November 6th, Tuesday

08:30 – 09:00	Registration

Opening
09:00 – 09:15

Prof. João Borges de Sousa
LSTS, Faculty of Engineering, University of Porto, Portugal

Prof. Falcão e Cunha
Director of the Faculty of Engineering, University of Porto, Portugal

Prof. Fátima Vieira
Vice-rector, University of Porto, Portugal

Session 1
Software
09:15 – 10:15

Chair
Harumi Sugimatsu
University of Tokyo

Co-chair
Neil Bose
Memorial University

Transitioning to Open Source at 6000m
Ian Vaughn - Woods Hole Oceanographic Institution, USA
Stefano Suman - Woods Hole Oceanographic Institution, USA
Zac Berkowitz - Woods Hole Oceanographic Institution, USA
Jennifer Vaccaro - Woods Hole Oceanographic Institution, USA
Sean Kelley - Woods Hole Oceanographic Institution, USA
Justin Fujii - Woods Hole Oceanographic Institution, USA
Michael Jakuba - Woods Hole Oceanographic Institution, USA
Jonathan Howland - Woods Hole Oceanographic Institution, USA
Louis Whitcomb -Johns Hopkins University, USA
Carl Kaiser - Woods Hole Oceanographic Institution, USA

Coordinated operation of multiple AUVs, ASVs and UAVs using the LSTS tool chain
José Pinto - LSTS, Faculty of Engineering, University of Porto, Portugal
Paulo Sousa Dias - LSTS, Faculty of Engineering, University of Porto, Portugal
João Borges de Sousa - LSTS, Faculty of Engineering, University of Porto, Portugal

A Natural Language Interface and Relayed Acoustic Communications for Improved Command and Control of AUVs
David Robb - Heriot-Watt University, UK
Jonatan Scharff Willners - Heriot-Watt University, UK
Nicolas Valeyrie - Heriot-Watt University, UK
Francisco J. Chiyah Garcia - Heriot-Watt University, UK
Atanas Laskov - SeeByte Ltd., Edinburgh, UK
Xingkun Liu - Heriot-Watt University, UK
Pedro Patron - SeeByte Ltd., Edinburgh, UK
Helen Hastie - Heriot-Watt University, UK
Yvan R. Petillot - Heriot-Watt University, UK

Improving the Modularity of AUV Control Systems using Behaviour Trees
Christopher Iliffe Sprague - KTH Royal Institute of Technology, Sweden
Özer Özkahraman - KTH Royal Institute of Technology, Sweden
Andrea Munafo - National Oceanography Centre, UK
Rachel Marlow - National Oceanography Centre, UK
Alexander Phillips - National Oceanography Centre, UK
Petter Ögren - KTH Royal Institute of Technology, Sweden

Robot Operating System (ROS) on the REMUS AUV using RECON
Eric Gallimore - Scripps Institution of Oceanography, USA
Roger Stokey - Woods Hole Oceanographic Institution, USA
Eric Terrill - Scripps Institution of Oceanography, USA

10:15 – 10:45	Coffee - Break

Session 2
Extreme environments
10:45 – 13:00

Chair
Dana Yoerger
Woods Hole Oceanographic Institution

Co-chair
Nina Mahmoudian
Michigan Tech

Toward an Autonomous Communications Relay for Deep-Water Scientific AUV Operations
Michael Jakuba - Woods Hole Oceanographic Institution, USA
Carl L. Kaiser - Woods Hole Oceanographic Institution, USA
Christopher R. German - Woods Hole Oceanographic Institution, USA
Adam S. Soule - Woods Hole Oceanographic Institution, USA
Sean R. Kelley - Woods Hole Oceanographic Institution, USA

Iceberg Wall Following and Obstacle Avoidance by an AUV
Robert McEwen - Monterey Bay Aquarium Research Institute, USA
Stephen P. Rock - Monterey Bay Aquarium Research Institute, USA
Brett Hobson - Monterey Bay Aquarium Research Institute, USA

Near-coincident mapping of sea ice from above and below with UAS and AUV
Hanumant Singh - Northeastern University, USA
Guy Williams - University of Tasmania, Australia
Darren Turner - University of Tasmania, Australia
Ted Maksym - Woods Hole Oceanographic Institution, USA

Deploying an AUV beneath the Sørsdal Ice Shelf: Recommendations from an expert-panel workshop
Peter King - University of Tasmania, Australia
Guy Williams - University of Tasmania, Australia
Richard Coleman - University of Tasmania, Australia
Konrad Zürcher - University of Tasmania, Australia
Isak Bowden-Floyd - University of Tasmania, Australia
Andrew Ronan - International Submarine Engineering, Canada
Chris Kaminski - International Submarine Engineering, Canada
Jean-Marc Laframboise - International Submarine Engineering, Canada
Stephen McPhail - National Oceanography Centre, UK
Jeremy Wilkinson - British Antarctic Survey, UK
Andrew Bowen - Woods Hole Oceanographic Institution, USA
Pierre Dutrieux - Lamont-Doherty Earth Observatory, USA
Neil Bose - Memorial University of Newfoundland, Canada
Anna Wåhlin - University of Gothenburg, Sweden
Jonas Andersson - MMT, Sweden
Phillip Boxall - Australian Antarctic Division, Australia
Matthew Sherlock - Commonwealth Scientific and Industrial Research Organisation, Australia
Toshihiro Maki - The University of Tokyo, Japan

Resident AUV Workshop 2018: Applications and a Path Forward
Dana Manalang - University of Washington, USA
John Delaney - University of Washington, USA
Aaron Marburg - University of Washington, USA
Anuscheh Nawaz - University of Washington, USA

Port Experiments of the Docking and Charging System Using an AUV and a Seafloor Station :Towards Long-term Seafloor Observation
Takumi Matsuda - Institute of Industrial Science - The University of Tokyo, Japan
Toshihiro Maki - Institute of Industrial Science - The University of Tokyo, Japan
Kotohiro Masuda - Institute of Industrial Science - The University of Tokyo, Japan
Takashi Sakamaki - Institute of Industrial Science - The University of Tokyo, Japan
Kenji Ohkuma - Institute of Industrial Science - The University of Tokyo, Japan

Search for life in ice-covered oceans and lakes beyond Earth
Christoph Waldmann - MARUM, University of Bremen, Germany
Jean-Pierre de Vera - Institute of Planetary Research, DLR, Germany
Bernd Dachwald - Faculty of Aerospace Engineering, Germany
Henry Strasdeit - Institute of Chemistry, University of Hohenheim, Germany
Frank Sohl - Institute of Planetary Research, DLR, Germany
Hendrik Hanff - Robotics Innovation Center, DFKI, Germany
Julia Kowalski - AICES, RWTH Aachen University, Germany
Dirk Heinen - III. Physikalisches Institut B, RWTH Aachen University, Germany
Sabine Macht - Institute of Flight Guidance, University of Brausnschweig, Germany
Ulf Bestmann - Institute of Flight Guidance, University of Brausnschweig, Germany
Sebastian Meckel - MARUM, University of Bremen, Germany
Marc Hildebrandt - Robotics Innovation Center, DFKI, Germany
Oliver Funke - Space Administration, DLR, Germany
Jan-Jöran Gehrt - Institute of Automatic Control, RWTH University, Germany

