institute, Hangzhou, China, where she conducted research in acoustic signal processing and acoustic engineering. In 2012, she joined Zhejiang University, where she currently is a Professor at the Department of Information Science and Electronic Engineering. Her research interests include array signal processing, acoustic tomography and acoustic imaging and robust signal processing in uncertain environments.



Dr. Weichang Li, Aramco Houston Research Center, USA (Invitation talk) (On-line)

Presentation title: Deep Learning for separating surface waves from seismic reflection events

Abstract: We have developed a method to combine unsupervised and supervised deep learning for seismic ground-roll attenuation. The method consists of network components that have physics meaning and motivation, including: A. a CNN network that separates a seismic record into ground-roll and reflection signal, while minimizing the residual between the input seismic record and the sum of the generated signal and ground-roll; B. a supervised classifier that creates a maximum separation of reflection and ground-roll in the frequency-wavenumber domain; and C. a CNN network modeling ground-roll from shallow reflection events. Test results on field seismic records demonstrate the effectiveness of the proposed method in preventing signal leakage and removing ground-roll from seismic data.

Personal profile: Weichang Li is with Aramco Americas' Houston Research Center where he is currently the head of the Machine Learning group. Weichang obtained his PhD degree in Electrical and Oceanographic Engineering in 2006, and MS (dual) in EECS and OE in 2002, all from MIT. He received his BS and MS in Acoustical Signal Processing from Harbin Engineering University in 1993 and 1996, respectively. He was with the signal processing group at the Institute of Acoustics, Chinese Academy of Sciences from 1996 to 1998 as an assistant scientist, and from 1998 to 1999 as an associate scientist. From 2006-2008 he was with Woods Hole Oceanographic Institution (WHOI) as an ONR postdoctoral fellow. From 2008-2015 he was with ExxonMobil Corporate Strategic Research Lab where he led the machine learning group from 2011-2014.

His current research focus is on machine learning, statistical signal processing algorithm research and applications in geophysics, geosciences, and energy engineering problems. He is a member of the Machine Learning Research Committee of SEG, an IEEE senior member, and guest associate editor for Geophysics and IEEE Transaction on Neural Networks and Learning Systems.



VIII. Design, development, testing and calibrations for acoustical sensor and array

Dr. Wei Lu



He received B.S degree and Ph. D degree in 2003 and 2010 respectively, from college of Underwater Acoustic Engineering, Harbin Engineering University. Now he is working in Harbin Engineering University as Associate Professor. His research interests include the new type underwater transducer and acoustics system, the mechanism of innovation for underwater sound emission technique. In recent years, he is now undertaking a number of scientific research projects, including National Natural Science Foundation of China, research of Science and Technology Commission of the Military and other national departments. He published about 30 journal and conference papers.

Prof. Bin Liang, NanJing University (Invitation talk)

Presentation title: Acoustic metamaterials for sound manipulation and beyond

Abstract: Recent years, the acoustic metamaterial has some special acoustic properties in natural materials, which have opened new ways to achieve magic acoustic phenomena, such as asymmetric sound manipulation and high-quality acoustical holography. The acoustic metamaterials also provide a new route for breaking through the fundamental limitation of traditional acoustic theory and technology. However, they are mainly used for specific waves manipulation, and difficult to realize acoustic detection, imaging and others independently. To solve these problems, the brain-like intelligent system is built by acoustic artificial structure. a specific matrix is designed on the basis of deep-learning techniques. It is verified that the groups of metamaterial unit-cells with specific matrix have specific intelligence for desired tasks. Taking the object identification based on the scattered wave as an example, which is of fundamental significance in wave physics, the meta-neural-network exhibits its magic performances in completing complex tasks with simplicity, precision, real time, and pure passivity.

Personal profile: Bin Liang is now the professor and doctoral supervisor at the Department of Physics, NanJing University. He was one of the first winners of Excellent youth fund of NSF. Also, he was selected for Talent Plan of Nanjing University (class B) and supported by Program for New Century Excellent Talents in University. His research interests include magic acoustic phenomena and manipulation of acoustic metamaterials. He proposed and achieved the concepts of acoustic diode and metamaterials, etc. As the first author or correspondence author (including co-authors), more than 90 SCI papers have been published, including 1 Nat. Mat., 1 Nat. Rev. Mat., 2 Nat. Comm., 1 Phys. Rev. X, 4 Phys. Rev. Lett. and 1 Adv. Mat. Nearly 20 patents have been authorized (include 2 US patents) and 9 papers were selected as highly cited papers in ESI, his research results have been repeatedly reported by Nature News, American Institute of Physics and other academic institutions and appeared on the “60-second science” program organized by Scientific American. As the second author, he won the first prize of natural science of the Ministry of Education in 2016, and he was selected into “World’s Top 2% Scientists” evaluated by Stanford and “Highly Cited Chinese Researchers” evaluated by Elsevier in 2021.



Prof. Yong Chai, Institute of Acoustics, Chinese Academy of Sciences (Invitation talk)

Presentation title: Several New Explorations for Low Frequency, Small Size Transducer

Abstract: With the development of marine science and national defense technology, it is more significant for low frequency underwater transducer with more compact structure. In recent years, a series of explorations and researches have been carried out on the design of low frequency, small size underwater transducer. In this report, the relevant progress for low frequency, small size underwater transducer is introduced. Meanwhile, the problems and the potential solutions in transducer research are discussed.

Personal profile: Chai yong, received B.S degree in college of mechanical engineering, Tsinghua university in 2002. In 2007, he received Ph. D degree from Institute of acoustics, Chinese Academy of Sciences under the guidance of Professor Mo Xiping. Now he worked at Institute of acoustics, Chinese Academy of Sciences as researcher and supervisor of master degree. The main research directions include the design theory of underwater transducer, the analysis of transducer and array and the applications of new functional materials in transducer. In recent years, he is now undertaking a number of scientific research projects, including National Natural Science Foundation of China, the pre-research of National defense, research of Science and Technology Commission of the Military and other cooperative projects between school and enterprise. More than 10 kinds of new underwater transducers have been successfully developed, and more than 20 academic papers have been published.



IX. Polar acoustics and under-ice propagation

Dr. Xiao Han



He received the B.S., M.S., and Ph.D. degrees in underwater acoustic engineering from Harbin Engineering University, Harbin, China, in 2011, 2014, and 2016, respectively, where he is currently an Associate Professor with the College of Underwater Acoustic Engineering. He has been a visiting scholar with Acoustic Research Laboratory, National University of Singapore since April 2019. He is a member of the youth working committee of the Chinese Society of Naval Architects and Marine Engineers, also a member of Acoustical Society of China. He has published more than 30 research articles in related journals and international conference proceedings. He is the holder of 13 patents. He is the principle investigator of

more than ten research projects, including National Key R&D Program of China, National Natural Science Foundation of China, Innovation Special Zone of National Defense Science and Technology, and Postdoctoral Science Foundation of China, etc. His research interests include underwater acoustic communication, underwater acoustic communication reconnaissance and confrontation, and underwater array signal processing.

Dr. Hongtao Wen, Third Institute of Oceanography, Ministry of Natural Resources, PRC (Invitation talk)

Presentation title: Research progress of underwater noise characteristics in key sea areas of Arctic Pacific sector

Abstract: The Bering Sea, the Chukchi plateau and its northern Center Arctic Ocean are important passages for China to enter the Arctic from Pacific. Based on the data of the 8th to 11th Arctic expedition in China, the characteristics of underwater noise in these key sea areas were studied. The monthly and seasonal variation characteristics of underwater noise and its response to environmental parameters such as sea ice, sea surface wind and sea surface temperature were analyzed.

