

## Curriculum Vitae Trygve Kristiansen, March 2023

**Name:** Trygve Kristiansen  
**Born:** 02.12.1975  
**Nationality:** Norwegian  
**Civil status:** Married, three children  
**Present position:** **Professor in Marine Hydrodynamics**, Department of Marine Technology, Norwegian University of Science and Technology (NTNU)  
**Education:** **PhD, Marine Hydrodynamics**, NTNU 2009  
**MsC, Applied Mathematics**, NTNU 2002.

### Employment history

06.2015 – Present **Professor at NTNU, Marine Hydrodynamics**, Department of Marine technology  
01.2010 – 12.2012 **PostDoc at NTNU**, Department of Marine technology  
08.2005 – 08.2008 **PhD student, NTNU**, Department of Marine technology  
04.2002 – 06.2015 **MARINTEK**, Offshore technology

### Professional interests

Numerical, experimental and theoretical marine hydrodynamics; gap resonances, higher order wave loads, marine membrane structures. Applications: offshore structures, aquaculture structures, floating solar islands, offshore wind.

### Experience with project management (selected)

03.2014 – 06.2015 **PVC3D moonpool phase 2, MARINTEK**  
Project leader. Further development of *PVC3D* towards tool for design and on-board decision support tool for moonpool vessels.

09.2013 – 04.2015 **Dudgeon Wind turbine farm, MARINTEK**  
Project leader. De-risking of the wind turbine farm Dudgeon near England for Statoil / Statkraft. Shallow water wave loads. Focus on fatigue and ringing, loads and responses. Combination of experiments, CFD and structural simulations as well as development of rational higher order wave load models.

01.2013 – 06.2015 **Nonlinear roll JIP, MARINTEK**  
Project leader locally at MARINTEK. 2-year JIP lead by BV and MARINTEK with 20 international parties. Main topics are bilge keel damping and second order wave excitation of large FPSOs. Further development of *PVC3D* for efficient computation of nonlinear roll damping.

01.2012 – 12.2012 **PVC3D moonpool, MARINTEK**  
Project leader. Pilot project for Statoil in implementing 3D version of hybrid numerical method developed during post.doc at NTNU called *PVC3D* (Potential Viscous code). Coupling between Navier-Stokes solver and potential flow solver. Results in 2-3 orders of magnitude faster simulations compared to “traditional” CFD methods for marine resonance problems.

### Present research activities and fields of interests

- Higher order wave loads on monopiles. In particular, in finite water depth conditions. Theory, experiments and numerical simulations
- Loads on complex subsea structures through the splash zone (marine operations). Experiments and numerical simulations.
- Moonpool resonance. Moonpools as pitch motion reducing devices. Violent flows in moonpool.

Experiments and numerical simulations.

- Hydrodynamic loads and responses of aquaculture plants. Experiments, numerical simulations and semi-empirical theory.
- Floating solar islands in waves. Elastic or hinged multi-body systems. Experiments, numerical simulations and theory.
- Vessel roll damping. Experiments and numerical calculations.
- Marine membrane structures. Closed fish farms and floating solar islands.
- Multi-modular marine platforms. Wake-interaction effects between pontoons. Experimental and numerical methods. Development of rational loads models.
- Numerical hydrodynamics, development of new methods. Development of hybrid numerical schemes (coupling potential and viscous flow solvers).

### **Responsibilities**

- Head of Hydrodynamics lab at Dept. of Marine Technology, NTNU since 09.2016

### **Research project participation**

- SFI BLUES (key personnel)
- NTNU AMOS (affiliated professor)
- SFI MOVE (supervisor of 2 PhD students and one post-doctoral fellow)
- FlexAqua (supervisor of one post-doctoral fellow)

### **Membership in academic and professional committees**

- ITTC committee on wave run-up and VIV in 2013

### **Master student supervision**

- Present academic year: main supervisor for 8 students, co-supervisor for 1 student
- Graduated under my main supervision since 2015: 44 students

### **PhD supervision**

- Fredrik Mentzoni; Loads on complex subsea structures through the splash zone (Oct. 2015 - 2019)
- Senthuran Ravinthrakumar; Nonlinear moonpool resonance (Aug. 2016 - 2019)
- Øyvind Rabliås; Dual ship maneuvering in low forward speed (Aug. 2017 - 2022)
- Mael Moreau; Nonlinear roll of vessels (Aug. 2017 - )
- Aurora Skare-Haavaag (Aug. 2021 - )
- Aref Moalemi, joint with DTU (Feb. 2020 - )
- Zhilong Wei, joint with DTU (March 2022 - )

### **Post-doctoral fellow supervision**

- Mia Prsic Abrahamsen; Loads on complex subsea structures in waves (Sept. 2015 - 2020)
- David Kristiansen; Loads and efficiency of lice skirts in aquaculture plants (Nov. 2018 - 2019)
- Arnt Fredriksen; Numerical modelling of lice skirts (March 2020 – 2021)

### **Non-academic publications and news items**

- June 2022: Interview on TU-podcast Teknisk sett
- November 2022: News item on nrk.no: «Disse kan dekke verdens energibehov i fremtiden»
- November 2022: News item on gemini.no: «Flytende soløyer kan dekke verdens energibehov i fremtiden»

### **Academic publications and h-index**

- Number of Journal papers: 33
- Number of Conference papers: 49
- h-index, google scholar: 21