Lunch / Poster Session I
13:00 – 14:15

AUV position estimation via acoustic seabed profile measurements
Alexander Miller - Institute for Information Transmission Problems RAS, Russia
Gregory Miller - Federal Research Center "Computer Science and Control" RAS, Russia

Multi-Objective Four-Dimensional Glider Path Planning using NSGA-II
Carlos Lucas - ARDITI / Observatório Oceânico da Madeira, Portugal
Daniel Hernadez-Sosa – IUSIANI Universidad de Las Palmas de Gran Canaria, Spain
Rui Caldeira - ARDITI / Observatório Oceânico da Madeira, Portugal

Variable-sweep Wing for Multi-modal Underwater Vehicle with Passive-controlled Accumulator
Daiwei Li - Shanghai Jiao Tong University, China
Zheng Zeng - Shanghai Jiao Tong University, China
JunJun Cao - Shanghai Jiao Tong University, China
Danfeng Chen - Shanghai Jiao Tong University, China
Baoheng Yao - Shanghai Jiao Tong University, China
Lian Lian - Shanghai Jiao Tong University, China

An indirect numerical method for a time-optimal state-constrained control problem in a steady two-dimensional fluid flow
Nathalie T. Khalil - Universidade do Porto - Faculdade de Engenharia, Portugal
Roman Chertovskih - Universidade do Porto - Faculdade de Engenharia, Portugal
Dmitry Karamzin - Federal Research Center "Computer Science and Control" RAS, Russia
Fernando Lobo Pereira - Universidade do Porto - Faculdade de Engenharia, Portugal

A generic and modular architecture for maritime autonomous vehicles
Eric Bensana - ONERA/DTIS, France
Magali BARBIER - ONERA/DTIS, France
Xavier PUCEL - ONERA/DTIS, France

Design of an AUV Research Platform for Demonstration of Novel Technologies
Clemens Deutsch - KTH Royal Institute of Technology, Sweden
Sebastian Thuné - KTH Royal Institute of Technology, Sweden
Filip Söderling - Saab Kockums AB, Sweden
Lázaro Moratelli Jr. - KTH Royal Institute of Technology, Sweden
Jakob Kuttenkeuler - KTH Royal Institute of Technology, Sweden

Performance evaluation of particle swarm intelligence based optimization techniques in a novel AUV path planner
Hui Sheng Lim - University of Tasmania - Australian Maritime College, Australia
Shuangshuang Fan - University of Tasmania - Australian Maritime College, Australia
Christropher K.H. Chin - University of Tasmania - Australian Maritime College, Australia
Shuhong Chai - University of Tasmania - Australian Maritime College, Australia

Fault-Tolerant Architecture for AUVs
Lucas Weihmann - UFSC - Federal University of Santa Catarina, Brazil
Tui Baraniuk - Applied Robotics Lactec Institutes, Brazil
Roberto Simoni - UFSC - Federal University of Santa Catarina, Brazil

A comparison between co-located UUV-based optical 3D reconstruction and interferometric bathymetry
Hunter Brown - L3 OceanServer, USA
Jeffrey Z. Snyder - L3 OceanServer, USA

Session 3
Vehicles I
14:15 – 16:15

Chair
Daniel Alcaraz
Plocan

Co-chair
Ralf Bachmayer
Marum - University of Bremen

Mesobot: an autonomous underwater vehicle for tracking and sampling midwater targets
Dana Yoerger - Woods Hole Oceanographic Institution, USA
Molly Curran - Woods Hole Oceanographic Institution, USA
Justin Fujii - Woods Hole Oceanographic Institution, USA
Christopher R. German - Woods Hole Oceanographic Institution, USA
Daniel Gomez-Ibanez - Woods Hole Oceanographic Institution, USA
Annette F. Govindarajan - Woods Hole Oceanographic Institution, USA
Jonathan C. Howland - Woods Hole Oceanographic Institution, USA
Joel K. Llopiz - Woods Hole Oceanographic Institution, USA
Peter H. Wiebe - Woods Hole Oceanographic Institution, USA
Brett W. Hobson - Monterey Bay Aquarium Research Institute, USA
Kakani Katija - Monterey Bay Aquarium Research Institute, USA
Michael Risi - Monterey Bay Aquarium Research Institute, USA
Bruce H. Robison - Monterey Bay Aquarium Research Institute, USA
Stephen M. Rock - Stanford University, USA
Cailean J. Wilkinson - University of St Andrews, UK
John A. Breier - University of Texas, USA

Software Control Architecture for the BOSS Manta Ray AUV Actuation System
Ievgenii Glushko - EvoLogics GmbH, Germany
Eugen Olenew - EvoLogics GmbH, Germany
Maksym Komar - EvoLogics GmbH, Germany
Leif Kniese - EvoLogics GmbH, Germany
Roman Sokolovskyi - EvoLogics GmbH, Germany
Oleksiy Kebkal - EvoLogics GmbH, Germany
Rudolf Bannasch - EvoLogics GmbH, Germany
Konstantin Kebkal - EvoLogics GmbH, Germany

Issues in Marine Vehicle Design: A Needs Based Analysis
Hanumant Singh - Northeastern University, USA
Vikrant Shah - Northeastern University, USA

Increasing the operational safety of Autonomous Underwater Vehicles using the JANUS communication standard
Fausto Ferreira - NATO STO CMRE, Italy
Roberto Petroccia - NATO STO CMRE, Italy
João Alves - NATO STO CMRE, Italy

Clio: An Autonomous Vertical Sampling Vehicle for Global Ocean Biogeochemical Mapping
Michael Jakuba - Woods Hole Oceanographic Institution, USA
John A. Breier - University of Texas, USA
Daniel Gómez-Ibáñez - Woods Hole Oceanographic Institution, USA
Kaitlyn Tradd - Woods Hole Oceanographic Institution, USA
Mak A. Saito - Woods Hole Oceanographic Institution, USA

The idea, design and current state of development of an Unmanned Submersible Surface Vehicle: USSV SeaDuck
Ralf Bachmayer - Memorial University of Newfoundland, Canada
Brad de Young - Memorial University of Newfoundland, Canada
Ron Lewis - Memorial University of Newfoundland, Canada
Haibing Wang - Memorial University of Newfoundland, Canada
Levi MacNeil - Memorial University of Newfoundland, Canada
Vincent Sobalski - Memorial University of Newfoundland, Canada
Federico Luchino - Memorial University of Newfoundland, Canada
Neil Riggs - Memorial University of Newfoundland, Canada

