Widar Weizhi Wang

Personal Information

Birthday: 26/01/1993
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Address: Nils Uhlin Hansens Veg 11C, 7026 Trondheim, Norway

Education and Experience:

04/2023-present: Senior Researcher
Marine hydrodynamics modelling, PhD co-supervisor, REEF3D development.
Norwegian University of Science and Technology (NTNU), Norway

01/2023-04/2023: Researcher
Marine hydrodynamics.
SINTEF Ocean, Norway

12/2021-12/2022: Researcher
Marine hydrodynamics modelling, PhD co-supervisor, REEF3D development.
Norwegian University of Science and Technology (NTNU), Norway

12/2019-12/2021: Postdoc
Wave modelling, FNPF-CFD model coupling and REEF3D development.
Norwegian University of Science and Technology (NTNU), Norway

09/2016-12/2019: PhD
<u>Thesis:</u> Large-scale phase-resolved wave modelling for the Norwegian coast under the E39 fjord-crossing project (defence in 2020).
<u>Contribution:</u> Joint development of REEF3D::SFLOW, REEF3D::FNPF and REEF3D::NSEWAVE in the open-source hydrodynamics REEF3D framework;
Norwegian University of Science and Technology (NTNU), Norway

09/2014-06/2016: Master of Science (M.Sc.)
<u>Thesis:</u> CorPower wave energy converter hydrodynamic analysis with waves and mooring systems using OpenFOAM waves2foam, SnappyHexMesh and Moody.
<u>Program:</u> Naval Architecture and Ocean Engineering.
Chalmers University of Technology (CTH), Sweden

09/2010-06/2014: Bachelor of Engineering (B.Eng.)
<u>Thesis:</u> Fatigue analysis of TLP platform tendons under hydrodynamic loads
<u>Program:</u> Naval Architecture and Ocean Engineering
Harbin Engineering University (HEU), China

Expertise and Skills:

Expertise:
- Numerical wave modelling (CFD, Potential Flow, Shallow Water and Spectral Models)
- Fluid mechanics, Hydrodynamics, Oceanography, Coastal engineering
- Coastal infrastructure, Offshore wind and platform and Aquaculture hydrodynamic analysis
- Open-source hydrodynamic model development (e.g. REEF3D, OpenFOAM)

Software and programming:
- <u>Numerical wave/CFD models:</u> **REEF3D**, **OpenFOAM**, **SWAN**, SWASH, ParaView
- <u>Programming:</u> **Python**, **MATLAB**, **Latex**, **C++**
- <u>CAD/bathymetry tools:</u> CATIA V5, FreeCAD; SOSI-format

Language:
- Norwegian (proficient, B2, Prøvebevis B1-B2 nivå)
- English (fluent, C1, IELTS core 8.0/9.0)
- Chinese (native, C2)

Organization:
- REEF3D Industry Seminar 2022 Organizer and Instructor
- OMAE Conference 2022 Session Chair for 3 sessions and Co-Chair for 1 session
- 2020-2022: Extended Management Committee, Dept. of Civil and Env. Eng. NTNU
- 2019-2022: Social Committee, Dept. of Civil and Env. Eng. NTNU

Hobbies and interests:

Running, Hiking, Biking; XC and Topptur Skiing; Bouldering and Climbing; Martial Arts, History

Track Records:

Publication:
- 18 articles in peer-reviewed international journals
- 18 articles in peer-reviewed conference proceedings
- Google Scholar: citations: 309, h-index: 10, i10-index: 10

Presentation:
- 20 presentations in international and national conferences
- Lecturer in master course TBA4270 Coastal Engineering at NTNU (in English)
- Guest lecturer in bachelor course TVM4116 Hydrodynamics at NTNU (**in Norwegian**)

Participation in projects and research proposals:
- 7 research project proposals (incl. one successful grant from ERC)
- 4 industry projects (incl. collaboration with Technip, TCOMS, ECN, MARIN, Deltares)

Awards and Certificates:

- **Best Paper Award** in OMAE conference 2022 (paper number OMAE2021-62185)
- Teacher Training Pedagogic Course Diploma at NTNU, 2017
- IPOET Scholarship Award for academic excellence during Master's study at Chalmers, 2016
- Norwegian permanent residence permit
- Norwegian driver's license B

Participated Projects:

Participation in industry projects:

2022: Shallow Water Initiative (HAWA-III) joint industry project (**JIP**), Role: analyst and project collaborator from NTNU

2021: Equinor **Empire Wind** project for offshore wind farm marine environment assessment, subcontracted from SINTEF Ocean; Role: analyst and consultant

2021: Joint research project with SBM Offshore (France) for FPSO analysis; Role: software instructor, research and development

2019: Reproducible CFD Modelling Practices for Offshore Applications, Joint Industry Project (**JIP**), Role: Project collaborator.