## Selected academic and professional publications

1. Kristiansen, T., Grøn, P. and O. M. Faltinsen, A floating membrane solar island study, 9th int Conference on Hydroelasticity in Marine Technology, Rome, 2022
2. Moreau, M., Kristiansen, T., Ommani, B. and B. Molin, An upright bottomless vertical cylinder with baffles floating in waves, *Appl. Ocean Res.*, 2022, 119
3. Rabliås, Ø. and T. Kristiansen, *A 2D+t approach for the transverse viscous loads in a modular maneuvering model*, *Ocean Engng.*, 2021, 228
4. Muhammad, M., Lader, P. F., Kristiansen, D., Kristiansen, T. and M. Kanazawa, *Bag and floater motions of a fabric membrane cage*, *J. Fluids and Struct.*, 2021, 106
5. Kristiansen, T., Sigstad, M. V., Winsvold, J., Rabliås, Ø. And O. M. Faltinsen, *A flexible multi-torus solar island concept*, Int. Workshop on Water Waves and Floating Bodies (IWWWFB), South Korea (digital), 2021
6. Ravinthrakumar, S., Molin, B. and B. Ommani, *A two-dimensional numerical and experimental study of piston and sloshing resonance in moonpools with recess*, *J. Fluid Mech.*, 2019, 877, 142-166
7. Patterson, B., Mo, F., Borgschulte, A., Hillestad, M., Fortunat, J., Kristiansen, T., Sunde, S. and J. Bokhoven, Renewable CO2 recycling and synthetic fuel production in a marine environment, *Proc. National Academy of Sciences*, 2019
8. Mentzoni, F. and T. Kristiansen, *Numerical modeling of perforated plates in oscillating flow*, *Appl. Ocean Res.*, 2019, 84, 1-11
9. Ravinthrakumar, S. and T. Kristiansen, *A 2D experimental and numerical study of moonpools with recess*, in *Proc. 37th Int. Conf. on Offshore Mech. and Arctic Eng.* 2018
10. Kristiansen, T. and P. Borvik, *A 2D experimental and numerical study of moonpools with recess*, in *Proc. 37th Int. Conf. on Offshore Mech. and Arctic Eng.* 2018
11. Kristiansen, T. and O. M. Faltinsen, *Higher order wave loads on monopiles in finite water depth*, *J. Fluid Mech.*, 2017, 833, 773-805
12. Bachynski, E., T. Kristiansen, R. Firoozkoobi and M. Thys, *An experimental and numerical investigation of monopile ringing in shallow water depth*, *Appl. Ocean Res.*, 2017, 68, 154-170
13. Ommani, B., T. Kristiansen, K. Berget, P. Sandvik and O.M. Faltinsen, *An investigation on moonpool blockage by box-shaped object close to free surface*, *Violent Flows*, Osaka, 2015
14. Ommani, B., T. Kristiansen and O.M. Faltinsen, *Simplified CFD modelling for bilge keel force and hull pressure distribution on a rotating cylinder*, *Appl. Ocean Res.*, 2016, 58:p. 253-265
15. Kristiansen, T. and O.M. Faltinsen, *Experimental and numerical investigation of a circular net cage with elastic floater in waves and current*. *J. Fluids and Structures*, 2014
16. Kristiansen, T., et al., *Experimental and Numerical Investigation of Ship Roll Damping with and without Bilge Keels*, in *Proc. 33rd Int. Conf. on Offshore Mech. and Arctic Eng.* 2014
17. Fredriksen, A., T. Kristiansen, and O.M. Faltinsen, *Wave-induced response of a floating 2D body with moonpool*. *Proceedings of Royal Society A*, In review 2014. Special issue
18. Kristiansen, T., T. Sauder, and R. Firoozkoobi, *Validation of a hybrid code combining potential and viscous flow with application to 3D moonpool*, in *OMAE-2013, Nantes*. 2013
19. Fredriksen, A., T. Kristiansen, and O.M. Faltinsen, *Investigation of gap resonance in moonpools at low forward speed using a nonlinear hybrid method coupling potential and viscous flow*. *Appl. Ocean Res.*, 2013. 47.
20. Kristiansen, T. and C.T. Stansberg, *Empirical prediction of nonlinear wave diffraction and run-up on vertical columns*, in *ITTC Workshop on VIV and Run-up*, Nantes. 2013
21. Kristiansen, T. and O.M. Faltinsen, *Gap resonance analyzed by a new domain-decomposition method combining potential and viscous flow*. *Appl. Ocean Res.*, 2012. 34: p. 198 – 208

22. Kristiansen, T. and O.M. Faltinsen, *Modelling of current loads on aquaculture net cages*. J. Fluids and Structures, 2012. 34: p. 218-235
23. Kristiansen, T. and O.M. Faltinsen, *A two-dimensional numerical and experimental study of resonant coupled ship and piston-mode motion*. Appl. Ocean Res., 2009. 32: p. 158-176
24. Kristiansen, T. and O.M. Faltinsen, *Studies on Resonant Water Motion Between a Ship and a Fixed Terminal in Shallow Water*. J. Offshore Mech. and Arctic Eng., 2009. 131
25. Kristiansen, T. and O.M. Faltinsen, *Application of a vortex tracking method to the piston-like behaviour in a semi-entrained vertical gap*. Appl. Ocean Res., 2008. 30: p. 1-16