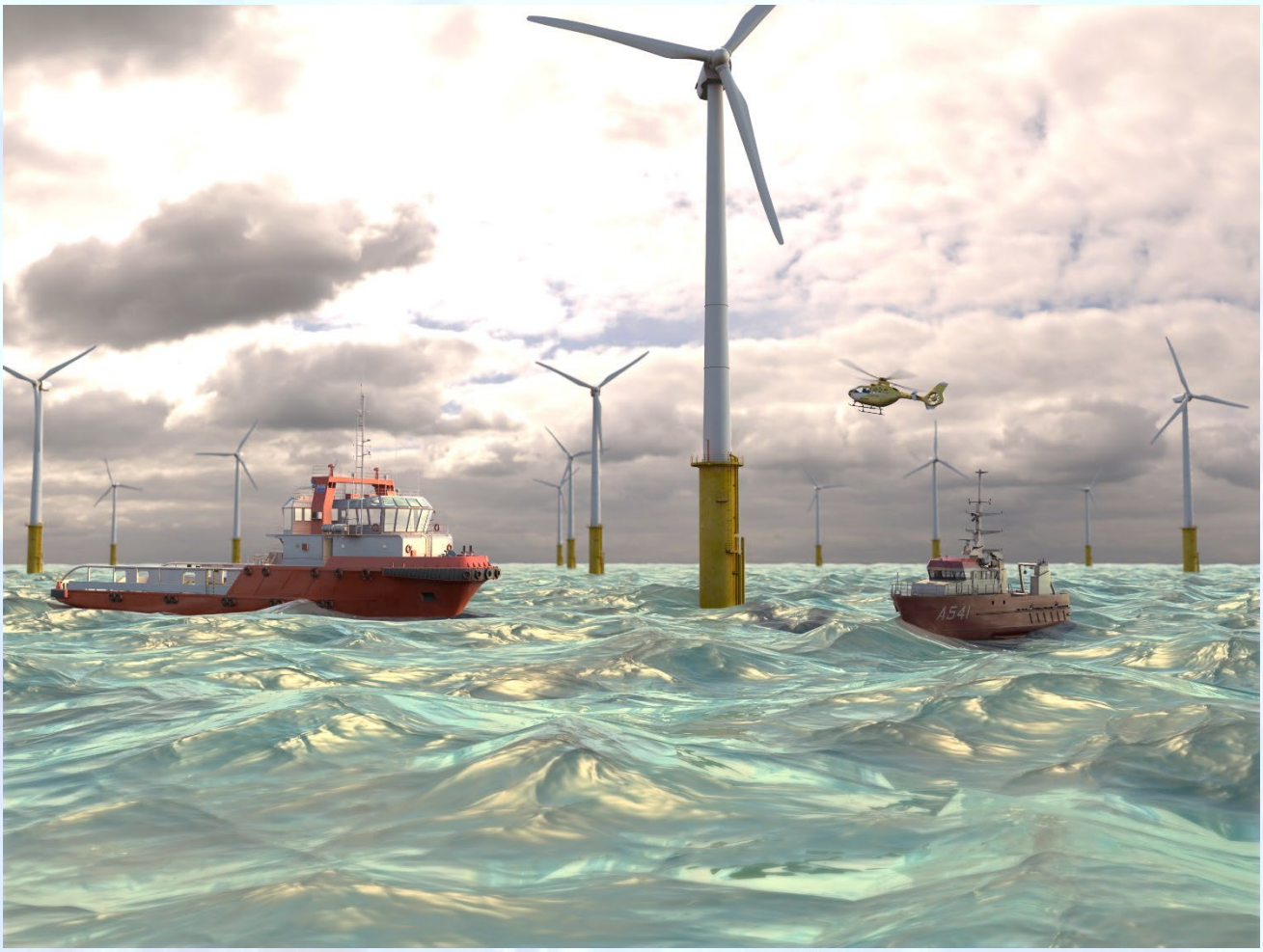
Fifth Conference of Computational Methods
&
Ocean Technology

(COTech 2026)