Personal profile: Dr. Hongtao Wen is an associate professor of the third Institute of Oceanography, Ministry of



Natural Resources, mainly engaged in Arctic acoustic research and ocean acoustic investigation. He has participated in the 8th Chinese National Arctic Research Expedition, which is the first environmental survey around the Arctic Ocean. He once served as the chief scientist of the major national special ocean acoustic investigation and research task, and accumulated more than 600 days of Arctic expedition and deep-sea investigation. He has won first prize of marine science and technology award, MNR, 2018 (Ranking the second). As the project leader, he has undertaken over 12 national, provincial and ministerial level projects, including National Key R & D program of China, National Natural Science Foundation of China, national special projects and Natural Science

Foundation of Fujian Province of China, and so on. More than 50 papers have been published, including 20 SCI or EI papers.



COA 2021

X. Underwater non-acoustic detection and communication

Prof. Niaz Ahmed

Niaz Ahmed received his B.S. degree in telecommunication engineering from NUCES-FAST University, Islamabad, Pakistan, the M.S. degree in computer engineering from CASE University, Islamabad, Pakistan, in 2010 and 2012, respectively, and the Ph.D. degree in electrical engineering from Missouri University of Science and Technology, Rolla, MO, USA, in 2017. He is one of the pioneers in the field of Magneto Inductive communication for underwater wireless sensor networks. He has published articles in reputed and prestigious journals and international conferences. He is also being selected in the OES student poster competition for two consecutive times. He is currently an Associate Professor in Harbin Engineering University University, Harbin, China. His research interests include wireless communication, underwater wireless sensor network, magneto-inductive communication and embedded systems.

Prof. Ying Shen, Harbin Engineering University (Invitation talk)

Presentation title: From Model, Algorithms to Knowledge: Novel Magnetic Sensors for Underwater Magnetic Anomaly Detection and Localization

Abstract: As a result of magnetization by the Earth's magnetic field, a moving metallic material can create distortions in the local geomagnetic field. The movement of different ferromagnetic objects manifest themselves as unique identifiable voltage signal at the magnetic sensor's output. The magnetic signal profiles in time and space are termed as the magnetic anomaly signature feature, which is essential target detection information. Current magnetic anomaly signal analysis method largely focuses on the improvement of the SNR of the original signal. However, it does not take into account the credit of other potential features for the detection and recognition of the cryptic target. In response to this problem, I propose to develop a comprehensive analytical method for interpretation of the rich information of the magnetic anomaly signature characteristics. Firstly, based on power spectrum density analysis method, the frequency band of the anomaly vector signal is determined, which leads to develop an adaptive filter to obtain the fingerprint characteristics. Secondly, based on the magnetic anomaly signature feature interpretation method, the relationship is analyzed between the motion characteristics of different objects (including motion velocity and relative distance) and the signature waveforms. Finally, a waveform pattern matching algorithm is proposed to infer the magnetic moment orientation (MMO) by calculating the signal energy distribution along each axis. This study aims to pave the way for analysis of the dependence between the magnetic anomaly signature features and the moving behaviors of the target.

Personal profile: Dr. Ying Shen, professor in the College of Acoustic Engineering at Harbin Engineering University. Dr. Shen received her Ph. D degree in Material Science and Engineering and Master Degree in Biological System Engineering from Virginia Tech in 2010 and 2014, respectively. Her research is mainly in the fields of magnetic anomaly detection, methods for target localization, and remote sensing and magnetometry. Dr. Shen has published 38 SCI papers, such as IEEE Geoscience and Remote Sensing Letters, IEEE Electron Device Letters, Smart Material and Structures and Applied Physical Letters.



Prof. Zhengxiang Chen, No.710 research and development institute, CSSCH (Invitation talk)

Presentation title: Fluxgate Magnetometer Calibration Method and Its Application in the Field of Magnetic Detection

Abstract: The fluxgate magnetometer is a kind of magnetic sensor with high sensitivity, high bandwidth and wide measurement range. It is widely used in space exploration, positioning and navigation, geological exploration, etc. This report introduces a calibration method for fluxgate magnetometer and its application in the field of magnetic detection. The linearity, noise, zero offset, and orthogonality are the most important parameters of the fluxgate magnetometer. The errors caused from these parameters will inflict the fluxgate magnetometer to deviate from the actual magnetic field value, and the fluxgate magnetometer needs to be calibrated. It motivates us to study the calibration method for these parameters of the fluxgate magnetometer. As a high-precision vector magnetometer, the fluxgate can detect the weak magnetic field varieties, so it can be used to detect and localize the ferromagnetic targets, such as UUV and UXO. In addition, the fluxgate also can be employed for the magnetic disturbances compensation, as an auxiliary sensor for the Magnetic anomaly detection (MAD) with optical pumping magnetometer (OPM) to search for the underwater targets.

Personal profile: Zhengxiang Chen, professor in CSSC, is currently serving as the deputy director of 1st class weak magnetic metering station of NDM, the deputy director of Magnetic Research Center of No.710 institute, CSSC, and the master supervisor in China Ship Research and Development Academy. Professor Chen's research interests mainly focus on magnetic sensing, magnetic metrology and magnetic detection. He has published more than 20 papers including "Development Status of Weak Magnetic Detection Technology". He won one 2nd prize and two 3rd prizes of National Defense Science and Technology Award, and one 1st prize, four 2nd prizes and two 3rd prizes of the Science and Technology Award of CSSC.



Prof. Junyi Zhai, Beijing Institute of Nanoenergy and Nanosystems, CAS (Invitation talk)

Presentation title: Blue Energy and Self-powered Ocean Sensing Floats

Abstract: Oceans cover about 70% of Earth's surface. Wave energy is plentiful day and night, whatever the weather. Yet hardly any of this wave energy is being generated. Triboelectric Nanogenerator (TENG) can effectively convert ambient mechanical energy to electrical energy based on the coupling of triboelectrification and electrostatic induction. Comparing to traditional electromagnetic generator, TENG shows excellent performance at low frequency, especially under 5 Hz. By various special designing and packing, TENG made by use of lightweight organic and metal materials, can harvest ocean wave energy everlastingly. To achieve high energy harvesting, TENG units can be connected as a network toward large-scale blue energy harvesting from the ocean. As the frequency of ocean wave is less than 1 Hz, TENG shows great advance in collecting ocean wave energy.

Marine monitoring is important to ocean transport and ocean resource development. Although satellite can provide some ocean information, it cannot offer precise on-site data such as salinity, etc. Floats with sensors could detect all kinds of on-site information and transmit detailed information to satellite for real time analysis. As the sensing floats should work in the middle of ocean for longtime, it is hard to change battery at regular intervals, thus floats should possess the ability to collect energy from the environment. Here, we demonstrate a self-powered ocean sensing float, it can sense ambient information and transmit information once per minute by using a small group of TENG units.

