

Tuesday, November 6th

08:30 – 09:15	Registration
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<p>Opening 09:15 – 09:30</p>	<p>Prof. João Borges de Sousa LSTS, Faculty of Engineering, University of Porto, Portugal</p> <p>Prof. Falcão e Cunha Director of the Faculty of Engineering, University of Porto, Portugal</p> <p>Prof. Fátima Vieira Vice-rector, University of Porto, Portugal</p>
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<p>Session 1 Software 09:30 – 10:30</p>	<p>Chair Harumi Sugimatsu University of Tokyo</p>	<p>Co-chair Neil Bose Memorial University</p>
	<p>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</p> <p>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</p> <p>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</p> <p>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</p>	

10:30 – 11:00	Coffee - Break
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Session 2
**Extreme
environments**
11:00 – 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 Sørdsdal 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 Wählin - 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 Braunschweig, Germany
Ulf Bestmann - Institute of Flight Guidance, University of Braunschweig, 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 Hernandez-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
Christopher 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

<p>Session 3 Vehicles I 14:15 – 16:15</p>	<p>Chair Daniel Alcaraz Plocan</p>	<p>Co-chair Ralf Bachmayer Marum - University of Bremen</p>
	<p>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</p> <p>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 Sokolovskiy - EvoLogics GmbH, Germany Oleksiy Kebkal - EvoLogics GmbH, Germany Rudolf Bannasch - EvoLogics GmbH, Germany Konstantin Kebkal - EvoLogics GmbH, Germany</p> <p>Issues in Marine Vehicle Design: A Needs Based Analysis Hanumant Singh - Northeastern University, USA Vikrant Shah - Northeastern University, USA</p> <p>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</p> <p>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</p> <p>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</p> <p>Hydrobotics: 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</p> <p>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</p>	

<p>16:15 – 16:45</p>	<p>Coffee - Break</p>
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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 University, USA Brian R. Page - Michigan Technological University, USA Bingxi Li - Michigan Technological University, USA John Naglak - Michigan Technological University, USA Caleb Kase - Michigan Technological University, USA Barzin Moridian - Michigan Technological University, 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
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Wednesday, November 7th

<p>Session 5 Multi-vehicle 08:30 – 10:30</p>	<p>Chair Mandar Chitre National University of Singapore</p>	<p>Co-chair P. B. Sujit IIITD</p>
	<p>A Natural Language Interface and Relayed Acoustic Communications for Improved Command and Control of AUVs</p> <p>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</p> <p>A Framework for Modeling Underwater Vehicles in Modelica</p> <p>Shashank Swaminathan - Franklin W. Olin College of Engineering, USA Srikanth Saripalli - Texas A&M University, USA</p> <p>Effective Team Coordination through Intra-Robot Replanning to Restore Team Plan Rationale</p> <p>Philip Cooksey - Carnegie Mellon University, USA Manuela Veloso - Carnegie Mellon University, USA</p> <p>Cooperative Motion Planning with Time, Energy, and Active Navigation Constraints</p> <p>Bahareh Sabetghadam - Instituto Superior Técnico, Portugal Rita Cunha - Instituto Superior Técnico, Portugal António Pascoal - Instituto Superior Técnico, Portugal</p> <p>A Low-cost Mobile Infrastructure for Multi-AUV Networking</p> <p>Nina Mahmoudian - Michigan Technological University, USA Barzin Moridian - Michigan Technological University, USA Li Wei - Michigan Technological University, USA John Hoffman - Michigan Technological University, USA Wensheng Sun - Michigan Technological University, USA Brian Page - Michigan Technological University, USA Matthew Sietsema - Michigan Technological University, USA Yi Zhang - Michigan Technological University, USA Zhaohui Wang - Michigan Technological University, USA</p> <p>Making Swarming Manageable</p> <p>Tyler MacCready - Apium, Inc., USA Joy Shapiro - Apium, Inc., USA</p> <p>Attainable-Set Model Predictive Control for AUV Formation Control</p> <p>Rui Gomes - Faculty of Engineering, University of Porto, Portugal Fernando Lobo Pereira - Faculty of Engineering, University of Porto, Portugal</p> <p>Expanded Underwater Robotics ready for Oil Spills (eURready4OS)</p> <p>Javier Gilabert - Politechnic University of Cartagena, Spain</p>	