Hydrobatics: A Review of Trends, Challenges and Opportunities for Efficient and Agile Underactuated AUVs
Sriharsha Bhat - KTH Royal Institute of Technology, Sweden
Ivan Stenius - KTH Royal Institute of Technology, Sweden

An Ocean Bottom Flying Node AUV for Seismic Observations
Zheyuan Wu - Harbin Engineering University, China
Zhongben Zhu - Harbin Engineering University, China
Zhongchao Deng - Harbin Engineering University, China
Hongde Qin - Harbin Engineering University, China
Xiangqian Wang - Harbin Engineering University, China

16:15 – 16:45 Coffee - Break

Session 4
Planning I
16:45 – 18:00

Chair
Dana Manalang
APL University of Washington

Co-chair
Hayato Kondo
University of Tokyo

Integrated Mission Planning and Adaptable Docking System for AUV Persistence
Nina Mahmoudian - Michigan Technological Univeristy, USA
Brian R. Page - Michigan Technological Univeristy, USA
Bingxi Li - Michigan Technological Univeristy, USA
John Naglak - Michigan Technological Univeristy, USA
Caleb Kase - Michigan Technological Univeristy, USA
Barzin Moridian - Michigan Technological Univeristy, USA

Min-Max Motion Planning Algorithms for Heterogeneous, Autonomous Underwater Vehicles
Sivakumar Rathinam - Mechanical Engineering Texas A&M University, USA

A coverage planner for AUVs using B-splines
Rômulo Rodrigues - Faculty of Engineering, University of Porto, Portugal
A. Pedro Aguiar - Faculty of Engineering, University of Porto, Portugal
António Pascoal - ISR/IST, University of Lisbon, Portugal

Trajectory Optimization for Underwater Vehicles in Time-Varying Ocean Flows
Miguel Aguiar - LSTS, Faculty of Engineering, University of Porto, Portugal
João Borges de Sousa - LSTS, Faculty of Engineering, University of Porto, Portugal
João Miguel Dias - NMEC, CESAM, DFis, University of Aveiro, Portugal
Jorge Estrela da Silva -ISEP, Porto, Portugal
Renato Mendes - NMEC, CESAM, DFis, University of Aveiro, Portugal
Américo S. Ribeiro - NMEC, CESAM, DFis, University of Aveiro, Portugal

Plenary Session I
18:00 – 19:00

Chair
Kostas Kyriakopoulos
National Technical University of Athens

A 30 year History of Research in Unmanned Systems
Prof. Anthony Healey , Naval Postgraduate School

19:00 – 20:00

Ice-Breaker sponsored by OCEAN INFINITY

November 7th, Wednesday

Session 5
Multi-vehicle
08:45 – 10:30

Chair	Co-chair
Mandar Chitre National University of Singapore	**P. B. Sujit** IIITD

A Framework for Modeling Underwater Vehicles in Modelica
Shashank Swaminathan - Franklin W. Olin College of Engineering, USA
Srikanth Saripalli - Texas A&M University, USA

Effective Team Coordination through Intra-Robot Replanning to Restore Team Plan Rationale
Philip Cooksey - Carnegie Mellon University, USA
Manuela Veloso - Carnegie Mellon University,, USA

Cooperative Motion Planning with Time, Energy, and Active Navigation Constraints
Bahareh Sabetghadam - Instituto Superior Técnico, Portugal
Rita Cunha - Instituto Superior Técnico, Portugal
António Pascoal - Instituto Superior Técnico, Portugal

A Low-cost Mobile Infrastructure for Multi-AUV Networking
Nina Mahmoudian - Michigan Technological Univeristy, USA
Barzin Moridian - Michigan Technological Univeristy, USA
Li Wei - Michigan Technological Univeristy, USA
John Hoffman - Michigan Technological Univeristy, USA
Wensheng Sun - Michigan Technological Univeristy, USA
Brian Page - Michigan Technological Univeristy, USA
Matthew Sietsema - Michigan Technological Univeristy, USA
Yi Zhang - Michigan Technological Univeristy, USA
Zhaohui Wang - Michigan Technological Univeristy, USA

Making Swarming Manageable
Tyler MacCready - Apium, Inc., USA
Joy Shapiro - Apium, Inc., USA

Attainable-Set Model Predictive Control for AUV Formation Control
Rui Gomes - Faculty of Engineering, University of Porto, Portugal
Fernando Lobo Pereira - Faculty of Engineering, University of Porto, Portugal

Expanded Underwater Robotics ready for Oil Spills (eURready4OS)
Javier Gilabert - Politechnic University of Cartagena, Spain

10:30 – 11:00	Coffee - Break

Session 6

Applications / Oceanography

11:00 – 12:45

Chair

Sivakumar Rathinam

Texas A&M University

Co-chair

Renato Mendes

LSTS, Aveiro University

Marine robotics exploration of a large-scale open-ocean front

Igor M. Belkin - University of Rhode Island, USA
João Borges de Sousa - LSTS, Faculty of Engineering, University of Porto, Portugal
José Pinto - LSTS, Faculty of Engineering, University of Porto, Portugal
Renato Mendes - LSTS, Faculty of Engineering, University of Porto, Portugal
Francisco López-Castejón - Technical University of Cartagena, Spain

How autonomous vehicles are enhancing ocean science

Brian Kieft - Monterey Bay Aquarium Research Institute, USA
Francisco P. Chavez - Monterey Bay Aquarium Research Institute, USA
David A. Clague - Monterey Bay Aquarium Research Institute, USA
Brett W. Hobson - Monterey Bay Aquarium Research Institute, USA
Kim Reisenbichler - Monterey Bay Aquarium Research Institute, USA
Bruce H. Robison - Monterey Bay Aquarium Research Institute, USA
Alana D. Sherman - Monterey Bay Aquarium Research Institute, USA
Kenneth L. Smith Jr. - Monterey Bay Aquarium Research Institute, USA

Field Report: Exploring Fronts with Multiple Robots

Maria João Costa - LSTS, Faculty of Engineering, University of Porto, Portugal
José Pinto - LSTS, Faculty of Engineering, University of Porto, Portugal
Paulo Sousa Dias - LSTS, Faculty of Engineering, University of Porto, Portugal
João Pereira - LSTS, Faculty of Engineering, University of Porto, Portugal
Keila Lima - LSTS, Faculty of Engineering, University of Porto, Portugal
Manuel Ribeiro - LSTS, Faculty of Engineering, University of Porto, Portugal
João Borges Sousa - LSTS, Faculty of Engineering, University of Porto, Portugal
Trent Lukaczyk - LSTS, Faculty of Engineering, University of Porto, Portugal
Renato Mendes - CIIMAR, Universidade do Porto
Maria P. Tomasino - CIIMAR, Universidade do Porto
Catarina Magalhães - CIIMAR, Universidade do Porto
Igor Belkin - University of Rhode Island, USA
Francisco Lopez-Castejon - Universidad Politécnica de Cartagena, Spain
Javier Gilabert - Universidad Politécnica de Cartagena, Spain
Kay Skarpnes - Norwegian University of Science and Technology (NTNU), Norway
Martin Ludvigsen - Norwegian University of Science and Technology (NTNU), Norway
Kanna Rajan - Norwegian University of Science and Technology (NTNU), Norway
Zara Mirmalek - Harvard University, USA
Alex Chekalyuk - Lamont-Doherty Earth Observatory, Columbia University, USA