Personal profile: Junyi Zhai is a professor and director of Scientific Research Office of Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences. In July 2001 and July 2004, he received a bachelor's degree from the Department of chemistry and a master's degree from the Department of materials science and engineering, Tsinghua University. He then went to the United States to study, and received a doctorate in materials science and engineering from Virginia Tech in February 2009. In April 2009, Dr. Zhai was awarded director's postdoctoral fellowship in Los Alamos National Laboratory. His work is focus on energy harvesting, self-powered sensing and systems, new multi-functional electronics and optoelectronic device and applications. So far, he has published over 100 research papers in SCI journals such as Science Advances, Advanced Materials, Applied Physics Letter, etc.,



with more than 5000 citations. The H-index of these papers is 46.

XI. Underwater acoustics in extreme and special environments: discovery, observation and application

Prof. Longxiang Guo



He is a professor of College of Underwater Acoustic Engineering, Harbin Engineering University. He received the BA and MA degree in EE from HEU, college of underwater acoustic in 1998 and 2001, and the Ph.D degree in underwater acoustic engineering in 2006. From Nov, 2013 to Aug, 2015, he worked as a post doctor in Libre University of Brussel (U.L.B) granted by Chinese Scholar Council, China. Guo's graduate research focused on underwater acoustic engineering, ocean acoustic and sonar system. Specially, his research interests include underwater object observation with active and passive method, target positioning and location, vector hydrophone signal processing, environmental affected sonar performance, and artic acoustic. In these fields, some project, such as National Natural Science Foundation of China, National Major Projects are granted.

Prof. Kunde Yang, Northwestern Polytechnical University (Invitation talk) (On-line)

Presentation title: Prediction models of Underwater Ambient Noise

Abstract: Underwater ambient noise is the resident acoustic field in the ocean, and the calculation of its power spectral density level plays an important role in the diagnosis of the ocean environment. This report focuses on the statistical characteristics and prediction models of ocean ambient noise spectra based on a large number of acoustic measurement data and satellite remote sensing data.

Personal profile: Kunde Yang is a professor and vice-dean with the School of Marine Science and Technology,



Northwestern Polytechnical University. He is currently the director of the Key Laboratory of Ocean Acoustics and Sensing, the Ministry of Industry and Information Technology, and the deputy director of a State Key Laboratory. Coauthored 6 monograph books, published more than 130 SCI papers, and obtained more than 60 authorized patents. His research interests include signal processing, ocean acoustics, and information transmission in the sea.

He has hosted over more than 30 projects including the National Natural Science Foundation of China, National Major Projects, and Key Pre-research Projects, and served as the Chief Scientist of ocean acoustic survey voyages seven times. He Won the second prize of the National Award for Technological Invention (ranked first) and seven Ministerial and Provincial-Level Science and Technology Awards. He has been awarded the titles of "National Science and Technology Innovation Leader", "Outstanding Young Talent", " Young and middle-aged scientific and technological innovation leaders of the Ministry of Science and Technology", " New Century Excellent Talents of Ministry of Education" and received a special allowance from the State Council.

Dr. Na Liu, First Institute of Oceanography, Ministry of Natural Resources (Invitation talk) (On-line)

Presentation title: Arctic Marine Environment Observation and Artificial Intelligence Prediction

Abstract: In view of the strategic significance of the Arctic in navigation, climate and ecological protection, the



Arctic Ocean has attracted much attention. The development of observation capability of Arctic marine environment is the basis of understanding the rapid change of the Arctic, serving the scientific issues related to waterway utilization, climate change and promoting ecological protection. This report will focus on the current situation and development of the Arctic marine environment observation, as well as the Arctic artificial intelligence prediction closely related to the real-time transmission of the Arctic marine environment observation.

Personal profile: Liu Na, Female, Doctor of physical oceanography, is mainly engaged in the investigation and research of Arctic marine environment. She led and designed 11 Arctic scientific expedition hydrological survey projects, realizing of long-term array observation of China's Arctic mooring, initially establishing the Arctic hydrological environment technology and observation system. Change of the Arctic Ocean and sea battlefield environment were studied by using the observation data obtained by China. She has won 5 provincial and ministerial awards for Arctic survey, presided over more than 40 scientific research projects, published more than 80 academic papers, published 1 Technical Specification for Arctic survey, 9 monographs and 15 patents. More than 20 doctors and graduate students have been trained.



Prof. Suleman Mazhar



Dr. Suleman Mazhar is a professor at Harbin Engineering University, China. He did PhD from the University of Tokyo, Japan in 2009 and a postdoctorate from Georgetown University, Washington DC, USA in 2011. He had been working as a faculty member at the department of Computer Science & Engineering at GIK Institute and was the lab director for BiSMiL Lab (Laboratory for Bio-inspired Simulation & Modeling of intelligent Life) at the Information Technology University, Pakistan. He is senior member IEEE, member WCPA (World Commission for Protected Areas), fellow of TYSP (Talented Young Scientist Program, Ministry of Science & Technology, China), Fulbright awardee and Monbukagakusho Alumni.

He got over funding of 40 million from DAAD-Germany, Higher Education Commission-Pakistan, WWF (*Worldwide Fund for Nature*) - Pakistan, ICIMOD (International Centre for Integrated Mountain Development) and MoST China. His research interests include deep learning, signal processing and ICT for development & global/ocean environment conservation. He serves as the chairman of the Scientific Committee of 2021 IEEE/OES China Ocean Acoustics Conference (COA2021).





COA 2021

Oral Session list

Session Chairs: Jinrong Wu, Lijia Gong

Place: *Donghai Hall*

Oral session I-1 (Thursday, Afternoon)

I. Underwater acoustics and acoustical oceanography

Time	Abstract Number	Paper Information
15:40 - 15:55	6149	Study on Driving Methods of Magnetostrictive/Piezoelectric Hybrid Janus-Helmholtz Transducer <i>Wenzhao Liu, Yong Chai, Xiping Mo</i> Institute of AcousticsChinese Academy of Sciences
15:55 - 16:10	6145	Broadband transmitting transducer composed of spherical transducer and copper tube <i>jie li, rongrong zhao, xianglong yu</i> Shanghai Marine Electronic Equipment Research Institution
16:10 - 16:25	6125	Research on Nonlinear Driving Manner of Fe-Ga Alloy Transducer <i>Jiaheng Zhao, Xiping Mo, Yong Chai, Yongping Liu</i> Institute of Acoustics, Chinese Academy of Sciences
16:25 - 16:40	6123	Research on Temperature Characteristics of Circular Tube Underwater Acoustic Transducer Based on Air Environment <i>Mingyu Zhang, Yan Wang, Jia Liu, Hui Zhao, Mingrui Li, Rui Zhang</i> Shanghai Marine Electronic Equipment Research Institute
16:40 - 16:55	6048	High-Sensitivity Miniaturized Fiber-Optic Hydrophones <i>Yingsong Huang, Liqiu Wang, Xiaojun Chen, Da Zhang, Wei Sun, Huiliang Ge</i> Hangzhou Applied Acoustics Research Institute
16:55 - 17:10	6035	Probe Response of DFB Fiber Laser Hydrophone under Acoustic Vibration coupled Excitation <i>Wen-zhang SONG, Bo TANG, Jun-bin HUANG, Hong-can GU, Xuan ZHOU, Hong-lin ZHAO</i> Naval University of Engineering and No.91388 Troop
17:10- 17:25	5902	A Coherent Weak Target DOA Estimation Method Based on Target Features <i>You Shao, Guangyin Zheng, Fuchen Liu, Fuqing Jiang</i> Hangzhou Applied Acoustics Research Institute
17:25- 17:40	4868	Using anti-acoustic baffle design to realize the directivity of transducers and arrays <i>zhao hui, Li haisen, zhu jianjun, Zhou Tian, Du Weidong</i> Harbin Engineering University