Participation in research project proposals:

2022: "Particle resolving fluid-sediment interaction"; **European Research Council (ERC)**; Role: assisting proposal writing; **Status: Granted**.

2022: "Optimization of floating structures and mooring systems for blue energy solutions using novel materials (SAMSON)"; Horizon Europe; Role: Work package leader for WP4 Numerical Hydrodynamic Modelling; Status: rejected.

2021: "MAPLE: Marine Plastic Pollution: Environmental Impact and life cycle scenarios"; NTNU sustainability project; Role: PhD co-supervisor; **Status: Granted**.

2021: "DIGICOAST – next-generation coastal modelling for wave, current and sediment transport impact on coastal infrastructure"; Centre for Green Shift in the Built Environment, NTNU; Role: PhD co-supervisor; **Status: Granted**.

2021: "Integrated Digital Modelling Framework for the Norwegian Coastal Industry"; KSP, the Research Council of Norway; Role: assisting proposal writing; Status: rejected.

2019: "Integrated modelling of the life cycle of stressors in the aquatic environment and evaluating ecosystem impact"; MILJØFORSK & CHINOR, the Research Council of Norway; Role: establishing international partnership with Tsinghua University in China; Status: rejected.

2018: "Machine learning based local wave climate prediction through high-resolution wave modelling data sets"; KLIMAFORSK, the Research Council of Norway; Role: assisting proposal writing; Status: rejected.

10 Selected Published Journal Articles:

[1] Wang W., Pakozdi C., Kamath A., Bihs H. (2023) Phase-resolved wave modelling in Norwegian fjords for the ferry-free E39 project, **Journal of Ocean Engineering and Marine Energy**, Vol. 9, DOI: 10.1007/s40722-023-00284-z

[2] Wang, W., Pákozdi, C., Kamath, A., Fouques, S. and Bihs, H. (2022). A Flexible Fully Nonlinear Potential Flow Model for Wave Propagation over the Complex Topography of the Norwegian Coast. ***Applied Ocean Research***, 122, 103103. doi: 10.1016/j.apor.2022.103103.

[3] Wang, W., Pákozdi, C., Kamath, A., Martin, T. and Bihs, H. (2022). Hydrodynamic Coupling of Viscous and Non-viscous Numerical Wave Solutions within the Open-source Hydrodynamics Framework REEF3D. ***J. Offshore Mech. Arct. Eng.***, 144(4). doi:10.1115/1.4053848. 041903.

[4] Pákozdi, C., Kamath, A., Wang, W. and Bihs, H. (2022). Application of Arbitrary Lagrangian-Eulerian Strips with Fully Nonlinear Wave Kinematics for Force Estimation. ***Marine Structures***, 83, 103190. doi: 10.1016/j.marstruc.2022. 103190.

[5] Wang W., Pákozdi C., Kamath A. and Bihs H. (2021) A Fully Nonlinear Potential Flow Wave Modelling Procedure for Full-scale Simulations of Sea States with Various Wave Breaking Scenarios. ***Applied Ocean Research***, 117, 102898. doi: 10. 1016/j.apor.2021.102898.

[6] Wang, W., Pákozdi, C., Kamath, A. and Bihs, H. (2021). Representation of 3-h Offshore Short-crested Wave Field in the Fully Nonlinear Potential Flow Model REEF3D::FNPF. ***J. Offshore Mech. Arct. Eng***., 144(4), 041902. doi: 10.1115/1.4053774.

[7] Pákozdi C, Wang W., Kamath A., Bihs H. (2021) Reduction of the Wave Propagation Error of a Sigma Grid Based Numerical Tank Using a Vertical Spacing Based on the Constant Truncation Error, ***Ocean Engineering***, 239, 109741, doi:10.1016/j.oceaneng.2021.109741.

[8] Wang, W., Martin, T., Kamath, A. and Bihs, H. (2020) An Improved Depth-Averaged Non-Hydrostatic Shallow Water Model with Quadratic Pressure Approximation. ***Int. J. Numerical Methods in Fluids***, 92, 803–824 doi:10.1002/fld.4807

[9] Bihs H., Wang W., Martin T. and Kamath A. (2020) REEF3D::FNPF - A Flexible Fully Nonlinear Potential Flow Solver. ***J. Offshore Mech. Arct. Eng***. 142(4). doi: 10.1115/1.4045915

[10] Wang W., Wu M., Palm J., & Eskilsson, C. (2018) Estimation of Numerical Uncertainty in Computational Fluid Dynamics Simulations of a Passively Controlled Wave Energy Converter. ***Journal of Engineering for the Maritime Environment,*** 232(1), 71–84. doi: 10.1177/1475090217726884