November 26 – 27, 2026, University of Stavanger, Norway

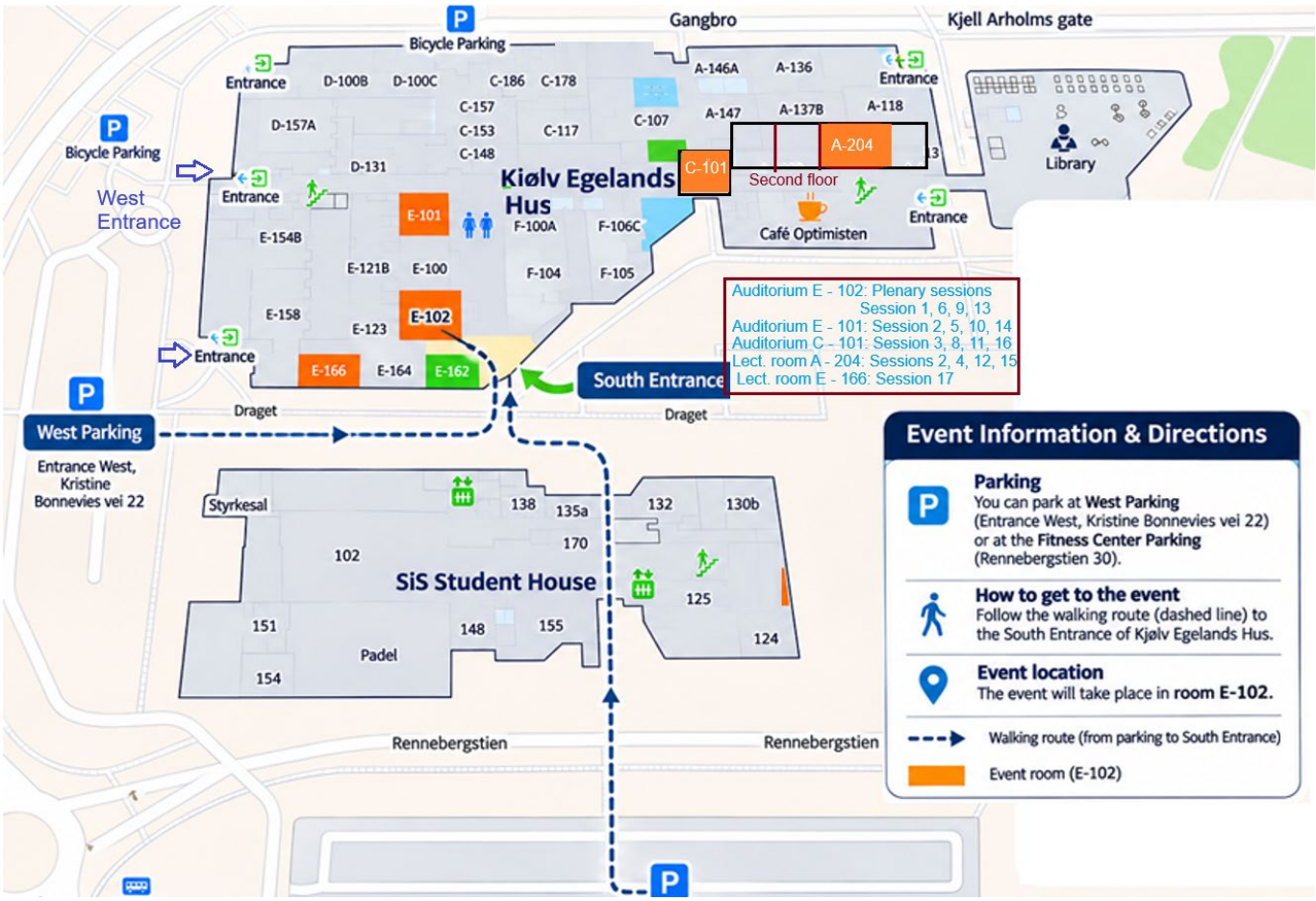


Final Conference Program

Department of Mechanical and Structural Engineering
and Materials Science,
University of Stavanger

University
of Stavanger





Venue

The conference is organized at University of Stavanger

Address:

Kjølv Egelands hus, Aud. E-102 (see map)

Entrance West and South, Kristine Bonnevies vei



COTech 2026 Conference Program

November 26 - 27, 2026
University of Stavanger, Norway

Program at Glance		
Date	**Time**	**Events**
Day 1 Nov. 26	08:30 – 09:00	Registration
	09:00 – 09:30	**Conference opening**
	09:30 – 10:10	**Keynote 1: Professor Jonas W Ringsberg**
	10:10 – 10:50	**Keynote 2: Professor Mohsen Asadi**
	10:50 – 11:20	Coffee break and group photo program
	11:20 – 12:40	FOUR Parallel Sessions (T1-1, T2-1, T4-1, T7-1)
	12:40 – 14:00	Lunch break
	14:00 – 14:40	**Keynote 3: Professor Palani I Anand**
	14:40 – 15:20	**Keynote 4: Professor Frederik Claeyssens**
	15:20 – 15:50	Coffee break
	15:50 – 17:20	FOUR Parallel Sessions (T2-2, T5-1, T6-1, T8-1)
	17:30 – 17:50	Transport to Stavanger Oil Museum
	18:00 – 21:30	Visiting Stavanger Oil Museum and conference dinner
Day 2 Nov. 27	08:30 – 09:00	Registration
	09:00 – 09:40	**Keynote 5: Professor Shun-Peng Zhu**
	09:40 – 11:00	FOUR Parallel Sessions (T3-1, T4-2, T5-2, T9-1)
	11:00 – 11:20	Coffee break
	11:20 – 12:40	FIVE Parallel Sessions (T2-3, T3-2, T4-3, T5-3, T9-2)
	12:40 – 14:00	Lunch break
	14:00 – 14:30	**Award Ceremony and Conference Closing**

Time allocation for presentations:
Keynote speakers: max. **40 min**; Each article in sessions: max. **15 min** excl. Q & A.

T1: *Wind Engineering and Industrial Aerodynamics*
T2: *Advanced Computational Methods & Applications in Marine, Subsea and Offshore Technology*
T3: *Fatigue, Corrosion and Structural Integrity of Engineering Structures and Mechanical Systems*
T4: *Smart Operations and Maintenance*
T5: *Design Optimization and Additive Manufacturing Technologies*
T6: *Advanced Manufacturing Systems*
T7: *Smart Energy Storage, Integration and Utilization*
T8: *Computational Intelligence for Power Systems*
T9: *Sustainable Ocean Structures*





Preface

COTech (Computational Methods & Ocean Technology) Conference originated as part of the research and dissemination activities of the Program Area for Research, "COTech - Computational Methods in Offshore Technology," at the Faculty of Science and Technology, University of Stavanger (UiS). The first conference was held in 2017. The research program itself was established in 2015 and initially comprised seven professors, four associate professors, two adjunct professors, and five PhD candidates from the Department of Mechanical and Structural Engineering and Materials Science (IMBM).

The program intended to bring together expertise in computational methods, including finite element methods (FEM), boundary and volume element methods, computational fluid dynamics (CFD), multibody dynamics simulation and related numerical techniques. These competencies are nowadays applied across a broad spectrum of fields, including marine and subsea technology, marine operations, mechanical system design and analysis, structural integrity and reliability of offshore structures, renewable energy, and wind engineering. In ocean-related engineering, numerical computation has evolved beyond a tool for exploring and realizing innovative concepts; it has become a primary approach for addressing complex engineering challenges associated with harsh and demanding offshore and Arctic environments.

The first COTech Conference focused on five thematic areas: (1) Wind Engineering, (2) CFD in Subsea and Marine Technology, (3) Marine Operations in Cold Climates, (4) Finite Element Analysis and Simulation-Driven Design Optimization, and (5) Structural Integrity and Health Monitoring of Structures. As a multidisciplinary forum for research dissemination, the 5th COTech Conference has continued to expand its scope by incorporating emerging technologies and applications, including smart operations and maintenance, smart energy storage systems, machine learning techniques, additive manufacturing, advanced manufacturing systems, computational intelligence for power systems, and sustainable ocean structures.

In general, the conference aims to provide a platform for academics, researchers, and industry professionals working in computational methods, artificial intelligence applications, and ocean/offshore technologies to present their latest research findings, exchange knowledge and ideas, and establish professional collaborations. It serves as a multidisciplinary forum for the dissemination of research outcomes and the sharing of experiences across a wide range of scientific and engineering disciplines.

The 5th COTech Conference is organized around nine thematic areas, which also serve as the conference tracks.