Session Chairs: Yanming Yang, Zhiliang Qin

Place: *Nanhai Hall*

Oral Session II-1 (Thursday, Afternoon)

II. Ocean acoustic observatories and ocean acoustic instruments, systems and platforms

Time	Abstract Number	Paper Information
15:40 - 15:55	6237	Sound Speed Measurement Using Phase Estimation Method of Pulse Signal in Water Liuqing Yang, Jun Zhang, Jiaheng Wang Hangzhou Applied Acoustics Research Institute
15:55 - 16:10	6124	Research on Measurement Method of Underwater Transducer Acoustic Field Based on Laser Reflection Tomography Weiyin Wang, Yi Chen, Shiquan Wang, Liuqing Yang Hangzhou Applied Acoustics Research Institute
16:10 - 16:25	6184	Modeling and Analysis for the Target Detection via Multiple Autonomous Underwater Vehicles Weihua Gao, Jing Yan, Xiaoyuan Luo Yanshan University
16:25 - 16:40	6007	Communication-Aware Swarm Control for AUVs: A Reinforcement Learning-Based Solution Xuanji Zhou, Jing Yan, Xiaoyuan Luo Yanshan University
16:40 - 16:55	6238	An Arc PVDF Hydrophone With Adjustable Beam Width Yan Guo, Xin-Ran XU, Zhen-Yu ZHENG, Xue-Rong LIAO, Kang-Yi PENG, Xiao-Long MEI Science and Technology On Sonar Laboratory ; Hangzhou Applied Acoustics Research Institute
16:55 - 17:10	6243	Matching analysis for transfer and radiation law of sound through pipe and sound source Jize Zhong, Diwang Li, Changlin Qiu, Du Shen, Hao Wang China Ship Development and Design Center

Session Chairs: Zhendong Zhao, Haigang Zhang

Place: *Xihai Hall*

Oral session III-1 (Thursday, Afternoon)

III. Ocean sound propagation modeling and experiments

Time	Abstract Number	Paper Information
15:40 - 15:55	6357	Numerical Simulation of Vortex-acoustic Coupled Acoustic Signals Based on Ray Acoustics <i>Min Yu, Xuan Zhang, Yongou Zhang, Zhihong Wang</i> Wuhan University of Technology
15:55 - 16:10	6133	Effects of sound velocity perturbations in the upper layer on the position of sound convergence zones in deep water <i>Fujin Yang, Tao Hu, Zhen Wang</i> Institute of Acoustics, Key Laboratory of Underwater Acoustics Environment, Chinese Academy of Sciences, University of Chinese Academy of Sciences
16:10 - 16:25	6039	Feature Analysis on the Circularity Degree of the Complex Sound Intensity in Shallow Water <i>Jianbo Ma, Chuanlin He, Yi Zheng, Yang Sun</i> Institute of Oceanographic Instrumentation , Qilu University of Technology Shandong Academy of Sciences
16:25 - 16:40	4835	Estimation of Source Strength of Underwater Acoustic Transducer in Shallow Water by Inverse Frequency Response Function <i>Yucai LIU, Yi CHEN, Wensheng Yi</i> Hangzhou Applied Acoustics Research Institute
16:40 - 16:55	6311	Influence of Softening Effect of Bubble Water on Cavity Resonance <i>Jiawen Yu, Desen Yang, Jie Shi</i> Harbin Engineering University; Acoustic Science and Technology Laboratory, Key Laboratory of Marine Information Acquisition and Security, Ministry of Industry and Information Technology; College of Underwater Acoustic Engineering
16:55 - 17:10	6296	Effective Nonlinearity Parameter and Acoustic Propagation Oscillation Behavior in Medium of Water Containing Distributed Bubbles <i>Yuezhu Cheng, Jie Shi, Anding Deng</i> Harbin Engineering University; Acoustic Science and Technology Laboratory; Key Laboratory of Marine Information Acquisition and Security, Ministry of Industry and Information Technology ; College of Underwater Acoustic Engineering
17:10- 17:25	5920	Simulation Analysis of the Effects of the Flow around Underwater Moving Bodies on the Acoustic Signal <i>Di Zhang, Shihong Zhou, Yubo Qi, Shuyuan Du, Changpeng Liu</i> State Key Laboratory of Acoustics, Institute of Acoustics, Chinese Academy of Sciences University of Chinese Academy of Sciences
17:25- 17:40	5941	The Evolution of the Speed of Sound Based on Changes of Entropy and Energy in Statistical Ocean <i>Jie Duan, Hangfang Zhao</i> 1. College of Information Science & Electronic Engineering, Zhejiang University; 2. Interdisciplinary Student Training Platform for Marine areas, Zhejiang University

Session Chairs: Niaz Ahmed, Ying Shen

Place: *Beihai Hall*

Oral session X-1 (Thursday, Afternoon)

X. Underwater non-acoustic detection and communication

Time	Abstract Number	Paper Information
16:00 - 16:15	4678	Analysis of the Influence of Underwater Acoustic Array Structural Factors on Multi-static Bearing-only Location <i>Xin Wang, Longxiang Guo, Xueli Sheng</i> College of Underwater Acoustic Engineering, Harbin Engineering University

Session Chairs: Bin Liang, Wei Lu

Place: *Beihai Hall*

Oral session VIII-1 (Thursday, Afternoon)

VIII. Design, development, testing and calibrations for acoustical sensor and array

Time	Abstract Number	Paper Information
16:55 - 17:10	6157	Research on a kind of Longitudinal Transducer Driven by Ni-Mn-Ga Alloys <i>Houqi Wang, Yu Lan, Wei Lu, Rongzhen Guo, Hao Sun</i> Harbin Engineering University

Session Chairs: Jianghui Li, Songzuo Liu

Place: *Bohai Hall*

Oral session VI-1 (Thursday, Afternoon)

VI. Underwater acoustic communication and networking

Time	Abstract Number	Paper Information
15:40 - 15:55	6239	Improved Dynamic Compressive Sensing Based Channel Estimation for Single-Carrier Underwater Acoustic Communication <i>yunfeng Hu, Jun Tao, Ming Jiang, Chunhui Dang</i> Southeast University
15:55 - 16:10	6214	Design of FM-DCSK Waveform for underwater covert Communication system <i>Yuting Yuan, Gangqiang Zhang</i> National Key Laboratory of Science and Technology on Underwater Acoustic Antagonizing
16:10 - 16:25	6213	Wormhole Attack Detecting in Underwater Acoustic Communication Networks <i>JunQing Zhang, Gangqiang Zhang, Junkai Liu</i> National Key Laboratory of Science and Technology on Underwater Acoustic Antagonizing, Shanghai
16:25 - 16:40	6211	Virtual Reference Assisted Self-localization Algorithm for Mobile Underwater Acoustic Networks with Only One Anchor <i>Jingjie Gao, wei Wang, Jianmin Yang, Peng Chen, Zhichen Zhang, Haodi Mei</i> Changan University
16:40 - 16:55	6169	Key generation technology based on multipath structure of underwater acoustic channel <i>Junkai LIU, Gangqiang Zhang, Junqing ZHANG</i> The 726 Research Institute of China Shipbuilding Industry Group
16:55 - 17:10	6142	The Effect of Shell Shape on Self-Interference Signal Strength of In-Band Full-Duplex Underwater Acoustic Communication Modem <i>Naihua Zheng, Songzuo Liu, Yi Lou, Yunjiang Zhao, Xinyu Liu, Teng Shi</i> Harbin Engineering University