10:30 – 11:00	Coffee - Break
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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 Skarpmes - 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 Chekaluyk - 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
 11:00 – 12:45

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 Ridaó Rodríguez - University of Girona, Spain
Patrik 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 Compiègne, 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

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 Mamani - 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
14:00 – 15:45

<p>Session 7 Vehicles II (contin.) 14:00 – 15:45</p>	<p>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</p> <p>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</p>
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15:45 – 16:30	Coffee - Break
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<p>Session 8 Localization / Navigation I 16:30 – 17:45</p>	<p>Chair Alexander Phillips National Oceanography Center</p>	<p>Co-chair Praveen Jain LSTS, Porto University</p>
	<p>Underwater Localization using Probabilistic Sonar Registration and Pose Graph Optimization Antoni Burguera - Universitat de les Illes Balears, Spain</p> <p>CAMELOT - Localization Beacon System Marin Stipanov - NATO STO-CMRE, Italy Stefano Fioravanti - NATO STO-CMRE, Italy</p> <p>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</p> <p>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</p> <p>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</p>	

<p>SOI presentation 17:50 – 18:10</p>	<p>Chair João Sousa LSTS, Porto University</p>
	<p>Oceanographic collaborations with Schmidt Ocean Institute Victor Zykov</p>

Thursday, November 8th

<p>Session 9 Control 08:30 – 10:15</p>	<p>Chair Fernando Pereira Systec, University of Porto</p>	<p>Co-chair Michael Jakuba Woods Hole Oceanographic Institution</p>
	<p>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</p> <p>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</p> <p>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</p> <p>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</p> <p>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</p> <p>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</p> <p>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</p>	

<p>Plenary Session II 10:15 – 11:00</p>	<p>Chair Brian Kieft Monterey Bay Aquarium Research Institute</p>
	<p>Multi-platform Ocean Observation from Events to Climate: Challenges and Opportunities Dr. Joaquín Tintoré, Socib</p>

<p>11:00 – 11:30</p>	<p>Coffee - Break</p>
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Session 10
Applications I
11:30 – 13:00

Chair

Carl Kaiser

Wood Hole Oceanographic Institution

Co-chair

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 Seokyoung - 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

<p>Session 12 Planning II 16:45 – 18:15</p>	<p>Chair Maria Costa LSTS University of Porto</p>	<p>Co-chair Øystein Sture Norwegian University of Science and Technology</p>
	<p>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</p>	
	<p>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</p>	
	<p>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 Silvio Gama - CMUP, Faculty of Sciences, University of Porto, Portugal</p>	
	<p>Path Planning for Bathymetry-aided Underwater Navigation Gao Rui - ARL, National University of Singapore, Singapore Mandar Chitre - ARL, National University of Singapore, Singapore</p>	
	<p>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</p>	
<p>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</p>		
<p>Mission planner for multiple AUVs Verification procedures combining simulations and experiments Ingrid Schjøberg - 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</p>		

<p>Awards / AUV2020 18:15 – 18:30</p>	<p>Chair Hanumant Singh Northeastern University</p>	<p>Co-chair Hayato Kondo University of Tokyo</p>
	<p>Awards</p>	
	<p>Chair Neil Bose Memorial University</p>	<p>AUV2020</p>

<p>19:45 – 22:00</p>	<p>Banquet</p>
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Friday, November 9th

<p>Session 13 Localization / Navigation II 08:30 – 10:30</p>	<p>Chair Ivan Stenius Royal Institute of Technology</p>	<p>Co-chair Ingrid Schjøberg Norwegian University of Science and Technology</p>
	<p>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</p> <p>Navigation and collision avoidance of underwater vehicles using sonar data Ingrid Schjøberg - Norwegian University of Science and Technology (NTNU), Norway Ørjan Grefstad - Norwegian University of Science and Technology (NTNU), Norway</p> <p>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</p> <p>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</p> <p>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</p> <p>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</p> <p>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</p> <p>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</p>	

10:30 – 11:00	Coffee - Break
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Session 14
Applications II
11:00 – 13:00

Chair
Philip McGillivray
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 McGillivray - 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

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

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