1. *Wind Engineering and Industrial Aerodynamics*
2. *Advanced Computational Methods & Applications in Marine, Subsea and Offshore Technology*
3. *Fatigue, Corrosion and Structural Integrity of Engineering Structures and Mechanical Systems*
4. *Smart Operations and Maintenance*
5. *Design Optimization, Additive Manufacturing Technologies & applications*
6. *Advanced Manufacturing Systems*
7. *Smart Energy Storage, Integration and Utilization*
8. *Computational Intelligence for Power Systems*
9. *Sustainable Ocean Structures*

Among the submitted manuscripts, 72 full papers successfully passed the review process. The reviews were conducted in accordance with the review policy of the IOP Conference Series, whereby each manuscript was evaluated by at least two independent reviewers, including both national and



international experts. In addition, five distinguished experts from different countries were invited to deliver keynote presentations in their respective fields of expertise.

The Conference Committee and the Editors of these proceedings would like to express their sincere gratitude to all reviewers and authors for their valuable contributions to the 5th COTech Conference. Their dedication and efforts have been instrumental in ensuring the high quality of the conference and its proceedings.

The organizers also gratefully acknowledge the financial support provided by Stavanger Municipality, as well as the financial and facility support from the Department of Mechanical and Structural Engineering and Materials Science, University of Stavanger. Finally, the Conference Committee wishes to extend its appreciation to the TN Research Support Team, particularly Mrs. Vanessa Grace Ochon Booc and Mr. Bjørn Rejkestam Jørgensen, for their invaluable administrative support and assistance in the successful organization of the conference.

Conference Organizing Committee

Prof. Hirpa G. Lemu
Prof. Dimitrios Pavlou
Prof. Muk Chen Ong
Prof. Jasna B. Jakobsen
Prof. Sudath C. Siriwardane
Prof. Yihan Xing
Assoc. Prof. Ove Mikkelsen

Volume Editors

Prof. Hirpa G. Lemu
Prof. Andrés García Granada
Prof. Dimitrios Pavlou
Assoc. Prof. Guang Yin
Prof. Hokyung Kim
Assoc. Prof. Idriss El-Thalji
Assoc. Prof. Jian Dai
Prof. Knut Erik Giljarhus
Assoc. Prof. Merkebu Z. Degefa
Assoc. Prof. Min-Ook Kim
Assoc. Prof. Mohammad Mansouri
Prof. Mohsen Assadi
Prof. Shujun Zhang
Prof. Sudath C. Siriwardane
Prof. Tiago J. F. Marques Ferradosa
Prof. Viktor Gribniak
Prof. Yihan Xing
Prof. Yiliu Liu
Assoc. Prof. Yonatan A. Tesfahunegn
Dr. Yosef Wakjira Adugna
Prof. Zhiyu Jiang



Invited Keynote Speakers

Professor Jonas W Ringsberg, Chalmers University of Technology, Sweden.
Professor Palani I Anand, M.E., Ph.D., FIE. Indian Institute of Technology Indore, India
Professor Frederik Claeyssens, University of Sheffield, UK
Professor Mohsen Assadi, University of Stavanger, Norway

Additional Plenary Keynote Speaker

Professor Shun-Peng Zhu, Fellow of Royal Aeronautical Society, Professor in Mechanical Engineering at University of Electronic Science and Technology of China (UESTC), China.

(Title of speech: Fatigue Reliability Analysis of Structures with Low Failure Probability: AI-driven and Challenges)

Technical Committee Members and Reviewers

Name	Affiliation
1. Assoc. Prof. Nirosha Adasooriya	University of Stavanger, Norway
2. Dr. Yosef W Adugna	University of Stavanger, Norway
3. Dr. Ashish Aeran	DNV, Norway
4. PhD Cand. Shoaib Ameer	University of Florence
5. Ms. Ayatte Atteya	Arab Academy for Sci., Techn & Maritime, Egypt
6. Prof. Mohsen Assadi	University of Stavanger, Norway
7. PhD Cand. Jenish Baniya	Oslo Metropolitan University, Norway
8. PhD cand. Temesgen Batu	Norwegian Univ. of Sci. and Tech (NTNU), Norway
9. PhD Cand. Kasra Saberi Beglar	University of Stavanger, Norway
10. Prof. Asfaw Beyene	San Diego State University, California, USA
11. Mr. Makafui K. Botsoe	University of Stavanger, Norway
12. Assoc. Prof. Etienne Cheynet	University of Bergen, Norway
13. Assoc. Merkebu Zenebe Degefa	University of Stavanger, Norway
14. Dr. Leon-Carlos Dempwolff	Norwegian Univ. of Sci. and Tech (NTNU), Norway
15. Dr. Naol D Dejene	Pusan National University, Busan, South Korea
16. Dame Alemayehu Efa	Wallaga University, Ethiopia
17. Assoc. Prof. Idris El- Thalji	University of Stavanger, Norway
18. Prof. Paolo Gargiulo	Reykjavik University, Iceland
19. Prof. Andrés-Amadir García-Granada	IQS School of Engineering, Spain
20. Prof. Knut Erik Giljarhus	University of Stavanger, Norway
21. Prof. Magnús Kjartan Gíslason	Reykjavik University, Iceland
22. Dr. Mahesh Gopal	Wallaga University, Ethiopia
23. Prof. Viktor Gribniak	Vilnius Gediminas Technical University, Lithuania
24. Assoc. Prof Endalkachew M. Gutema	Wallaga University, Ethiopia
25. Dr. Bonsa Regassa Hunde	Shagar Institute of Technology, Ethiopia
26. Dr. Fredrik Skaug Fadnes	Norconsult AS, Norway
27. Prof. Tiago Fazeres-Ferradosa	University of Porto, Portugal