Ocean-gliders contribution to improve monitoring capacity in the East-Central North Atlantic

Daniel Alcaraz - PLOCAN, Spain
C. Barrera - PLOCAN, Spain
C. Waldmann - MARUM, University of Bremen, Germany
R. Caldeira - ARDITI / Observatório Oceânico da Madeira, Portugal
M.J. Rueda - PLOCAN, Spain
J. Hernández - PLOCAN, Spain
O. Llinás - PLOCAN, Spain

NOAA/AOML-CARICOOS Underwater Glider Operations In Support Of Tropical Cyclone Intensification Studies

Grant Rawson - NOAA/AOML/Univ of Miami/CIMAS, USA
Ulises Rivero - NOAA/OAR/Univ of Miami, USA
Gustavo Goni - NOAA/OAR/Univ of Miami, USA
Ricardo Domingues - NOAA/AOML/Univ of Miami/CIMAS, USA
Francis Bringas - NOAA/OAR/Univ of Miami, USA
Jili Dong - NOAA/EMC/College Park, USA
Hyun-Sook Kim - NOAA/EMC/College Park, USA
George Halliwell - NOAA/OAR/Univ of Miami, USA
Julio Morell - University of Puerto Rico at Mayaguez, USA
Luis Pomales - University of Puerto Rico at Mayaguez, USA
Patricia Chardon - University of Puerto Rico at Mayaguez, USA

Session 6
Applications / Oceanography (contin.)
11:00 – 12:45

An Autonomous Vehicle-Based Open Ocean Lagrangian Observatory
Brett Hobson - Monterey Bay Aquarium Research Institute, USA
Brian Kieft - Monterey Bay Aquarium Research Institute, USA
Ben Raanan - Monterey Bay Aquarium Research Institute, USA
Yanwu Zhang - Monterey Bay Aquarium Research Institute, USA
James Birch - Monterey Bay Aquarium Research Institute, USA
John P. Ryan - Monterey Bay Aquarium Research Institute, USA
Francisco P. Chavez - Monterey Bay Aquarium Research Institute, USA

A new front-tracking algorithm for AUVs
Igor M. Belkin - University of Rhode Island, USA
João Borges de Sousa - LSTS, Faculty of Engineering, University of Porto, Portugal
José Pinto - LSTS, Faculty of Engineering, University of Porto, Portugal
Renato Mendes - LSTS, Faculty of Engineering, University of Porto, Portugal
Francisco López-Castejón - Technical University of Cartagena, Spain

Lunch / Poster Session II
12:45 – 14:00

Using AUVs to study estuarine outflow stratification under severe environmental constraints
Sara Cardigos - Physics Department, University of Aveiro, Portugal
Renato Mendes - CESAM, University of Aveiro, Portugal
António Sérgio Ferreira - LSTS, Faculty of Engineering, University of Porto, Portugal
José Pinto - LSTS, Faculty of Engineering, University of Porto, Portugal
João Borges de Sousa - LSTS, Faculty of Engineering, University of Porto, Portugal
João Miguel Dias - Physics Department, University of Aveiro, Portugal

A novel approach to obstacle avoidance for an I-AUV
Roberto Simoni - Federal University of Santa Catarina, Brazil
Pere Ridao Rodríguez - University of Girona, Spain
Patryk Cieślak - University of Girona, Spain
Dina Youakim - University of Girona, Spain

AUV Scaled Model Prototyping using 3D Printing Techniques
Claudio Coreixas - UFRJ/NTNU, Norway
Robson Costa Santiago – CECS/UFABC, Brazil

A Comparison of Submap Registration Methods for Multibeam Bathymetric Mapping
Nils Bore - KTH Royal Institute of Technology, Sweden
Ignacio Torroba - KTH Royal Institute of Technology, Sweden
John Folkesson - KTH Royal Institute of Technology, Sweden

Resident Autonomous Underwater Vehicles: Docking Revisited
Tom Curtin - Applied Physics Laboratory, University. of Washington, USA
Dana Manalang - Applied Physics Laboratory, University. of Washington, USA

Towards autonomous ocean observing systems using Miniature Underwater Gliders with UAV deployment and recovery capabilities
Alex Alcocer - Oslo Metropolitan University, Norway
Erik Sollesnes - Oslo Metropolitan University, Norway
Ole Martin Brokstad - Oslo Metropolitan University, Norway
Rolf Klæboe - Oslo Metropolitan University, Norway
Bendik Vågen - Oslo Metropolitan University, Norway
Alfredo Carella - Oslo Metropolitan University, Norway
Artur Piotr Zolich - Norwegian University of Science and Technology, Norway
Tor Arne Johansen - Norwegian University of Science and Technology, Norway

Managing Spatio-Temporal Data Streams on AUVs
Tobias Werner - Institute for Applied Photogrammetry and Geoinformatics Jade University of Applied Sciences, Germany
Thomas Brinkhoff - Institute for Applied Photogrammetry and Geoinformatics Jade University of Applied Sciences, Germany

Depth control of an underwater vehicle using robust PD controller: real-time experiments
Angel Eduardo Zamora Suarez - CINVESTAV, Mexico
Adrian Manzanilla Magallanes - CINVESTAV, Mexico
Miguel Angel Garcia Rangel - CINVESTAV, Mexico
Rogelio Lozano Leal - Université de Technologie de Compiegne, France
Sergio Salazar Cruz - CINVESTAV, Mexico
Filiberto Muñoz Palacios - CINVESTAV, Mexico

AUV Propulsion and Maneuvering by Means of Asymmetric Thrust
Robin Hunter Littlefield - Woods Hole Oceanographic Institution, USA
Frederic Jaffre - Woods Hole Oceanographic Institution, USA
Jeffrey W. Kaeli - Woods Hole Oceanographic Institution, USA

Lunch / Poster Session II (contin.)
12:45 – 14:00

Autonomous Sea Turtle Detection Using Multi-beam Imaging Sonar: Toward Autonomous Tracking
Hiroumi Horimoto - The University of Tokyo, Japan
Toshihiro Maki - The University of Tokyo, Japan
Kazuya Kofuji - Ibaraki Prefectural Oarai Aquarium, Japan
Takashi Ishihara - Suma Aqualife Park, Japan

