## Proceedings of ASME 2023 42<sup>nd</sup> International Conference on Ocean, Offshore & Arctic Engineering

(OMAE2023)

Volume 10

June 11-16, 2023 Melbourne, Australia

Conference Sponsor Ocean, Offshore and Arctic Engineering Division

© 2023 The American Society of Mechanical Engineers, 2 Park Avenue, New York, NY 10016, USA (www.asme.org)

All rights reserved. Printed in the United States of America. Except as permitted under the United States Copyright Act of 1976, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of the publisher.

INFORMATION CONTAINED IN THIS WORK HAS BEEN OBTAINED BY THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS FROM SOURCES BELIEVED TO BE RELIABLE. HOWEVER, NEITHER ASME NOR ITS AUTHORS OR EDITORS GUARANTEE THE ACCURACY OR COMPLETENESS OF ANY INFORMATION PUBLISHED IN THIS WORK. NEITHER ASME NOR ITS AUTHORS AND EDITORS SHALL BE RESPONSIBLE FOR ANY ERRORS, OMISSIONS, OR DAMAGES ARISING OUT OF THE USE OF THIS INFORMATION. THE WORK IS PUBLISHED WITH THE UNDERSTANDING THAT ASME AND ITS AUTHORS AND EDITORS ARE SUPPLYING INFORMATION BUT ARE NOT ATTEMPTING TO RENDER ENGINEERING OR OTHER PROFESSIONAL SERVICES. IF SUCH ENGINEERING OR PROFESSIONAL SERVICES ARE REQUIRED, THE ASSISTANCE OF AN APPROPRIATE PROFESSIONAL SHOULD BE SOUGHT.

ASME shall not be responsible for statements or opinions advanced in papers or . . . printed in its publications (B7.1.3). Statement from the Bylaws.

For authorization to photocopy material for internal or personal use under those circumstances not falling within the fair use provisions of the Copyright Act, contact the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923, tel: 978-750-8400, www.copyright.com.

Requests for special permission or bulk reproduction should be addressed to the ASME Publishing Department, or submitted online at: https://www.asme.org/publications-submissions/journals/information-for-authors/journalguidelines/rights-and-permissions

ISBN: 978-0-7918-8692-2

## TABLE OF CONTENTS

Is the 100-Year Return Value for Significant Wave Height Increasing in the Tasman Sea?	1
Toward Quantum Algorithms for Simulating Nonlinear Ocean Surface Waves	10
Hydroelastic Analysis of Submersible Circular Seaweed Platform	20
Jellyfish Deflection From Marine Fish Pens Using Bubbler Technology	27
Determination of Mooring Load Levels on a Cage Designed for Exposed Aquaculture in Chile	36
Hydroelastic Response of Submersible Open Net Fish Pens Under Wave Action	45
Novel Solution for Mitigating Sloshing in Floating Closed-Containment Aquaculture Tanks	51
Numerical Modelling of the Performance of Floating Fish Pen in Harsh Environmental Conditions  Nazhmiddin Nasyrlayev, Ashley Dyson, Gholamreza Kefayati, Ali Tolooiyan	59
Hydroelastic Responses of a Circular Net Cage Under Wave Action	66
The Challenges and Opportunities for the Use of Robotic Autonomous Robotic Systems in Support of the Blue Economy	71
A Feasibility Study on Green Energy Production at the Location of Offshore Oil and Gas Platforms in Australia	80
Vahid Aryai, Nagi Abdussamie, Rouzbeh Abbassi, Irene Penesis, Chien-Ming Wang, Vikram Garaniya	
Numerical Modelling in the Development of the M4 Prototype for Albany, Western Australia	94
Finite Element Analysis of Composite Mooring Tensioner Springs in Wave Energy Converters	104
Performance Feasibility of a Multi-Source Offshore Renewable Energy Platform for Aquaculture	111
Techno-Economic Assessment of Developing Combined Offshore Wind and Wave Energy in Australia	121
Qiang Gao, Boyin Ding, Nesimi Ertugrul	121
A Facility Location Model for Uncrewed Surface Vessels in The Maritime Survey Industry	130

Time-Series Forecasting for Health Monitoring of Marine and Offshore Renewable Energy	
Systems	. 137
Floating Nuclear Power Plants, a Safe Way Out of the Energy and Climate Conundrum	. 143
Implementation of Industry 4.0 and its Effect on Human Element and Sustainable Development in the Blue Economy	. 154
Towards Developing a Code of Practice for Offshore Aquaculture Vessels	. 160
A Review: DC Microgrids for Sustainable Power Delivery in Offshore Industries	. 174
Interdependency of Human Factors and Turbine State in Offshore Wind Farm Operations	. 183
Numerical Simulation of Marine and Coastal Zone Multidimensional System Sustainable  Development	. 191
Research on Offshore Engineering Equipment Industry in Shandong Based on Sustainable  Development	. 197
Spatial-Temporal Evolution Of The Regional Shipping Network: A Case Study of Ports Along the Maritime Silk Road	. 203
Efficiency Evaluation of Resources Allocation in Port Cluster in the Yangtze River Delta Area  Based on DEA-BCC Model	211
A New Multi-Criteria Decision-Making Tool for Subsea Oil and Gas Asset Decommissioning	. 220
Assessing Underwater Noise Impact From Marine Projects	. 232

## **Author Index**