28.	Dr. Amin Hajizadeh	Aalborg University, Denmark
29.	Prof. Lars Erik Holmedal	Norwegian Univ. of Sci. and Tech (NTNU), Norway
30.	Ass. Prof. Rania Ibrahim	Arab Academy for Science, Techn. & Maritime, Egypt
31.	Dr. Dmytro Ivanko	NORCE Research AS, Norway
32.	Prof. Jasna B. Jakobsen	University of Stavanger, Norway
33.	Prof. Zhiyu Jiang	University of Agder, Norway
34.	Prof. Emeritus Halldór Jónsson	Reykjavik University, Iceland
35.	Dr. Kilje Jung	Hyundai Engineering & Construction, South Korea
36.	Dr. Ali Karimi	University of Stavanger, Norway
37.	Prof. Arvind Keprate	Oslo Metropolitan University, Norway
38.	Prof. Soomin Kim	Seoul National University, Soth Korea
39.	Dr. Ibuki Kusano	IQS Ramon Llull University, Spain
40.	Dr. Elyas Larkermani	Norwegian Univ. of Sci. and Tech (NTNU), Norway
41.	Prof. Yiliu Liu	Norwegian Univ. of Sci. and Tech (NTNU), Norway
42.	Prof. Jayantha P Liyanage	University of Stavanger, Norway
43.	Assoc. Prof. Mohammad Mansouri	University of Stavanger, Norway
44.	Dr. Joaquin Menacho	IQS Ramon Llull University, Spain
45.	Prof. Dimitrios Pavlou	University of Stavanger, Norway
46.	Dr. Kristen Rege	Subsea 7 AS, Norway
47.	Prof. Amir Safari	University of South-Eastern Norway
48.	Assoc. Prof. Yanyan Sha	University of Stavanger, Norway
49.	Prof. Sudath Siriwardane	University of Stavanger, Norway
50.	Dr. Ahmet Soydan	Norwegian Univ. of Sci. and Tech (NTNU), Norway
51.	Prof. Dan Sui	University of Stavanger, Norway
52.	Dr. Jian Tan	Delft University of Technology, The Netherlands
53.	Ass. Prof. Tesfaye Olana Terefe	Adama Science and Technology University, Ethiopia
54.	Assoc. Prof. Yonatan A Tesfahunegn	Reykjavik University, Iceland
55.	Assoc. Prof. Mesay A. Tolcha	Jimma University, Ethiopia
56.	Prof. Ali Turkyilmaz	University of Stavanger, Norway
57.	Prof. Ling Wan	Ningbo University, China
58.	Dr. A.H. Samitha Weerakoon	University of Stavanger, Norway
59.	Prof. Abimbola Windapo	Cape Town University, South Africa
60.	Dr. Tekalign L Woldesillasa	Ambo University, Ethiopia
61.	Assoc. Prof. Baiheng WU	Western Norway Univ. of Applied Sciences, Norway
62.	Dr. Xu Xiang	Norwegian Public Roads Administration, Norway
63.	Prof. Yihan Xing	University of Stavanger, Norway
64.	Dr. Guang Yin	University of Stavanger, Norway
65.	Prof. Shujun Zhang	Western Norway Univ. of Applied Sciences, Norway
66.	Prof. Wenzhe Zhang	Universidad Politecnica de Madrid, Spain



Main Conference Program, November 26 - 27, 2026	
DAY 1	**Thursday, November26, 2026**
08:30 - 09:00 *Location*	Registration *In front of Auditorium E-102*
09:00 – 09:30	**Opening Ceremony** *Auditorium KE E-102* Welcome: Prof. Hirpa G. Lemu, Chairman of Conf. Organizing Committee Professor Marte Cecilie Wilhelmsen Solheim Vice-Rector for Innovation and Society, University of Stavanger
09:30 – 10:10 *Chair:* *Location*	**Keynote Speech 1** ***Professor Muk Chen Ong,*** *University of Stavanger, Norway* *Auditorium KE E-102*
Keynote speaker	***Professor Jonas W Ringsberg****,* Department of Mechanical Engineering, Division of Marine Technology, Chalmers University of Technology, Sweden. **Keynote title:** UN's decade of ocean science: challenges in sustainable shipping, the Arctic case
10:10 – 10:50 Chair	**Keynote Speech 2:** ***Professor Jasna B. Jakobsen,*** University of Stavanger, Norway
Keynote speaker	***Professor Mohsen Assadi,*** Department of Energy and Petroleum Technology, University of Stavanger **Keynote title:** Sustainable Energy and Circular Economy: Challenges and Opportunities
10:50 – 11:20	Coffee break and group photo



Day 1 Keynote Speeches I (E-102)

Chair: Professor Dimitrios Pavlou, University of Stavanger

Keynote 1

UN's decade of ocean science: challenges in sustainable shipping, the Arctic case

Professor Jonas W Ringsberg.
Department of Mechanical Engineering, Division of Marine Technology,
Chalmers University of Technology, Sweden.

Abstract: The United Nations (UN) has designated 2021-2030 as the "Decade of Ocean Science for Sustainable Development", highlighting the critical importance of the oceans for the long-term stability of the Earth system and human society. Today's geopolitical developments in the southern hemisphere are negatively affecting shipping and transportation, and ship fuel consumption is expected to increase due to rerouting. The shipping routes in the Arctic can therefore be important enablers for safe and efficient marine transportation. But there are challenges and concerns about whether the Arctic should be opened for shipping corridors. The presentation has two parts. In the first part, aspects of sustainability and responsibilities regarding Arctic shipping routes are discussed, followed by methods and tools developed for safe maritime operations under extreme conditions referred to as the "Arctic case". Concluding remarks exemplify future research directions needed for sustainable Arctic shipping corridors.

Keynote 2

Sustainable Energy and Circular Economy: Challenges and Opportunities

Professor Mohsen Assadi,
Department of Energy and Petroleum Technology, University of Stavanger, Norway

Abstract: A circular economy aims to minimize waste by keeping materials and resources in use for as long as possible, including reusing materials after the technical lifetime of the equipment in which they were originally used. Sustainability focuses on using resources in ways that do not deplete them, emphasizing practices that maintain environmental, social, and economic balance—such as relying on renewable resources. Although these concepts are often viewed as two sides of the same coin, practical experience shows important differences. For example, the materials used to harness renewable energy—such as those in wind turbines and solar panels—have generated large volumes of waste once the components reach the end of their operational life. Developing countries face especially rapid growth in both energy demand and material consumption. Without innovative manufacturing solutions and efficient material recycling systems, this growth will accelerate resource depletion. Learning from global best practices and accumulated experience is therefore critical. Achieving social development and widespread prosperity requires close collaboration in planning and executing development initiatives at both local and global levels, drawing on proven approaches and lessons learned. Addressing energy poverty—along with ensuring energy security, reliability, and availability—is essential for sustainable development. Access to stable, reliable, and affordable energy is also a prerequisite for adopting new technologies such as AI. At the same time, minimizing resource depletion through circularity remains crucial. Consequently, we are facing significant challenges in simultaneously enabling sustainable development and ensuring efficient resource use.