Session Chairs: Fengxiang Ge, Xueli Sheng

Place: *Huanghai Hall*

Oral session VII-1 (Thursday, Afternoon)

VII. Signal processing: Sonar modeling, signal detection and estimation, target tracking and recognition

Time	Abstract Number	Paper Information
15:40 - 15:55	6187	Generalized Radon Transform Approach to Motion Parameter Estimation of Single Target Moving in Multiple Straight-line Segments <i>Mingyang Lu, Jidan Mei, Shuchang Wang, Tianfeng Huang, Yuqing Pei, Rui Wang</i> Harbin Engineering University
15:55 - 16:10	5976	Low-frequency Underwater Acoustic Signal Denoising Method in the Shallow Sea with a Low Signal-to-noise Ratio <i>Yaowen Wu, Chuanxi Xing, Dongyu Zhang, Lixiang Xie</i> Yunnan Minzu University
16:10 - 16:25	5972	Underwater Small Moving Target Detection Using Maximum Length Sequences <i>Kaiyang Hou, Tingting Teng, Yiao Zhang</i> Harbin Engineering University
16:25 - 16:40	5957	High-accuracy Single-beam Sounding Using Small Bandwidth and Rough Sound Speed <i>Xionghou Liu, Yanhua Li, Shulei Lan</i> Northwestern Polytechnical University
16:40 - 16:55	5946	Echo Detection Method Based on Matched Filter Using Fast Orthogonal Search <i>Zhishan Zhao, Liang Jie, Yuwei Li</i> Shanghai Marine Electronic Equipment Research Institute
16:55 - 17:10	5917	Multi-ping Reverberation Suppression Combined with Spatial Continuity of Target Motion <i>Ruixin Nie, Xionghou Liu, Chao Sun, Yifan Zhou</i> Northwestern Polytechnical University
17:10- 17:25	5912	Frequency Line Extractor Using Hidden Markov Models <i>Yun Gao, Delong Sun</i> Shanghai Marine Electronic Equipment Research Institute
17:25- 17:40	6165	Experimental Study on Depth Discrimination for A Moving Source with A Horizontal Array in Shallow Water <i>Duo Zhai, Fenghua Li, Bo Zhang</i> Institute of Acoustics, Chinese Academy of Sciences; University of Chinese Academy of Sciences

Session Chairs: Jingrong Wu, Lijia Gong

Place: *Donghai Hall*

Oral session I-2 (Friday, Morning)

I. Underwater acoustics and acoustical oceanography

Time	Abstract Number	Paper Information
08:00 - 08:15	6258	Hierarchical Construction of Sound Speed Profile based on Argo and Sea Surface Data <i>Honglin Li, Qianqian Li, Xian Yan, Shoulian Cao, Zhichuan Ma, Kangying Zhou</i> Shangdong University of Science and Technology
08:15 - 08:30	6160	Simulation of Underwater Sound Propagation of High-Speed Sources <i>Songwen Li</i> Shanghai marine electronic equipment research institute
08:30 - 08:45	6081	Simulation of acoustic-energy frequency response caused by internal waves in the Yellow Sea <i>Zhen WANG, Tao HU, Shengming GUO, Li MA</i> Institute of Acoustics, Key Laboratory of Underwater Acoustics Environment, Chinese Academy of Sciences, University of Chinese Academy of Sciences,
08:45 - 09:00	6034	Analysis of the acoustic longitudinal horizontal correlation characteristics with wind-generated waves in shallow water <i>Meijuan Yao, Licheng Lu, Bingwen Sun, Shengming Guo, Li Ma</i> Institute of Acoustics, Chinese Academy of Sciences
09:00 - 09:15	5963	Boundary Slip Effect on Acoustic Scattering from a Rigid Cylinder via Immersed Boundary-Lattice Boltzmann Method <i>Xinyi Han, JianHua Lu, Yunan Cai, Nan Chen, Meng Xiang</i> School of Naval Architecture Ocean Engineering Dalian University of Technology
09:15 - 09:30	5962	A Lattice Boltzmann Method for Acoustic Propagation in the Presence of Internal Solitary Waves <i>Yu Wang, Jianhua Lu</i> Dalian University of Technology
09:30- 09:45	5961	Numerical Study of the Boundary Slip Effect on the Sound Absorption Performance of the Helmholtz Resonator <i>Yongkun Xiao, Jianhua Lu</i> School of Naval Architecture, Dalian University of Technology
09:45- 10:00	5948	One method of acquiring radiated sound based on spatial transformation <i>Biao Wang, Chaoqun Rui, Xingyang Nie, Chengming Luo, Bi Xuejie</i> Jiangsu University of Science and Tehcnology
10:00- 10:15	6089	Geoacoustic parameters inversion by combining particle filtering and genetic algorithm <i>Weiwen WU, Qunyan REN, Licheng LU, Li MA</i> Key Laboratory of Underwater Acoustic Environment, Institute of Acoustics, Chinese Academy of Sciences

Session Chairs: Zhenglin Li, Jie Shi

Place: *Nanhai Hall*

Oral session V-1 (Friday, Morning)

V. Ocean noise and reverberation

Time	Abstract Number	Paper Information
08:20 - 08:35	6135	The Radiating Sound Signals of Golden Pomfret Farming in a Large Cage <i>Peizhen Zhang, Shouyong Gao, Zhenpeng Wang, Huan Liu, Chen Shen, Mo Qingshu</i> Guangdong Oean University
08:35 - 08:50	6040	Passive acoustic localization of a natural CO2 seep - implication for Carbon Capture and Storage <i>Jianghui Li, Paul White, Jonathan Bull, Ben Roche, John Davis, Timothy Leighton, Michele Deponte, Emiliano Gordini, Diego Cotterle, Tian Zhou, Chao Xu</i> University of Southampton, UK
08:50 - 09:05	6041	Underwater Noise Classification based on Support Vector Machine <i>Guoli Song, Xinyi Guo, Wenbo Wang, Jun Li, Hua Yang, Li Ma</i> Institute of Acoustics, Chinese Academy of Sciences
09:05 - 09:20	6231	Helical Wave Spectrum of Bending Waves in an Infinite Composite Cylinder with Periodic Rings <i>Xuwen Yin, Zhixiong Yang, Zitian Wei, wenwei Wu</i> China Ship Scientific Research Center
09:20 - 09:35	6077	Research on Ship-radiated Noise evaluation and Experiment Based on OTPA Optimized by Operation Clustering <i>Ruibiao Li, Wenjun Bu, Jianwei Cheng</i> Institute of Noise and Vibration Naval University of Engineering
09:35 - 09:50	5109	The Application of Regularization Method to Acoustic Radiation Prediction in Shallow Water <i>Zhiwen QIAN, Dejiang SHANG, Jingsheng ZHAI, Yuanan HE</i> School of Marine Science and Technology Tianjin University
09:50 - 10:05	6182	Research on the Performance of Sound Absorption Coating Based on Piezoelectric Shunt Damping <i>Liang Feng, Xinran Xu, Shushu Si, Xu Yan</i> Science and technology on sonar laboratory Hangzhou applied acoustics research institute
10:05 - 10:20	6262	Ambient Noise Measurements with an Acoustic Submerged Buoy in Deep Sea <i>Wei Guo, Fuyin Wang, Qiong Yao, Shuidong Xiong, Yanqun Wu, Chengyan Peng</i> National University of Defense Technology