High-rate underwater acoustic communication system for SHINKAI6500
Takuya Shimura - Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Japan
Yukihiro Kida - Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Japan
Mitsuyasu Deguchi - Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Japan

Working towards the design framework for an fluid actuated softwing
Arne Kausche - MARUM, University of Bremen, Germany
Ralf Bachmayer - MARUM, University of Bremen, Germany

Perfect Pairing: Smart Hydrophones and Wave Gliders Combined to Track Elusive Whale Migration
Mark Wood - Ocean Sonics Ltd. , Canada

Design of a Reconfigurable Autonomous Underwater Vehicle for Offshore Platform Monitoring and Intervention
Marco Pagliai - University of Florence, Italy
Alessandro Ridolfi - University of Florence, Italy
Jonathan Gelli - University of Florence, Italy
Alessia Meschini - University of Florence, Italy
Benedetto Allotta - University of Florence, Italy

Design and Testing of a Compact Autonomous Underwater Vehicle for Archaeological Surveying and Monitoring
Alessia Meschini - University of Florence, Italy
Jonathan Gelli - University of Florence, Italy
Niccolò Monni - University of Florence, Italy
Marco Pagliai - University of Florence, Italy
Alessandro Ridolfi - University of Florence, Italy
Lorenzo Marini - University of Florence, Italy
Benedetto Allotta - University of Florence, Italy

Design and Development of an Open-frame AUV: ANAHITA
Akash Jain - Indian Institute of Technology, India
Naveen Chandra R - Indian Institute of Technology, India
Manish Kumar - Indian Institute of Technology, India

Session 7
Vehicles II
14:00 – 15:45

Chair
António Pascoal
LarSys-Instituto Superior Técnico

Co-chair
Javier Gilabert
Universidad Politécnica de Cartagena

Design of an AUV for Visual Inspection of Nuclear Power Plants
Eduardo Matias Robador - Instituto Balseiro, National Commission of Atomic Energy, CNEA, Argentina
Germán Matáas Hansen - Instituto Balseiro, National Commission of Atomic Energy, CNEA, Argentina
Lautaro Acha - Instituto Balseiro, National Commission of Atomic Energy, CNEA, Argentina
Sol Pedre - Instituto Balseiro, National Commission of Atomic Energy, CNEA, Argentina
Alejandro Tobías Quispe Mamaní - Instituto Balseiro, National Commission of Atomic Energy, CNEA, Argentina

Miniaturized Underwater Gliders as Payload Transfer Units
Tobias Rossol - DFKI GmbH, Germany
Marc Hildebrandt - DFKI GmbH, Germany
Marius Wirtz - DFKI GmbH, Germany

Unmanned Vehicle Autonomy for Long-Duration Surveillance Missions
Hossein Rastgoftar - University of Michigan Ann Arbor, USA
Jinning Jiang - University of Michigan Ann Arbor, USA
Ella Atkins - University of Michigan Ann Arbor, USA

UNEXMIN AUV perception system design and characterization
Eduardo Silva – INESC TEC / ISEP, Portugal

Sizing the energy system on long-range AUVs
Ariel Chiche - KTH - Royal Institute of Technology, Sweden
Carina Lagergren - KTH - Royal Institute of Technology, Sweden
Göran Lindbergh - KTH - Royal Institute of Technology, Sweden
Ivan Stenius - KTH - Royal Institute of Technology, Sweden

Session 7
Vehicles II (contin.)
14:00 – 15:45

A comprehensive comparison of computational methods on propeller modelling of an AUV
HuiSheng Lim - University of Tasmania, Australian Maritime College, Australia
Guo Hao Ang - University of Tasmania, Australian Maritime College, Australia
Shuangshuang Fan - University of Tasmania, Australian Maritime College, Australia
Yuting Jin - University of Tasmania, Australian Maritime College, Australia
Christopher K. H. Chin - University of Tasmania, Australian Maritime College, Australia
Shuhong Chai - University of Tasmania, Australian Maritime College, Australia
Neil Bose - Memorial University of Newfoundland, Canada

Modeling of Articulated Underwater Robots for Simulation and Control
Henrik Schmidt-Didlaukies - Norwegian University of Science and Technology, Norway
Asgeir J. Sørensen - Norwegian University of Science and Technology, Norway
Kristin Y. Pettersen - Norwegian University of Science and Technology, Norway

15:45 – 16:30 Coffee - Break

Session 8
Localization / Navigation I
16:30 – 17:45

Chair
Alexander Phillips
National Oceanography Center

Co-chair
Praveen Jain
LSTS, Porto University

Underwater Localization using Probabilistic Sonar Registration and Pose Graph Optimization
Antoni Burguera - Universitat de les Illes Balears, Spain

CAMELOT - Localization Beacon System
Marin Stipanov - NATO STO-CMRE, Italy
Stefano Fioravanti - NATO STO-CMRE, Italy

Implementation of a Hydrodynamic Model-Based Navigation System for a Low-Cost AUV Fleet
Supun A. T. Randeni P. - Massachusetts Institute of Technology, USA
Nicholas R. Rypkema - Massachusetts Institute of Technology, USA
Erin M. Fischell - Massachusetts Institute of Technology, USA
Alexander L. Forrest - University of California, USA
Michael R. Benjamin - Massachusetts Institute of Technology, USA
Henrik Schmidt - Massachusetts Institute of Technology, USA

Guidance of an Autonomous Surface Vehicle for Underwater Navigation Aid
José Pedro Sousa - Faculty of Engineering, University of Porto, Portugal
Bruno M. Ferreira - INESC TEC
Nuno A. Cruz - INESC TEC

Towards Enhancing the Navigational Accuracy of UUVs Through Collaboration of Multiple Heterogeneous Marine Vehicles
Nadir Kapetanovic - University of Zagreb, Faculty of Electrical Engineering and Computing, Croatia
Đula Nađ - University of Zagreb, Faculty of Electrical Engineering and Computing, Croatia
Nikola Mišković - University of Zagreb, Faculty of Electrical Engineering and Computing, Croatia
Zoran Vukić - University of Zagreb, Faculty of Electrical Engineering and Computing, Croatia

SOI presentation
17:50 – 18:10

Chair
João Sousa
LSTS, Porto University

Oceanographic collaborations with Schmidt Ocean Institute
Victor Zykov

18:10 – 19:10	Discussion Session

November 8th, Thursday

Session 9
Control
08:30 – 10:15

Chair
Fernando Pereira
Systec, University of Porto

Co-chair
Michael Jakuba
Woods Hole Oceanographic Institution

Robust Subsea Pipeline Tracking with Noisy Multibeam Echosounder
Vibhav Bharti - Heriot-Wat University, UK
David Lane - Heriot-Wat University, UK
Sen Wang - Heriot-Wat University, UK