DAY 1	Thursday, November 26, 2026
11:20 – 12:40	**Four Parallel Sessions**
Session 1:	**Advanced Computational Methods & Applications in Marine, Subsea and Offshore Technology** (T2-1)
Session chairs:	Dr. Jian Tan, Delft University of Technology, The Netherlands Professor Muk Chen Ong, University of Stavanger, Norway
Location:	*E-102*
1	Boundary expansion of spectral-domain modeling approach for marine renewables. *Jian Tan, G Lavidas (Session keynote)*
2	The influence of hydrofoil elastic skin on cavitation *Mariusz Domagala, Hassan Momeni Joanna Fabis-Domagala*
3	Separable physics-informed Neural Networks for modelling flows around a circular cylinder near the Plane Wall. *Peiqing Zhao, Muk Chen Ong, Guang Yin*
4	A physics-guided graph-attention surrogate for farm-scale wake and power prediction trained on three-turbine configurations. *Lichao Xiong, Chern Fong Lee, Muk Chen Ong, Guang Yin*
5	A hybrid CFD-analytical study of surface vessel added resistance in internal solitary waves Shangming Wang
Underlined author names are presenting authors.	
Session 2:	**Wind Engineering and Industrial Aerodynamics** (T1-1)
Session chairs:	Professor Jasna B. Jakobsen, University of Stavanger, Norway Professor Knut Erik Giljarhus, University of Stavanger, Norway
Location:	*E-101*
1	Can dual pulsed scanning Doppler wind lidars measure turbulence coherence? *Etienne Cheynet, Jasna B Jakobsen, Paulius Kavaliauskas, Charlotte Obhrai, J. Reuder*
2	Field measurement of the wind flow downstream of a parabolic trough solar collector array *Yuanchen Wan, Mathilde Bøkevoll, Etienne Cheynet*
3	HAZID and qualitative risk analysis of gangway-based personnel transfers to Offshore wind turbine structures. *Saad Idrees, Ove T. Gudmestad*
4	Evaluation of bridge deck aerodynamic coefficients in a short open-section wind tunnel. *Carl Oscar H. Meyer-Johansen, James R. Bell, Nicolò Daniotti, Jónas Thor Snæbjörnsson, Jasna Bogunovic Jakobsen*
5	Dynamic response of a 15-MW floating wind turbine on semi-submersible, spar, and tension-leg platforms under varying atmospheric stability conditions. *Lennart Vogt, Jasna Bogunović Jakobsen, Jacobus Bernardus de Vaal, Etienne Cheynet, Lin Li*
Underlined author names are assumed presenting authors.	
Session 3:	**Smart Operations and Maintenance (T4-1)**
Session chairs:	Professor Emeritus Ove T. Gudmestad, University of Stavanger, Norway Professor Jayantha P. Liyanage, University of Stavanger, Norway
Location:	*C-101*
1	Trim effects on a ship's resistance and the implications for fuel consumption. *Mahdi E. Kohnaki, Ove T. Gudmestad*
2	Reusable novel energy dissipation concept for bridges and offshore structures *Bjørn-Martin Staavi, Yanyan Sha*
3	Operator-enabled context-sensitive decision process for high-risk offshore drilling operations: Enhancing contextual knowledge, advanced situation awareness, and operational resilience. *Mohammad Bakhshandeh, Jayantha P. Liyanage*



4	A machine learning-enabled digital twin framework for risk-prioritized autonomous underwater vehicle inspection of subsea oil and gas pipeline networks. *Harish Kumar, Endalkachew M Gutema, Naol D. Dejene*
5	The Trust Paradox in Renewable Technology Adoption: Balancing Acceptance and Risk Perception in Offshore Oil and Gas. *Anne Marit Gårseth, Yiliu Liu*
Underlined author names are presenting authors.	
Session 4: Session chairs: *Location:*	**Smart Energy Storage, Integration and Utilization (T7-1)** Professor Mohsen Assadi, University of Stavanger, Norway Assoc. Professor Mohammad Manouri, University of Stavanger, Norway *A-204*
1	Techno-economical analysis of a solar-assisted multi-zone residential heat *Ali Karimi, Amir Safari, Mohammad Mansouri*
2	AI based optimal design of concentrated solar power plant integrated thermal energy storage system in Hurghada, Egypt. *Nahla Hussien, Rania Swief, Rania Ibrahim, Mohsen Assadi, Hady Fayek*
3	Operational evaluation of a dry-cooler-only heat source mode in a hybrid geothermal energy plant. *Fredrik S. Fadnes, Mohsen Assadi*
4	Integrated techno-economic assessment of PV–battery–micro gas turbine microgrids with thermal energy supply and storage pathways, grid support and electricity trading: a case Study. *A.H. Samitha Weerakoon, Mohsen Assadi, R Gholami*
Underlined author names are presenting authors.	
12:40 – 14:00	Lunch break



14:00 – 15:20 Chair Location	**Keynote Speeches II** ***Professor Andrés-Amadir García-Granada*** *IQS School of Engineering, Spain* *Auditorium KE E-102*
14:00 – 14:40	**Keynote 3:** A Sustainable Laser Cleaning Approach for Underwater Biofouling Removal on Ship Hulls ***Professor Palani Iyamperumal Anand,*** *M.E., Ph.D.,FIE* Mechatronics and Instrumentation lab, Department of Mechanical Engineering Indian Institute of Technology Indore, India
14:40 – 15:20	**Keynote 4:** Additive Manufacturing with High Internal phase Emulsion-based Printing Inks ***Professor Frederik Claeyssens*** School of Chemical, Materials and Biological Engineering University of Sheffield, United Kingdom
15:20 – 15:50	Coffee break

Keynote 3

A Sustainable Laser Cleaning Approach for Underwater Biofouling Removal on Ship Hulls

Professor Palani Iyamperumal Anand, M.E., Ph.D.,FIE

Abstract: Biofouling, characterized by the accumulation of microorganisms, algae, and sessile marine organisms such as mussels on submerged surfaces, poses a major challenge in marine environments, particularly on ship hulls and other technical surfaces. This accumulation significantly increases hydrodynamic drag, resulting in higher fuel consumption and elevated CO_2 emissions, thereby imposing considerable economic and environmental burdens on the maritime industry. In this study, an in-situ underwater laser-based cleaning approach was developed for the removal of biofouling from ship hull surfaces. A nanosecond-pulsed Nd:YAG laser was employed at two wavelengths, 532 nm and 1064 nm, and operated at energy levels of approximately 250 mJ and 350 mJ. The treated surfaces were subsequently analyzed to evaluate cleaning efficiency and assess any microstructural modifications induced by laser exposure. Among the tested conditions, irradiation at 532 nm with an energy of 250 mJ demonstrated the most effective performance, achieving uniform removal of algal biofouling without residual deposits. Furthermore, negligible thermal or mechanical damage to the substrate was observed, indicating selective ablation of surface contaminants while preserving the integrity of the hull material. To investigate the durability of the treatment, laser-cleaned samples were re-exposed to the marine environment. Although no macrofouling regrowth was observed for up to seven days, signs of rust formation and algal recolonization were detected. These findings indicate that laser cleaning offers an effective solution for immediate biofouling removal and short-term prevention; however, supplementary surface treatments or protective coatings may be necessary to mitigate microbial recolonization and corrosion over extended periods.



