

# **26th Numerical Towing Tank Symposium (NuTTS'24)**

Mulheim, Germany  
23-25 October 2024

ISBN: 979-8-3313-0905-3

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2024) by Numerical Towing Tank Symposium  
All rights reserved.

Printed with permission by Curran Associates, Inc. (2025)

For permission requests, please contact Numerical Towing Tank Symposium  
at the address below.

Numerical Towing Tank Symposium  
c/o Volker Bertram  
121 Erdkampsweg  
22335 Hamburg, Germany

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# List of Extended Abstracts

|     |                                                                                                          |                                                                                                                                    |     |
|-----|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----|
| P01 | Philipp Mucha                                                                                            | Computational Fluid Dynamics Analysis of Inland Waterway Ship Maneuvering in Extremely Shallow Water                               | 1   |
| P02 | Georg Göbel, Lahbib Zentari, Cristian Brutto, Jacek A. Jankowski                                         | Full Scale Prediction of Ship Induced Waves in Restricted Waters with Numerical Tools – a Comparative Study                        | 7   |
| P03 | Muhammed Talha Özdenoglu, Yao Zhang, Stephen Turnock, Tahsin Tezdogan                                    | Development of a CFD-based Collision Avoidance Model for Maritime Autonomous Surface Ships in Restricted Waters                    | 13  |
| P04 | Guillermo Chillcce, Lahbib Zentari, Bettar Ould el Moctar                                                | Ship hydrodynamics in steady circular motion in shallow waters - Experience from the SHINING workshop                              | 19  |
| P05 | Genís Masjoan Vallés, Juha Tanttari, Ville Vuorinen                                                      | Development and validation of underwater radiated noise analysis method using computational fluid dynamics simulations             | 24  |
| P06 | Arne Heuvelman, Sasha Zverkhovskiy, Scott Terry                                                          | CFD Analysis of Air Lubrication Effects on Ship Propulsive Performance                                                             | 30  |
| P07 | Roya Shademani, Tommi Mikkola, Teemu Manderbacka, Sasan Tavakoli, Heikki Remes                           | CFD Modeling Approaches for Simulating Air Lubricating System in Ships: Preliminary Findings                                       | 36  |
| P08 | Ian Hubbard, Themistoklis Melissaris                                                                     | Detecting Numerical Instabilities in Propeller Cavitation Erosion Modelling Using Unsupervised Learning                            | 42  |
| P09 | Carlos Eduardo Simões de Almeida, Claudio Mueller Prado Sampaio, Mariana Lopes Pinto, Philip Pritzelwitz | Hydrodynamic performance enhancement of Newcastlemax bulk carriers via parametric modelling and Computational Fluid Dynamics (CFD) | 48  |
| P10 | Aaron Harrison Godfrey, Miles Wheeler                                                                    | Multiphase Computational Fluid Dynamics Based Optimization of Hydrofoil Envelope Performance                                       | 54  |
| P11 | Ines Ivković, Matija Vasilev, Milan Kalajdžić                                                            | A CFD-Based Analysis of Bow Modification Influence on Ship Resistance and Energy Efficiency                                        | 60  |
| P12 | Yanxin Feng, Bettar Ould el Moctar                                                                       | Hull Optimizaion of a Catamaran in both Deep and Shallow Water                                                                     | 67  |
| P13 | Marco Lugaresi, Diego Villa, Stefano Gaggero                                                             | Gap effect of a Rim Driven thruster in convergent and divergent duct configuration                                                 | 71  |
| P14 | Kenshiro Takahashi                                                                                       | Numerical study on tip-leakage flow for a stationary hydrofoil                                                                     | 84  |
| P15 | Daniel Akinmulewo, Simon Froitzheim                                                                      | Propeller Prediction in Behind Condition using a RANS-Based Artificial Body Force Method                                           | 90  |
| P16 | Laurens-Jan Lagendijk, Arjan Lampe, Jaap Windt, Stefan Hickel, Tom van Terwisga                          | Simulation workflow for flexible marine propellers                                                                                 | 97  |
| P17 | Negin Donyavizadeh, Arash Eslamdoost, Rickard Bensow                                                     | Optimization of the Open Water Performance of a Ducted Propeller                                                                   | 122 |
| P18 | Ahmet Soydan, Widar W. Wang, Hans Bihs                                                                   | Ship Hydrodynamic Simulations Using an Upgraded Direct Forcing Immersed Boundary Method                                            | 128 |