Session Chairs: Zhendong Zhao, Haigang Zhang

Place: *Xihai Hall*

Oral session III-2 (Friday, Morning)

III. Ocean sound propagation modeling and experiments

Time	Abstract Number	Paper Information
08:20 - 08:35	4855	Simulation Study on Acoustic Scattering Characteristics of a SCUBA Diver <i>Tianlin Yang, Yunzhe Tong, Xingang Fan</i> Shanghai Marine Electronic Equipment Research Institute National key Laboratory of Science and Technology on Underwater Acoustic Antagonizing
08:35 - 08:50	6094	Observation and analysis of low-frequency sound horizontal-diffraction using vector sensor in the Reefs Water <i>Yaxiao Mo, Chaojin Zhang, Licheng Lu, Yuqing Jia, Li Ma</i> Institute of Acoustics, Chinese Academy of Sciences

Session Chairs: Kunde Yang, Longxiang Guo

Place: *Xihai Hall*

Oral session XI-1

XI. Underwater acoustics in extreme and special environments: discovery, observation and application

Time	Abstract Number	Paper Information
09:10 - 09:25	6271	Numerical simulation of underwater vehicle wake field <i>Lin Zhu, Yan Zhou, Xinyi He</i> Optoelectronics System Laboratory, Institute of Semiconductors, Chinese Academy of Sciences;University of Chinese Academy of Sciences;The No.92578 Army of PLA
09:25 - 09:40	5896	The Gradient-type Least-squares Deconvolution Multipath Underwater Acoustic Channel Estimation <i>Tianfeng Huang, Qiuying Peng, Jidan Mei</i> Harbin Engineering University
09:40 - 09:55	6166	A Method of Multipath Mitigation Based on LS and Complex ResNet in Water Supply Pipes <i>Ruiping Song, Yu Jiang, Jie Qi, Haixin Sun, Cunxiao Fan, Hamada Esmail</i> School of Informatics, Xiamen University

Session Chairs: Qunyan Ren, Yiwang Huang

Place: *Beihai Hall*

Oral session IV-1 (Friday, Morning)

IV. Marine sediment acoustics

Time	Abstract Number	Paper Information
08:20 - 08:35	6078 Virtual	Research on Bayesian Seabed Acoustic Parameter Inversion Method Based on Parallel Tempering Algorithm <i>RuiMeng Yu, ChuanXi Xing, ZhiLiang Wan, SiYuan Jiang</i> School of Electrical and Information Technology Yunnan Minzu University
08:35 - 08:50	5934	Sensitivity Analysis of Group Velocity Dispersion for the Sediment-Borne Mode in the Deep Ocean <i>Jingpu Cao, Yubo Qi, Shihong Zhou, Shuyuan Du, Zhaohui Peng</i> Institute of Acoustics, Chinese Academy of Sciences. University of Chinese Academy of Sciences
08:50 - 09:05	4901 Virtual	Determination of chewing sound of Whiteleg shrimp in a farming pond <i>Mengting Shen, Jinlin Li, Xiuxiu Wang, Rixin Zhang, Zihao Wang, Zhengliang Cao</i> College of Marine Sciences, Shanghai Ocean University
09:05 - 09:20	6170	Research on Ultrabroadband Acoustic Absorbers Based on Slow-wave Metamaterials <i>Xin Wang, Jiahao Wang, Yongyao Chen</i> Harbin Engineering University
09:20 - 09:35	4817	Backscattering Characteristics over a Wide Band of a Sand Bottom in the South Yellow Sea of China <i>Shengqi Yu, Baohua Liu, Kaiben Yu, Zhiguo Yang, Guangming Kan</i> National Deep Sea Center
09:35- 09:50	5909	Doppler Effect Analysis of Bottom Reverberation for a Moving Platform in Shallow Water <i>Dongpeng Mo, Bo Gao, Wenhua Song, Jie Pang, Yiru Zuo</i> Ocean University of China
09:50- 10:05	5905	Three-dimensional Acoustic Effect by Seamounts in Shallow Sea <i>Qile Wang, Wei Zhang, Hanhao Zhu, Zhiqiang Cui, Yangyang Xue</i> Institute of Marine Science and Technology; Zhejiang Ocean University
10:05- 10:20	4669	Computation of acoustic scattering from underwater targets by ACA-BEM <i>Jiayuan Gong, Hongyang Chen, Longxiang Guo, Wenjian Chen, Guangping Zhu, Hui Sun</i> Institute of Automotive Engineers, Hubei University of Automotive Technology, Shiyan, China Acoustic Science and Technology Laboratory, Harbin Engineering University, Harbin, China Key Laboratory of Marine Information Acquisition and Security(Harbin Engineering University), Ministry of Industry and Information Technology, Harbin, China College of Underwater Acoustic Engineering, Harbin Engineering University, Harbin, China

Session Chairs: Jianghui Li, Songzuo Liu

Place: *Bohai Hall*

Oral session VI-2 (Friday, Morning)

VI. Underwater acoustic communication and networking

Time	Abstract Number	Paper Information
08:20 - 08:35	6134	Digitally Assisted Analog Self-interference Cancellation for In-band Full-duplex Underwater Acoustic Communication <i>Yunjiang Zhao, Gang Qiao, Yi Lou, Xinyu Liu, Naihua Zheng, Yi Zhang</i> YICHANG TESTING TECHNIQUE RESEARCH INSTITUTE
08:35 - 08:50	6131	Non-cooperative MPSK modulation identification in SIMO underwater acoustic multipath channel <i>Tao Fang, Songzuo Liu, XiongBiao Wu, Honglu Yan, Imran Ullah</i> Harbin Engineering University
08:50 - 09:05	6036	A Study of Time Domain Adaptive Decision Feedback MSK Equalization over Time-varying Underwater Acoustic Channel <i>Ruigang Han, Ning Jia, Biao Liu, Jianchun Huang, Shengming Guo</i> 1.Key Laboratory of Underwater Acoustic Environment, Chinese Academy of Sciences 2.Institute of Acoustics, Chinese Academy of Sciences 3.University of Chinese Academy of Sciences
09:05 - 09:20	6005	Non-Uniform Doppler Compensation Method for Staggered Multitone Filter Bank Multicarrier in the Underwater Acoustic Channel <i>Xinyu Liu, Gang Qiao, Lu Ma, Naihua Zheng, Yunjiang Zhao</i> Harbin Engineering University
09:20 - 09:35	5994	Frogmen formation voice communication technology based on Fast ICA <i>Xiao Zhang, Xiaomeng Liu</i> Jilin University
09:35 - 09:50	5952	Discrete Events and Finite State Machine Based Program Architecture for Underwater Acoustic Communication Network Simulation <i>Menghua Wen, Lu Ma</i> Hangzhou Applied Acoustic Research Institute
09:50 - 10:05	5931	Research on Real-time Simulated Self-interference Cancellation Technology of Full Duplex Underwater Acoustic Communication <i>Gang Qiao, Yinheng Lu, Yi Lou, Yunjiang Zhao, Chenlu Yang, Songwen Wu</i> Harbin Engineering University
10:05 - 10:20	5923	Deep Learning-Based Code Index Modulation Spread Spectrum Underwater Acoustic Communication <i>Gang Qiao, Yufei Liu, Feng Zhou, Suleman Mazhar, Yunjiang Zhao, Guang Yang</i> Harbin Engineering University