Keynote 4

Additive Manufacturing with High Internal phase Emulsion-based Printing Inks

Professor Frederik Claeyssens

Abstract: Highly porous materials can be readily produced by emulsion templating, and in particular the use of photocurable resins as the continuous phase of a high internal phase emulsion (HIPE) can rapidly yield highly interconnected porous polymers. These polymerised High Internal Phase Emulsions (polyHIPEs), when stabilised by surfactants, exhibit typically interconnected pores of 10-50 µm, and are explored for a host of applications, such as sponges for recovery of oil spills, catalyst support, biomaterials for tissue engineering or light-weight materials. To further enhance the use of polyHIPEs in these applications we explored the used of photocurable HIPEs as resins for vat photopolymerization, to additive manufacture inherently porous light-weight materials. This provides the opportunity to build hierarchical macroscopic scale structures s incorporating a porous microstructure. In recent years we focused on producing an easy to formulate printing ink with the correct light absorbing properties and sufficient stability to be used in commercial vat-photopolymerization set-ups. We will highlight the underlying general principles to produce a suitable polyHIPE printing ink. We will also report on our recent work on characterisation, properties and potential post-processing of the obtained 3D scaffolds, for example metallization and carbonization. An overview of our recent developments in application areas such as biomaterials, porous electrodes and light-weight materials will be highlighted.



15:50 – 17:20	FOUR Parallel Sessions
Session 5:	**Advanced Computational Methods & Applications in Marine, Subsea and Offshore Technology** (T2-2)
Session chairs:	Assoc. Prof. Guang Yin, University of Stavanger, Norway Dr. Chern Fong Lee, University of Stavanger, Norway
Location:	*E-101*
1	On the modeling of air lubrication effects on a full-scale ship model using Euler–Euler and volume-of-fluid methods. *Adam P. Kosinski, Lars E. Holmedal, Hans J. Sveen, Anders L. Östman*
2	Assessing CFD parameter influence on TUDFlow3D. *Rui Antunes, L de Wit, Tiago Fazeres-Ferradosa, Yorick Broekema, Filipe Miranda, Francisco Taveira-Pinto, L. de Wit*
3	A reduced-order 3D streamline simulation model for evaluating perforation-depth effects on injection energy in anisotropic reservoirs. *Shipra Singh, Ali Akbar Eftekhari, Enrico Riccardi, Aksel Hiorth*
4	Simulation of ship-waterway interaction in confined waterways. *Leon-Carlos Dempwolff, Hans Bihs, Widar Wang, Elyas Larkermani, Ahmet Soydan*
5	Anti-phase vortex shedding behind dual step cylinders. *Zhishuo Zhang, Lars Erik Holmedal, Cai Tian, Jianxun Zhu*
6	Bubble drag reduction over a flat plate: Operating envelope, interfacial-force mechanisms, and multi-slot injection. *Chen Zhao, Lars Erik Holmedal*
Underlined author names are presenting authors.	
Session 6:	**Design Optimization and Additive Manufacturing Technologies (T5-1)**
Session chairs:	Professor Andrés-Amadir García-Granada, IQS, Barcelona, Spain Assoc. Professor Mesay Alemu Tolcha, Jimma University, Ethiopia
Location:	*E-102*
1	A small-scale Artificial Intelligence module for the initial design phases of the machinery facility layouts in the shipbuilding industry. *Tariq Wazed Akash, Ove Tobias Gudmestad*
2	Topology-dependent fluid transport in gyroid and diamond TPMS bone scaffolds: a comparative CFD study of hydraulic resistance and permeability. *Dejene Alemayehu, Dame Alemayehu, Endalkachew M. Gutema*
3	Compressive response of gyroid infill structures at different relative densities. *Andrés-Amadir García-Granada, Horacio Rostro-Gonzalez, Iris Selgar-Agramunt Giovanni Gomez-Gras, M.M. Aghdam*
4	Parametric design and optimization of a shredder rotor carriage using ANSYS Workbench. *Edosa K. Tesema, Hirpa G. Lemu, Firankor T. Daba*
5	Microalgal starch as a precursor material for bioplastics: A critical review of structural and functional characteristics. *Kokeb H. Jiru, Hirpa G. Lemu, Eyosiyas H. Tamerat, Mesay A. Tolcha*
Underlined author names are presenting authors.	
Session 7:	**Advanced Manufacturing Systems (T6-1)**
Session chairs:	Assoc. Professor Endalkachew M. Gutema, Wallaga University, Ethiopia Dr. Yosef A. Wakjira, University of Stavanger, Norway
Location:	*A-204*
1	Optimization and minimization of surface roughness and temperature during the milling of Aluminium LM26 reinforced MWCNT Using RSM and DFA. *Endalkachew M Gutema, Mahesh Gopal*
2	Assessment of awareness level towards Industry 4.0 technology in manufacturing industry *Negasa F Gedefa, Hirpa G. Lemu, Tekalign L. Woldassilasie*



3	Identifying the key AI-enabled benefits enhancing 3D printing performance: A DEMATEL based approach. *Tekalign L. Woldassilasie, Moti M. Abera, Edossa D. Iticha*
4	Machining operation optimization in turning of Al6061 using response surface methodology and desirability function analysis. *Jao B. Chali, Hirpa G. Lemu, Mahesh Gopal*
5	Parameter optimization in CNC dry turning of AISI 1060 steel for sustainable manufacturing *Tesfaye O. Geleta, Endalkachew M. Gutema, Mahesh Gopal*

Underlined author names are presenting authors.

Session 8: **Computational Intelligence for Power Systems** (T8-1)
Session chairs: Assoc. Professor Merkebu Z. Degefa, University of Stavanger, Norway
Professor Shujun Zhang, Western Norway Univ. of Applied Sciences, Norway

Location: *C-101*

1	Data-driven performance assessment and forecasting of solar water heaters using artificial intelligence techniques. *Mohamed Magdy, Rania A. Ibrahim, Mohammad Mansouri, Nahla E. Zakzouk*
2	Decentralized AI-driven flexibility for transformer-constrained industrial energy communities. *Merkebu Z. Degefa, Bjørn Grønning. J. A. Arno*
3	Modelling power-system flexibility under high renewable penetration: A system dynamics case study of Germany. *Sarah Mashhadi*
4	VPWT: Integration of a photovoltaic vertical wind turbine into an autonomous eectric vehicle charging station. *John Larion*

Underlined author names are presenting authors.