|     |                                                                                                |                                                                                                                                                                                       |     |
|-----|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| P19 | Noh Zainal Abidin, Frederic Grondin, Pol Muller Muller, Jean-François Sigrist                  | Assessment of hydrodynamic characteristics and computational resources for submarine resistance analysis: A comparative study between CFD Codes with application of the BB2 Submarine | 134 |
| P20 | Charles Badoe, Merrick Stanley, Peter Bull, Richard Pattenden                                  | Calibration of RANS Wall Model for Accuracy Improvement of Submarine CFD Resistance Prediction                                                                                        | 140 |
| P21 | Gert J. Dekkers, Artur K. Lidtke, Thomas P. Lloyd, Fernanda L. Dos Santos, Gabriel D. Weymouth | Quantifying the effect of turbulence intensity on turbulence-interaction noise of an airfoil using scale-resolving simulations                                                        | 146 |
| P22 | Fabian Knoblauch, Widar Weizhi Wang, Hans Bihs                                                 | A VOF-PLIC Algorithm for Modeling the Impact of Breaking Waves on Structures in the CFD Solver REEF3D::CFD                                                                            | 152 |
| P23 | Eric Heilshorn, Kevin J. Maki, Robinson Perić, Jannes Berndt, Moustafa Abdel-Maksoud           | Comparison of different approaches to couple the high-order spectral (HOS) method with computational fluid dynamics solvers                                                           | 159 |
| P24 | Claes Eskilsson                                                                                | Water wave simulations using fully nonlinear potential flow: spectral/hp element models implemented in nektar++                                                                       | 165 |
| P25 | Andreas Peters, Bettar Ould el Moctar, Robert Potthoff                                         | Effects of Density Ratio on Sloshing-Induced Impact Pressures                                                                                                                         | 171 |
| P26 | Chaitanya Sanghavi, Isabel Michel, Fabian Castelli, Jörg Kuhnert                               | MESHFREE Simulations for Maritime Applications                                                                                                                                        | 172 |
| P27 | Mazyar Dawoodian, Bettar Ould el Moctar                                                        | Effects of Oxygen Molecules on nucleation and growing of nanobubbles                                                                                                                  | 173 |
| P28 | Jeroen Wackers, Gaétan Rousseau, Ganbo Deng                                                    | Simulation practice and scale effects for sail-driven cargo ships in sideslip                                                                                                         | 174 |
| P29 | Ricardo Francisco Suarez Fernandez, Moustafa Abdel-Maksoud, Carlos Jahn                        | Evaluation of the Performance of Model-Based Identification Method of Ship Manoeuvring Parameters using Convex Programming                                                            | 180 |
| P30 | Benjamin Kossmann, Bettar Ould el Moctar                                                       | Development of an azimuth propeller duct for shallow water applications                                                                                                               | 194 |
| P31 | Wout Opdam, Maarten Bijlard, Bart van Esch, Themis Melissaris                                  | Hydrodynamic Characteristics of a Gate Rudder During Straight-sailing And Sailing With a Ship Drift Angle                                                                             | 203 |
| P32 | Qi Zhang, Bettar Ould el Moctar, Changqing Jiang                                               | Extreme-event analysis of a floating structure with mooring dynamics in an irregular sea state                                                                                        | 209 |
| P33 | João Muralha, Tiago Gomes, António Maximiano, Guilherme Vaz                                    | Modelling turbine-turbine interactions using techniques learned from Naval Engineering                                                                                                | 213 |
| P34 | Eduardo Tadashi Katsuno, Simon Tödter, Jörn Linde, Andreas Peters, Bettar Ould el Moctar       | Hydroelasticity Effects During Helicopter Ditching                                                                                                                                    | 220 |