An Example of Underwater Acoustic Network based on Modems Incorporating Open-Source Networking Software Framework
Oleksiy G. Kebkal - EvoLogics GmbH, Germany
Veronika K. Kebkal - EvoLogics GmbH, Germany
Konstantin G. Kebkal - EvoLogics GmbH, Germany
Dmitry D. Minaev - Special Design Bureau for Automation of Marine Research, Russia
Roman Leonenkov - Special Design Bureau for Automation of Marine Research, Russia
Andrey S. Korytko - Special Design Bureau for Automation of Marine Research, Russia

Target Tracking using an Autonomous Underwater Vehicle: A Moving Path Following Approach
Praveen Jain - Faculty of Engineering, University of Porto, Portugal
A. Pedro Aguiar - Faculty of Engineering, University of Porto, Portugal
João Borges de Sousa - LSTS, Faculty of Engineering, University of Porto, Portugal

A Tube-based MPC Scheme for Interaction Control of Underwater Vehicle Manipulator Systems
Alexandros Nikou - KTH Royal Institute of Technology, Sweden
Christos K. Verginis - KTH Royal Institute of Technology, Sweden
Dimos V. Dimarogonas - KTH Royal Institute of Technology, Sweden

Experimental evaluation of depth controllers for a small-size AUV
Corina Barbalata - Naval Architecture and Marine Engineering, University of Michigan, USA
Eduardo Iscar - Naval Architecture and Marine Engineering, University of Michigan, USA
Matthew Johnson-Roberson - Naval Architecture and Marine Engineering, University of Michigan, USA

Steering Plane Dynamics of a Small Autonomous Underwater Vehicle That Tows a Large Payload
Michael Kepler - Virginia Tech, USA
Suraj Pawar - Virginia Tech, USA
Daniel J. Stilwell - Virginia Tech, USA
Stefano Brizzolara - Virginia Tech, USA
Wayne L. Neu - Virginia Tech, USA

Decentralized Impedance Control for Cooperative Manipulation of Multiple Underwater Vehicle Manipulator Systems under Lean Communication
Kostas Kyriakopoulos - National Technical University of Athens, Greece
Charalampos P. Bechlioulis - National Technical University of Athens, Greece
George C. Karras - National Technical University of Athens, Greece
Kostas J. Kyriakopoulos - National Technical University of Athens, Greece

Plenary Session II
10:15 – 11:00

Chair
Brian Kieft
Monterey Bay Aquarium Research Institute

Multi-platform Ocean Observation from Events to Climate: Challenges and Opportunities
Dr. Joaquín Tintoré , Socib

11:00 – 11:30	Coffee - Break

Session 10
Applications I
11:30 – 13:00

Chair	Co-chair
Carl Kaiser Wood Hole Oceanographic Institution	**Martin Ludvigsen** Norwegian University of Science and Technology

Autonomous Surface/Subsurface Survey System Field Trials
Alexander Phillips - National Oceanography Centre, UK
Georgios Salavasidis - National Oceanography Centre, UK
Matt Kingsland - National Oceanography Centre, UK
Catherine Harris - National Oceanography Centre, UK
Miles Pebody - National Oceanography Centre, UK
Daniel Roper - National Oceanography Centre, UK
Robert Templeton - National Oceanography Centre, UK
Stephen McPhail - National Oceanography Centre, UK
Thomas Prampart - National Oceanography Centre, UK
Terry Wood - National Oceanography Centre, UK
Ruth Taylor - L3 ASV, UK
Tiefion Jones - Sonardyne International Ltd, UK

Autonomous Underwater Vehicle Model-Based High-Gain Observer for Current Estimation
Eonjoo Kim - University of Tasmania - Australian Maritime College, Australia
Shuangshuang Fan - University of Tasmania, Australian Maritime College, Australia
Neil Bose - Memorial University of Newfoundland, Canada

AUV seafloor tracking for MCM operations
Christin Rhén - Saab Dynamics, Sweden
Simon Keisala - Saab Dynamics, Sweden
Alfons Råberg - Saab Dynamics, Sweden
Adam Lindberg - Linköping University, Sweden
Per Abrahamsson - Saab Dynamics, Sweden

Object Recognition in Forward Looking Sonar Images using Transfer Learning
Louise Rixon Fuchs - KTH - Royal Institute of Technology, Sweden
Andreas Gällström - Saab Dynamics, Sweden
John Folkesson - KTH - Royal Institute of Technology, Sweden

Object Recognition and Pose Estimation using Laser scans For Advanced Underwater Manipulation
Himri Khadidja - Universitat de Girona, Spain
Roger Pi - Universitat de Girona, Spain
Pere Ridao - Universitat de Girona, Spain
Nuno Gracias - Universitat de Girona, Spain
Albert Palomer - Universitat de Girona, Spain
Narcis Palomeras - Universitat de Girona, Spain

Failure Rates and Failure Reduction Efforts in the U.S. National Deep Submergence Facility's Autonomous Underwater Vehicle Sentry
Carl L. Kaiser - Woods Hole Oceanographic Institution, USA
Dana R. Yoerger - Woods Hole Oceanographic Institution, USA
James C. Kinsey - Woods Hole Oceanographic Institution, USA
Sean Kelley - Woods Hole Oceanographic Institution, USA
Zachary Berkowitz - Woods Hole Oceanographic Institution, USA
Andrew D. Bowen - Woods Hole Oceanographic Institution, USA

Lunch / Student Poster Competition
13:00 – 14:15

Conceptual Design of a Spherical Underwater Vehicle Equipped with Vertically Rotatable Thruster Units
Jason Kim - Pohang University of Science and Technology (POSTECH), South Korea
Taesik Kim - Pohang University of Science and Technology (POSTECH), South Korea
Son-Cheol Yu - Pohang University of Science and Technology (POSTECH), South Korea

Design of an AUV System Based on Wireless Mesh Network for Data Collection in the Water Column
Zongtong Luo - School of Naval Architecture and Ocean Engineering, Huazhong University of Science and Technology, China
Yan Liu - Shenzhen Huazhong University of Science and Technology Research Institute, China
Xianbo Xiang - Hubei Key Laboratory of Naval Architecture and Ocean Engineering Hydrodynamics (HUST), China

Low Cost Structural Morphing AUV for Long-term Water Column Exploration and Data-harvesting
Tsz Ho SZE - City University of Hong Kong, China
S. H. Yi - City University of Hong Kong, China
J. Lu - City University of Hong Kong, China

Momonga-like AUV –AUV with a variable wing
Kenichi Fujita - The University of Tokyo, Japan
Toshiro Maki - The University of Tokyo, Japan

Balloon AUV: Seawater Sampling AUV Using Active Buoyancy Control
Minsung Sung - Pohang University of Science and Technology (POSTECH), South Korea
Son-Cheol Yu - Pohang University of Science and Technology (POSTECH), South Korea