17:30 – 17:50	Transport to Norwegian Oil Museum
18:00 – 21:30	Visit to Stavanger Oil Museum & Conference dinner



DAY 2	Friday, November 27, 2026
08:30 – 09:00	Registration
09:00 – 09:40	**Keynote Speech 5**
Chair:	Professor Dimitrios Pavlou, University of Stavanger, Norway
Location:	*Auditorium KE E-102*
	Keynote title: Fatigue reliability analysis of structures with low failure probability: AI-driven and Challenges ***Professor Shun-Peng Zhu*** University of Electronic Science and Technology of China (UESTC), China

Abstract: Accurate and efficient assessment of the fatigue reliability of major equipment structures is crucial for ensuring their safe service. Traditional methods are insufficient to meet the demands of complex engineering projects, particularly in addressing core challenges such as low failure probability, high computational cost, and high input dimensionality. We have constructed an AI-driven fatigue reliability assessment paradigm. Starting with the quantification of multi-source uncertainties, we have established a parameterized simulation process, developed advanced sampling algorithms, active learning strategies, and enhanced simulation methods, and formed a fatigue reliability analysis framework for various complex problems, centered on data-driven and physics-driven approaches. The effectiveness of the proposed method has been validated through engineering cases, achieving efficient reliability assessment for complex engineering problems. Note that unified analysis methods for the synergistic coupling of multiple complex factors have become an important research direction.





09:40 – 11:00	**FOUR Parallel Sessions**
Session 9:	**Fatigue, Corrosion and Structural Integrity of Engineering Structures and Mechanical Systems** (T3-1)
Session chairs:	Professor Dimitrios Pavlou, University of Stavanger, Norway Professor Viktor Gribniak, Vilnius Gediminas Technical University, Lithuania
Location:	*E-102*
1	Towards self-diagnosing FFF components: Relating conductivity loss to mechanical degradation under accelerated environmental aging *Viktor Gribniak, Arvydas Rimkus, Rokas Kovalenkovas, Surya Rajendran*
2	Repurposing natural gas pipeline infrastructure for hydrogen transport: A structural integrity perspective. *Ali K Khodabakhsh, Pasindu E. Y. Guruge, Nirosha D Adasooriya*
3	Verification of commercial finite element software for fatigue life assessment of steel connections, *Marius Ree, Sudath C. Siriwardane*
4	Surface roughness as a critical factor in hydrogen-assisted cracking of API 5L X52 pipeline steel. *Markus Rønning Danielsen, Pasindu Erange Guruge, Nirosha D Adasooriya*
5	Feasibility of pultruded glass fiber reinforced polymer for lightweight pedestrian bridge applications. *Taj M. Tanmoy, Sudath C. Siriwardane, Syed A. Ahmad, Freddy Paulsen*
Underlined author names are presenting authors.	
Session 10:	**Smart Operations and Maintenance (T4-2)**
Session chairs:	Professor Abimbola Windapo, Cape town University, South Africa Assoc. Professor Idriss Elthalji, University of Stavanger, Norway
Location:	*E-101*
1	Traceable GenAI-assisted evidence-to-decision workflow for low-carbon affordable housing: A matched-process pilot in Stavanger. *Darmarajan Chinasamy, Abimbola Windapo*
2	Computational assessment of municipal infrastructure asset performance for smart operations and maintenance. *Sizolwenkosi Mthethwa, Abimbola Windapo*
3	Smart manufacturing supply chain through Artificial Intelligence technologies: An empirical study in the Ethiopian context. *Edossa D. Eticha, Tekalign L. Woldassilasa*
4	How fast can a station clear? Simulating prescriptive crowd dispersal after major events. *Abdulah Alnasser, Sulaiman Alsugair, Meshal Aljubair, Abdullah AlFheed, Sultan Alkhidhr, Idriss Elthalji,*
Underlined author names are presenting authors.	
Session 11:	**Design Optimization and Additive Manufacturing Technologies (T5-2)**
Session chairs:	Professor Andrés-Amadir García-Granada, IQS School of Engineering, Spain Assoc. Professor Mesay Alemu Tolcha, Jimma University, Ethiopia
Location:	*C-101*
1	Crimping analysis of additive manufacturing coils for pelvic congestion *Joaquin Menacho, Guilhem Perquel-Zamudio, F Canalejo-Codina, Ibuki Kusano, Mercedes Balcells, Jordi Martorell, Andrés-Amadir García-Granada*
2	CFD analysis of additive manufacturing coils for pelvic congestion. *Ibuki Kusano, Rodrigo Mor-Gimeno, Joaquin Menacho, Mercedes Balcells, Jordi Martorell, Andrés-Amadir García-Granada*
3	Physics-based modeling of climate-induced degradation in crystalline silicon PV modules for performance-loss prediction. *Eshetu T. Ymer, Hirpa G. Lemu, Mesay A. Tolcha*



4	Computational simulation and machine-learning prediction of 4D printing: Modeling PLA's time-dependent deformation using thermal response. *Robsan A. Asefa, Hirpa G. Lemu, Endalkachew M. Gutema*
5	Design, fabrication, and computational biomechanical evaluation of a multi-material synthetic proximal femur surrogate using PolyJet technology *Laia M. Gordi, Maria S. Malloni, F K Ciliberti, Paolo Gargiulo, Yonatan A. Tesfahunegn*
	Underlined author names are presenting authors.
Session 12:	**Sustainable Ocean Structure** (T9-1) Session chairs: Professor Zhiyu Jiang, University of Agder, Norway Professor Jian Dai, Oslo Metropolitan University, Norway *Location: A-204*
1	Detection of extreme wave events in the Norwegian North Sea using hybrid convolutional neural network models. *Yusef Said, Zekeria Mohamed, Shoaib Ameer, Lei Jiao, Zhiyu Jiang*
2	Bias correction of NORA3 wave hindcast data using wave buoy observations along the Norwegian coast. *Shoaib Ameer, Per Simen Reed, Lei Jiao, Zhiyu Jiang, Lorenzo Cappietti*
3	A time-domain framework for response analysis of a long floating bridge under combined traffic and wave actions. *Yi Song, Jian Dai, Chaoru Lu*
4	Preliminary performance evaluation of a pontoon-type concrete modular floating platform in the frequency domain. *Shi Hong Wong, Jian Dai, Tze Che Van, Sudharshan Raman*
Underlined author names are presenting authors.	
11:00 – 11:20	Coffee break