Session Chairs: Fengxiang Ge, Xueli Sheng

Place: *Huanghai Hall*

Oral session VII-2 (Friday, Morning)

VII. Signal processing: Sonar modeling, signal detection and estimation, target tracking and recognition

Time	Abstract Number	Paper Information
08:20 - 08:35	5954 Virtual	Direction of Arrival Estimation of Underwater Acoustic Target Based on Off-Grid Sparse Bayesian Inference <i>ZhiLiang Wan, ChuanXi Xing, SiYuan Jiang</i> Yunnan Minzu University
08:35 - 08:50	5925	Application of Striation-based Beamforming for Enhanced Passive Azimuth Estimation with Horizontal Line Array in Shallow Water <i>Changpeng Liu, Shihong Zhou, Yubo Qi</i> State Key Laboratory of Acoustics, Institute of Acoustics, Chinese Academy of Sciences University of Chinese Academy of Sciences
08:50 - 09:05	5911	Difference Coarray Design based on Genetic Algorithm and Convex Optimization <i>Lening Wang, hangfang Zhao</i> College of Information Science & Electronic Engineering, Zhejiang University
09:05 - 09:20	5906	Source power spectrum estimation using r- ω interference structure in shallow water <i>Bohan Yuan, Haozhong Wang, Chunhui Hu</i> Ocean University of China
09:20 - 09:35	6181	A Discrimination Method between Surface and Submerged Targets based on Frequency Diversity Wavenumber Domain Features <i>Li Peng</i> Science and Technology on Underwater Test and Control Laboratory
09:35 - 09:50	6121	Research on Magnetic Anomaly Signal Separation Method of Crossover or Overlapping Buried Submarine Cables <i>Chunkai Zhou</i> China Ship Development and Design Center
09:50- 10:05	6046	Ultra-long distance explosive source localization based on characteristics of IMS acoustic signal <i>Chaojin Zhang, Bingwen Sun, Yaxiao Mo, Li Ma</i> Institute of Acoustics, Chinese Academy of Sciences
10:05- 10:20	6042	Eigenvalue Decline Index of Correlation Matrix for Shallow Water Source Depth Discrimination <i>Guangying ZHENG, Wenbo ZHU, Fangwei ZHU, You SHAO, Qiaoli ZHANG</i> Hangzhou applied acoustics research institute

Session Chairs: Suleman Mazard, Yongyao Chen

Place: *Donghai Hall*

OBOR session (Friday, Morning)

Time	Abstract Number	Paper Information
10:40 - 10:55	6288	On High Angular Resolution Processing for Multiple Targets Detection in Passive Underwater Sensor Array Systems <i>Umar Hamid, Shurjeel Wyne, Shahid Ali</i> COMSATS University Islamabad CUI
10:55 - 11:10	6171	Acoustic Wave Analysis In Deep Sea And Shallow Water Using Bellhop Tool <i>Durr E Shehwar, Sana Gul, Muhammad Usama Zafar, Urooj Shaukat, Ali Hassan Syed, Syed Sajjad Haider Zaidi</i> Xi'an Jiaotong University
11:10 - 11:25	6112	Seasonal evolution of Sea Surface Salinity in the Northwestern Indian Ocean: Argo Data Study <i>Sartaj Khan, Shengchun Piao, Yang Song, Shazia Khan, Bingchen Xu, Zeeshan Babar</i> Harbin Engineering University
11:25 - 11:40	5965	Research on Observability Conditions for Single and Multiple Observing Stations in Underwater Bearing only Tracking <i>Asra Nusrat, Yaan Li</i> School of Marine Science and Technology
11:40 - 11:55	5762	Low-Complexity Iterative Hybrid Equalization for OSD Systems <i>Sheraz Anwar, Wenwei Ying, Jiangqiao Li, Haixin Sun, Bisma Gul</i> Xiamen University
11:55 - 12:10	5083	Full-duplex Underwater Optical Communication Systems: A Review <i>Imran Ullah Khan, Basit Iqbal, Songzuo Liu</i> College of Underwater Acoustics Engineering, HEU, China
12:10 - 12:25	6375	Multiple RTS and DATA Receptions in a Loop-Based Underwater Propagation Delay Aware MAC Protocol <i>Basit Iqbal, Liu Songzuo, Imran Ullah Khan</i> Harbin Engineering University
12:25 - 12:40	5977	Design and Analysis of Li-fi Underwater Wireless Communication System <i>Aman Muhammad, Gang Qiao, Muzzammil Muhammad</i> Harbin Engineering University

Session Chairs: Zhenglin Li, Jie Shi

Place: *Nanhai Hall*

Oral session V-2 (Friday, Morning)

V. Ocean noise and reverberation

Time	Abstract Number	Paper Information
11:00 - 11:15	6127	Spectrum Analysis of Deep Water Ambient Noise in the Philippine Sea <i>Jiahua Zhu, Wei Guo, Bingbing Zhang, Yanxin Ma, Yangyang Chen, Lu Lu</i> National University of Defense Technology
11:15 - 11:30	5930	The Analysis of Reverberation Affected by Tide Changes in Shallow Water <i>Wenrong Yue, Juan Yang, Feng Xu, Zhong Li, Ran Miao</i> Institute of Acoustics, CAS
11:30 - 11:45	5959 Virtual	Research on Multiplicative Speckle Noise Denoising Method of Side-Scan Sonar Image based on Analysis Sparse Decomposition <i>SiYuan Jiang, ChuanXi Xing, ZhiLiang Wan, LiLi Du, RuiMeng Yu</i> Yunnan Minzu University
11:45 - 12:00	6062	Waveform Prediction of Underwater Acoustic Propagation Using Finite-difference Time-domain Method <i>Jiahui ZHU, Jinrong WU, Qiannan HOU, Li MA</i> Key Laboratory of Underwater Acoustic Environment, Institute of Acoustics, Chinese Academy of Sciences, University of Chinese Academy of Sciences
12:00 - 12:15	6162	Acquisition and analysis of long-range sound field based on underwater glider <i>Jian Li, Xinyi Guo, Li Ma</i> The Institute of Acoustics of the Chinese Academy of Sciences

Session Chairs: Hongtao Wen, Xiao Han

Place: *Xihai Hall*

Oral session IX-1 (Friday, Morning)