Robotic Buoy and Small AUV System with Laser Positioning System and Real-time Fluorometer
Juhwan Kim - Pohang University of Science and Technology (POSTECH), South Korea
Son-Cheol Yu - Pohang University of Science and Technology (POSTECH), South Korea

Littoral Magnetic and Water Column Survey Underwater Glider
Brian Page - Michigan Technological University, USA
John Naglak - Michigan Technological University, USA
Matthew Sietsema - Michigan Technological University, USA
Nina Mahmoudian - Michigan Technological University, USA

Design of a Buoyancy Controllable AUV by changing volume for data collection in the water column
Taesik Kim - Pohang University of Science and Technology (POSTECH), South Korea
Jason Kim - Pohang University of Science and Technology (POSTECH), South Korea
Son-Cheol Yu - Pohang University of Science and Technology (POSTECH), South Korea

Single Thruster AUV for Collecting Water Column Data in Shallow Water Using Buoyancy System
Meungsuk Lee - Pohang University of Science and Technology (POSTECH), South Korea
Son-Cheol Yu - Pohang University of Science and Technology (POSTECH), South Korea

Attitude Control of AUV using Multiple Buoyancy Engines for Exploration and Water Column Profiling
Song Seokyong - Pohang University of Science and Technology (POSTECH), South Korea
Taesik Kim - Pohang University of Science and Technology (POSTECH), South Korea
Minsung Sung - Pohang University of Science and Technology (POSTECH), South Korea
Son-Cheol Yu - Pohang University of Science and Technology (POSTECH), South Korea

Session 11
Applications / Mapping
14:15 – 16:15

Chair
Brett Hobson
Monterey Bay Aquarium Research Institute

Co-chair
José Pinto
LSTS, Porto University

AUV Abyss workflow: autonomous deep sea exploration for ocean research
Meike Klischies - GEOMAR - Helmholtz-Center for Ocean Research Kiel, Germany
Marcel Rothenbeck - GEOMAR - Helmholtz-Center for Ocean Research Kiel, Germany
Anja Steinführer - GEOMAR - Helmholtz-Center for Ocean Research Kiel, Germany
Isobel A. Yeo - Marine Geoscience National Oceanography Center, UK
Christian dos Santos Ferreira - MARUM, University of Bremen, Germany
Jochen Mohrmann - GEOMAR - Helmholtz-Center for Ocean Research Kiel, Germany
Claas Faber - GEOMAR - Helmholtz-Center for Ocean Research Kiel, Germany
Carsten Schirnick - GEOMAR - Helmholtz-Center for Ocean Research Kiel, Germany

Geotechnical Surveys with Cooperative Autonomous Marine Vehicles: the EC WiMust project
Giovanni Indiveri - ISME node @ Dip. Ing. Innovazione Unisalento, Lecce, Italy
The WiMUST Team an EU - H2020 Project

Towards Multi Session Visual SLAM in Underwater Environments Colonized with Posidonia Oceanica
Francisco Bonin Font - University of the Balearic Islands, Spain
Antoni Burguera Burguera - University of the Balearic Islands, Spain

Automatic Habitat Mapping using Convolutional Neural Networks
André Diegues - LSTS, Faculty of Engineering, University of Porto, Portugal
José Pinto - LSTS, Faculty of Engineering, University of Porto, Portugal
Pedro Ribeiro - CRACS/INESC TEC, Faculty of Sciences, University of Porto, Portugal

Sparse Gaussian Process SLAM, Storage and Filtering for AUV Multibeam Bathymetry
Nils Bore - KTH Royal Institute of Technology Stockholm, Sweden
Ignacio Torroba - KTH Royal Institute of Technology Stockholm, Sweden
John Folkesson - KTH Royal Institute of Technology Stockholm, Sweden

Recognition of Cold-Water Corals in Synthetic Aperture Sonar Imagery
Øystein Sture - Norwegian University of Science and Technology (NTNU), Norway
Martin Ludvigsen - Norwegian University of Science and Technology (NTNU), Norway
Margrete S. Scheide - Norwegian University of Science and Technology (NTNU), Norway
Terje Thorsnes - Geological Survey of Norway (NGU), Norway

Online 3D Underwater Exploration and Coverage
Eduard Vidal - Universitat de Girona, Spain
Narcís Palomeras - Universitat de Girona, Spain
Marc Carreras - Universitat de Girona, Spain

Analysis of Uncertainty in Laser-Scanned Bathymetric Maps
Michael Leat - University of Southampton, UK
Adrian Bodenmann - University of Southampton, UK
Miquel Massot-Campos - University of Southampton, UK
Blair Thornton - University of Southampton, UK

16:15 – 16:45 Coffee - Break

Session 12
Planning II
16:45 – 18:15

Chair
Maria Costa
LSTS University of Porto

Co-chair
Øystein Sture
Norwegian University of Science and Technology

On-line AUV Survey Planning for Finding Safe Vessel Paths through Hazardous Environments
Chris Denniston - University of Southern California, USA
Thomas R. Krogstad - Norwegian Defence Research Establishment (FFI), Norway
Stephanie Kemna - University of Southern California, USA
Gaurav S. Sukhatme - University of Southern California, USA

Cooperative path-following of autonomous marine vehicles: theory and experiments
Francisco Rego - Larsys/ISR, Portugal
N. T. Hung - ISR, Portugal
A. M. Pascoal - ISR, Portugal

Optimal Control Framework for AUV's Motion Planning in Planar Vortices Vector Field
Fernando Lobo Pereira - Faculty of Engineering, University of Porto, Portugal
Teresa Grilo - CMUP, Faculty of Sciences, University of Porto, Portugal
Sílvio Gama - CMUP, Faculty of Sciences, University of Porto, Portugal

Path Planning for Bathymetry-aided Underwater Navigation
Gao Rui - ARL, National University of Singapore, Singapore
Mandar Chitre - ARL, National University of Singapore, Singapore

Feedback-Based Informative AUV Planning from Kriging Errors
Ryan N. Smith - Fort Lewis College, USA
Gregory Murad Reis - School of Computing and Information Sciences, Florida International University, USA
Tauhidul Alam - Department of Mathematics, Computer and Information Science, SUNY Old Westbury, USA
Leonardo Bobadilla - School of Computing and Information Sciences, Florida International University, USA

Active planning of AUVs for 3D reconstruction of underwater object using imaging sonar
Byeongjin Kim - Pohang University of Science and Technology (POSTECH), South Korea
Jason Kim - Pohang University of Science and Technology (POSTECH), South Korea
Meungsuk Lee - Pohang University of Science and Technology (POSTECH), South Korea
Minsung Sung - Pohang University of Science and Technology (POSTECH), South Korea
Son-Cheol Yu - Pohang University of Science and Technology (POSTECH), South Korea