11:20 – 12:40	**FIVE Parallel Sessions**
Session 13: Session chairs:	**Fatigue, Corrosion and Structural Integrity of Engineering Structures and Mechanical Systems** (T3-2) Prof. Sudath C. Siriwardane, University of Stavanger, Norway Prof. Debiao Meng, University of Electronic Science and Technology of China
Location:	*E-102*
1	Development of safe structures and robust materials in the Norwegian petroleum industry. *Mons Hauge, Morten Andre Langøy, Inge Lotsberg*
2	Multiaxial rolling contact fatigue assessment of R260 rail steel: Effects of cyclic plasticity and longitudinal traction. *Goftila G Sirata, Hirpa G. Lemu, Mesay A. Tolcha*
3	Thermal localisation in drag-braked railway wheels: Depth penetration and equalization. *Goftila G Sirata*
4	Effect of post-cooling time on the residual bond strength of GFRP bars in reinforced concrete after elevated-temperature exposure. *Hans Bertheussen, Samdar Kakay, Sudath C Siriwardane*
5	Numerical analysis of debonding identification in GFRP-steel marine structures using a curvature-wavelet based framework. *Dawit M. Yona, Beata Zima, Przemysław Krata*
6	Application of advanced surrogate models in structural uncertainty quantification and reliability analysis. *Debiao Meng, Qingyang Deng, Huaxi Wu, Muhammad Umar Khan, Tiago Fazeres-Ferradosa, Shun-Peng Zhu*
Session 14: Session chairs:	**Smart Operations and Maintenance** (T4-3) Professor Arvind Keprate. Oslo Metropolitan University, Norway Mr. Makafui Botsoe, University of Stavanger, Norway
Location:	*E-101*
1	When real faults are too rare to wait for: A fault injection methodology for labelled diagnostic data. *Idriss Elthalji, Makafui Botsoe*
2	Toward an agentic maintenance management system: A case study of UiS technical laboratories. *Makafui Botsoe, Idriss Elthalji,*
3	Anomaly detection in oil well production time-series data. *Mina Farmanbar, Iqra Ishtiaq*
4	Fault diagnostics for hydrogen-fuelled micro gas turbines using physics-based modeling and random forest classification. *Mustafa M. Fatalla, Ali Karimi, Elsayed Saber, Ahmed Abdelsalam Taha, Essam Seddik*
5	Validating predictive uncertainty in cable condition monitoring. *Apoorv Chaudhary, Arvind Keprate, Yasha Parvini, Signe Riemer-Sørensen*
Underlined author names are presenting authors	
Session 15: Session chairs:	**Design Optimization and Additive Manufacturing Technologies** (T5-3) Assoc. Professor Yonatan A. Tesfahunegn, Reykjavik University, Iceland Dr. Yosef Wakjira Adugna, University of Stavanger, Norway
Location:	*A-204*
1	Effect of powder reuse on tensile strength of AlSi10Mg alloy produced by selective laser melting. *Yonatan A. Tesfahunegn, J D Maddison, Dagur Ingi Ólafsson*
2	Effect of PCL content in 3D-printed resin blends on thermal behavior, surface hardness, and in vitro cell response. *Yosef W. Adugna, Hirpa G Lemu, Hanne R Hagland*



3	Simulation-based study of enset fiber-reinforced Tough 1500 resin composites for automotive mounting bracket applications. *Tishager T Teriya, Hirpa G. Lemu, Endalkachew M Gutema, Palani I Anand*
4	Topology optimization and thermal modeling of wire arc additive manufacturing for formula SAE front upright. *Nathan Alemayehu, Mesay Alemu*
5	Process parameter optimization for porosity reduction in selective laser melting of AlSi10Mg using finite element simulation with response surface methodology. *Kidist L. Dolicho, Mesay A. Tolcha, M. M. Yirdaw*
6	Finite element analysis of sand-casting defect effects on the service life of aluminum alloy flange coupling components. *Temesgen T. Jiru, Mesay A. Tolcha*
Underlined author names are presenting authors	

Session 16: **Sustainable Ocean Structures** (T9-2)
Session chairs: Professor Jian Dai, Oslo Metropolitan University, Norway
Professor Zhiyu Jiang, University of Agder, Norway

Location: *C-101*

1	Global motion responses of a pontoon-type floating nuclear power plant under marine environmental and aircraft Impact loads. *Geonwoo Song, Jeong-Gon Kim, Soomin Kim, Chulhun Chung, Ho-Kyung Kim*
2	Global screening of offshore renewable energy surplus around ports for maritime decarbonization. *Sanghwan Cho, Jian Dai, Chaoru Lu, Min Ook Kim*
3	Hybrid GA–PSO optimization of ambient-cured low-clinker alkali-activated mortars: Model development and experimental verification. *Sanghwan Cho, Yumin Chae, Min Ook Kim*
4	Human-AI-in-the-loop global sensitivity analysis framework for marine engineering systems. *Yu Ma, Lin Li, Yihan Xing*
Underlined author names are presenting authors	

Session 17: **Smart Energy Storage, Integration and Utilization (T7-2)**
Session chairs: Assoc. Prof. Mohammad Manouri, University of Stavanger, Norway
Dr. Ali Karimi, University of Stavanger, Norway

Location: *E-166*

1	Energy management strategy for triple hybrid energy storage systems in smart grids *Rewaa Elfaham, Mostafa Hamad, Ali Karimi*
2	Model predictive control-based tool for multi-vector renewable energy integration on farms. *Mohamed H Abdelrahman, Mohammad Mansouri, Dmytro Ivanko, Peter Breuhaus, Yahya N. K. Nasr Alarian,*
3	Modeling of domestic AC performance to improve energy efficiency. *Ali Kattaia, Asmaa El-Sayed, Nabil Mahmoud, Rania Sweif, Mohamed Elmors*
4	Prediction of molar volume in the Ni-Co-Cr system using supervised machine-learning techniques. *Thaer Syam, Mohamed Arab, Sajad Alimohammadi, M. M. Syam*
Underlined author names are presenting authors.	

12:40 – 14:00 **Lunch break**

14:00 – 14:30 **Award Ceremony and Conference Closing** **(Location: E-102)**



Conference Organizer

Department of Mechanical and Structural Engineering and Materials Science

University of Stavanger

Bachelor studies within

- Mechanical Engineering
- Structural Engineering

MSc studies within

- Mechanical and Structural Engineering
- Industrial Asset Management
- Marine- and Offshore Technology

PhD-studies within

- Offshore Technology: Mechanical and Structural Engineering