IX. Polar acoustics and under-ice propagation

Time	Abstract Number	Paper Information
11:00 - 11:15	6086	Moving Acoustic Source Transmission Trial in the Marginal Ice Zone of the Arctic <i>Xueli Sheng, Chaoping Dong, Longxiang Guo</i> Harbin Engineering University
11:15 - 11:30	5964	An Ice Thickness Measurement Method based on Up-looking Sonar <i>Tongxin Liang, Danzhu Yu, janhua Lu</i> School of Naval Architecture Ocean Engineering Dalian University of Technology Dalian,China
11:30 - 11:45	6111	Feature Fusion of Rotating Machinery Based on EEMD and LLE Algorithm <i>Sibo Gao, Zhiyuan Dong, Wei Yang, Qiang Zhang, Xiaohan Gao, Shujie Liu</i> Dalian University of Technology
11:45 - 12:00	6100	Semi-Supervised Noise Classification Based on Auto-Encoder <i>Haiyan Ni, Wenbo Wang, Meng Zhao, Qunyan Ren, Li Ma</i> Key Laboratory of Underwater Acoustics Environment, Institute of Acoustics, Chinese Academy of Sciences, University of Chinese Academy of Sciences
12:00 - 12:15	5937	Source Depth Discrimination in Shallow Water Using Modal Correlation Scintillation Index <i>Xiaobin Li, Chao SUN, Xionghou LIU</i> School of Marine Science and Technology, Northwestern Polytechnical University

Session Chairs: Longxiang Guo, Peng Xiao

Place: *Beihai Hall*

Oral session VII-4 (Friday, Morning)

VII. Signal processing: Sonar modeling, signal detection and estimation, target tracking and recognition

Time	Abstract Number	Paper Information
10:40 - 10:55	5921	Optimal location method of spontaneous data fusion based on TDOA/AOA <i>Yifan Zhou, Yingmin Wang, Ruixin Nie, Qian Cheng, Guolei Zhu</i> Northwestern Polytechnical University
10:55 - 11:10	6274	High-resolution DOA Estimation Algorithm of Vector Hydrophone Based on Preselected Filter <i>Wu Zhou, Zhenduo Wang, Zhe Xie</i> Hangzhou Applied Acoustics Research
11:10 - 11:25	6177	Research on Passive Positioning Technology of Time Reversal Mirror Based on Submerged Single Vector Sensor <i>Xiang Xiao, Shiqi Mo</i> College of Underwater Acoustic Engineering, Harbin Engineering University, Harbin 150001, China
11:25 - 11:40	6079	Aliasing line spectrum recognition method based on sound pressure and acceleration <i>Tianxing LI, Jinrong WU, Li MA</i> Institute of Acoustics, Chinese Academy of Sciences
11:40 - 11:55	6217	A compressive sensing SAS imaging method based on resampling of observation space for seabed small target <i>shi yi</i> Hangzhou Applied Acoustics Research Institute
11:55 - 12:10	5945	Range estimation on a single hydrophone deepening vertically in the Pekeris waveguide <i>Xiao Yuan</i> Ocean university of China

Session Chairs: Jianghui Li, Songzuo Liu

Place: *Bohai Hall*

Oral session VI-3 (Friday, Morning)

VI. Underwater acoustic communication and networking

Time	Abstract Number	Paper Information
11:00 - 11:15	5904	Doppler tracking and symbol synchronization method for mobile M-ary spread spectrum underwater acoustic communications <i>Guang Yang, Gang Qiao, Feng Zhou, Yuanan He, Yunjiang Zhao, Yufei Liu</i> Harbin Engineering University
11:15 - 11:30	5763 Virtual	Underwater Acoustic Channel Estimation Based on Sparsity-Aware Deep Neural Networks <i>Longjie Gao, Sicong Liu</i> Xiamen University
11:30 - 11:45	5793	Passive Estimation Method For Motion Parameters Of Underwater Near-Field Moving Target <i>Nan Zou, Junyi He, Tongsheng Shen, Wanrong Zou</i> Harbin Engineering University
11:45 - 12:00	6070	Source Ranging Using Attention-based Convolutional Neural Network <i>Xu Xiao, Wenbo Wang, Qunyan Ren, Meng Zhao, Li Ma</i> Institute of Acoustics, Chinese Academy of Sciences
12:00 - 12:15	6136	Covert Underwater Acoustic Communication Based on Ocean Ambient Noise <i>Biao Liu, Jianchun Huang, Ning Jia, Shengming Guo</i> 1.Institute of Acoustics, Chinese Academy of Sciences 2.Key Laboratory of Underwater Acoustic Environment, Chinese Academy of Sciences 3. University of Chinese Academy of Sciences

Session Chairs: Fengxiang Ge, Xueli Sheng

Place: *Huanghai Hall*

Oral session VII-3 (Friday, Morning)

VII. Signal processing: Sonar modeling, signal detection and estimation, target tracking and recognition

Time	Abstract Number	Paper Information
11:00 - 11:15	6067	High-Resolution Quaternion-Based Algorithm for Coherent Underwater Sources with Linear Vector-Hydrophone Array <i>Yi Lou, Xinghao Qu, Ruofan Sun, Gang Qiao</i> College of Underwater Acoustic Engineering, Harbin Engineering University
11:15 - 11:30	6063	Two-dimensional Direction Estimation of Generative Adversarial Beamforming <i>Jingben Liu, Jinxin Dong, Jiantao Liu, Lianghao Guo, Chao Yan</i> State key laboratory of acoustics, Institute of acoustic, Chinese Academy of Sciences University of Chinese Academy of Sciences
11:30 - 11:45	5924	An Identification Method of Underwater Targets Based on Sparse Representation <i>Jiawei WANG, Feng XU, Juan YANG</i> Institute of Acoustics, Chinese Academy of Sciences, University of Chinese Academy of Sciences
11:45 - 12:00	6206	Real-time Detection and Classification for Targeted Marine Mammals <i>Yankun Chen, Weiping Wang, Yinian Liang, Defu Zhou, Chao Dong, Jie Li</i> South China Sea Marine Survey and Technology Center of State Oceanic AdministrationSMST
12:00 - 12:15	5951	Three Dimensional Reconstruction of Forward- Looking Sonar Images Based on Oren and Nayar Model <i>Kun Cheng, Feng Xu, Juan Yang</i> Institute of Acoustics, Chinese Academy of Sciences
12:15 - 12:30	4872	Image Formation Theory and Experiment Based on ML Criterion and EM Algorithm <i>Rongjie Huang, Song Wang, Hangfang Zhao</i> Ocean College, Zhejiang University

Poster Session list

Place: *Teachers' Salon*

Date	Time	Abstract Number
Thursday July 15	Session 1 10:00-10:40	6265, 6234, 6220, 6154, 6110, 6104, 6074, 5913, 6228, 6175, 6069, 6189, 6179, 6027, 5991, 5018, 6018, 5062, 6053, 6064, 5800, 5008, 6146, 6164, 6115, 6066, 4838, 6099
	Session 2 15:00-17:00	6012, 5986, 6058, 6139, 6031, 6216, 6204, 6256, 6194, 5007, 6291, 6260, 6254, 6250, 6193, 6137, 6120, 6075, 6065, 6028, 5955, 5903, 5789, 6158, 6144, 6143, 6205, 6180
Friday July 16	Session 3 08:00-10:40	5802, 6355, 6153, 6126, 6085, 5926, 6113, 6084, 6047, 6045, 6037, 6026, 5942, 5927, 5919, 5918, 4890, 4862, 6368, 6235, 6233, 6176, 6141, 6118, 6098, 6083, 6073, 6057
	Session 4 10:40-12:00	6052, 5953, 4994, 4883, 5928, 6038, 6159, 6155, 6106, 6044, 6236, 5910, 5787, 4870, 6096, 6055, 6109, 6092, 5956, 6183, 6161, 5922, 5030, 4973, 5899, 6138, 6101, 6082, 6173, 6271



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