Mission planner for multiple AUVs Verification procedures combining simulations and experiments
Ingrid Schjølberg - Norwegian University of Science and Technology (NTNU), Norway
Stephanie Buadu - Norwegian University of Science and Technology (NTNU), Norway
Tore Mo-Bjørkelund - Norwegian University of Science and Technology (NTNU), Norway

Awards / AUV2020
18:15 – 18:30

Chair
Hanumant Singh
Northeastern University

Co-chair
Hayato Kondo
University of Tokyo

Awards

Chair
Neil Bose
Memorial University

AUV2020

19:45 – 22:00 Banquet

November 9th, Friday

Session 13
Localization / Navigation II
08:30 – 10:30

Chair
Ivan Stenius
Royal Institute of Technology

Co-chair
Ingrid Schjølberg
Norwegian University of Science and Technology

Submap based Normal Distribution Transform Scan Matching by using Heterogenous Sonars for AUV Navigation
Hangil Joe - Pohang University of Science and Technology (POSTECH), South Korea
Son-Cheol Yu - Pohang University of Science and Technology (POSTECH), South Korea

Navigation and collision avoidance of underwater vehicles using sonar data
Ingrid Schjølberg - Norwegian University of Science and Technology (NTNU), Norway
Ørjan Grefstad - Norwegian University of Science and Technology (NTNU), Norway

A Forward-Looking Sonar-Based System for Underwater Mosaicing and Acoustic Odometry
Matteo Franchi - University of Florence, Italy
Alessandro Ridolfi- University of Florence, Italy
Leonardo Zacchini - University of Florence, Italy

Sonar Based SLAM Navigation in Flooded Confined Spaces with the IMOTUS Hovering AUV
Dr. Serdar Soylu - Cellula Robotics Ltd., Canada
Peter Hampton - Cellula Robotics Ltd., Canada
Tristan Crees - Cellula Robotics Ltd., Canada
Adrian Woodroffe - Cellula Robotics Ltd., Canada
Eric Jackson - Cellula Robotics Ltd., Canada

Doppler Velocity Log Placement Effects on Autonomous Underwater Vehicle Navigation Accuracy
Chris D. Monaco - Pennsylvania State University, USA
Sean N. Brennan - Pennsylvania State University, USA
Kurt A. Hacker - Pennsylvania State University, USA

An AUV Navigation System Using an Adaptive Error State Kalman Filter Based on Variational Bayesiant
António Pedro Aguiar - Faculty of Engineering, University of Porto, Portugal
Narjes Davari - Faculty of Engineering, University of Porto, Portugal
Joao Borges de Sousa - Faculty of Engineering, University of Porto, Portugal

Real Time Autonomous Maritime Navigation using Dynamic Visibility Graphs
Dimitris Zissis - University of the Aegean-MarineTraffic, Greece
Elias Xidias - University of the Aegean-MarineTraffic, Greece

Development of Error Reduction Model using Bayesian Filter for AUV Navigating Under Moving Ice
Peter King - University of Tasmania, Australia
Jimin Hwang - University of Tasmania, Australia
Shuangshuang Fan - University of Tasmania, Australia
Alexander Forrest - University of California, USA

10:30 – 11:00 Coffee - Break

Session 14

Applications II

11:00 – 13:00

Chair
Philip McGillivary
United States Coast Guard

Co-chair
Philip Cooksey
Carnegie Mellon University

Learning of Multi-Context Models for Autonomous Underwater Vehicles

Bilal Wehbe - DFKI - Robotic Innovation Center, Germany
Octavio Arriaga - DFKI - Robotic Innovation Center, Germany
Mario Michael Krell - Robotics Research Group, University of Bremen, Germany
Frank Kirchner - DFKI - Robotic Innovation Center, Germany

Field results from point to point real-time underwater acoustic tracking using a simple mathematical filter

Brent Jones - Monterey Bay Aquarium Research Institute, USA
Francisco P Chavez - Monterey Bay Aquarium Research Institute, USA
Brian Kieft - Monterey Bay Aquarium Research Institute, USA
Thomas C O'Reilly - Monterey Bay Aquarium Research Institute, USA
Christopher Wahl - Monterey Bay Aquarium Research Institute, USA

Detection, Localization And Classification Of Fish And Fish Species In Poor Conditions Using Convolutional Neural Networks

Jesper Christensen - ATLAS MARIDAN ApS, Denmark
Lars Valdemar Mogensen - ATLAS MARIDAN ApS, Denmark
Roberto Galeazzi - Technical University of Denmark, Denmark
Jens Christian Andersen - Technical University of Denmark, Denmark

Observer/AMAR G4 Passive Acoustic Monitoring System for Autonomous Maritime Observation

John Moloney - JASCO Applied Sciences (Canada) Ltd, Canada
Art Cole - JASCO Applied Sciences (Canada) Ltd, Canada
Craig Hillis - JASCO Applied Sciences (Canada) Ltd, Canada
Katie Kowarski - JASCO Applied Sciences (Canada) Ltd, Canada
Blair MacDonald - JASCO Applied Sciences (Canada) Ltd, Canada
Trent Johnson - JASCO Applied Sciences (Canada) Ltd, Canada

Meeting The Challenges Of Port & Harbor Security Involving Unmanned Systems: Threat Detection And Response

Dr. Phil McGillivary - US Coast Guard Pacific Area, USA

Informed Sampling and Adaptive Monitoring using Sparse Gaussian Processes

Mandar Chitre - Acoustic Research Laboratory, NUS, Singapore
Rajat Mishra - Faculty of Engineering, NUS, Singapore
Sanjay Swarup - Faculty of Engineering, NUS, Singapore

Development of Smart Networks and AI Based Navigation for dynamic underwater environments

Alexander Phillips - National Oceanography Centre, UK
Davide Fenucci - National Oceanography Centre, UK
Andrea Munafò - National Oceanography Centre, UK
Jeffrey Neasham - Newcastle University School of Engineering UK
Naomi Gold - National Oceanography Centre, UK
Jeremy Sitbon - ecoSUB robotics Ltd, UK
Iain Vincent - ecoSUB robotics Ltd, UK
Terry Sloane - ecoSUB robotics Ltd, UK

Integration and Evaluation of a Next-Generation Chirp-Style Sidescan Sonar on the REMUS 100

Eric Gallimore - Scripps Institution of Oceanography, USA
Eric Terrill - Scripps Institution of Oceanography, USA
Robert Hess - Scripps Institution of Oceanography, USA
Andrew Nager - Scripps Institution of Oceanography, USA
Heidi Bachelor - Scripps Institution of Oceanography, USA
Andrew Pietruszka - Scripps Institution of Oceanography, USA

Lunch 13:00 – 14:00	Chair **Hayato Kondo** University of Tokyo	Co-chair **Hanumant Singh** Northeastern University
	The future of IEEE OES AUV Symposiums	