To whom it may concern

Subject: Contribution to the funding application for the PhD Project "Multi-Fidelity Physics-Informed Neural Network (PINN) to Solve Partial Differential Equations - An Innovative Approach to Model Fluid Dynamics and Ocean Wave Evolution"

This document outlines the contributions of each team member to the funding application for the aforementioned PhD project. The team that collaborated to write the proposal was set up due to a call for fundamental cross-divisional PhD projects at the department of Mechanics and Maritime Sciences at Chalmers University of Technology in spring 2022.

Team Members:
- **Prof. Håkan Nilsson** (Division of Fluid Dynamics)
- **Prof. Wengang Mao** (Division of Marine Technology)
- **Assoc. Prof. Arash Eslamdoost** (Division of Marine Technology)
- **Dr. Saeed Salehi** (Division of Fluid Dynamics)

The complete team had not previously collaborated in this configuration, however, Prof. Mao, Assoc. Prof. Eslamdoost, and Dr. Salehi had previously carried out a small project on data-driven modeling of ship hydrodynamics. The formation of the team was originally initiated by Dr. Saeed Salehi, who with his interest in Machine Learning and CFD had identified Prof. Wengang Mao as an expert in Machine Learning techniques. Dr. Salehi then connected Prof. Mao with Prof. Nilsson, a CFD specialist. Assoc. Prof. Arash Eslamdoost was later added to the team due to his extensive experience in advanced CFD modeling, completing a well-rounded team with expertise in both Machine Learning and CFD.
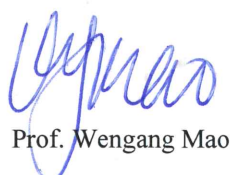
The combination of Machine Learning and CFD was clear from the start as the foundation of the project, but there was a need to refine the focus given the vast scope of both fields. Dr. Saeed Salehi and Prof. Wengang Mao jointly proposed PINN as a promising and mutually interesting research area for both divisions.
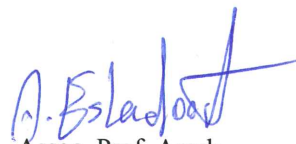
Contributions:
- **Prof. Håkan Nilsson:**
  - ✓ Ensured that the proposal was focused, leveraging the diverse expertise of the team members
  - ✓ Contributed to the writing of the proposal, with emphasis on clarity, feasibility, and alignment with the funding call requirements

- **Prof. Wengang Mao:**
  - ✓ Initiate the ideas of Machine Learning to solve the partial differential equations (so-called PINNs) for fluid dynamics and ocean waves for the proposal
  - ✓ Contributed to the development of the PINN methodology
  - ✓ Drafted the first proposal, and coordinated the revision to the final proposal document

- **Assoc. Prof. Arash Eslamdoost:**
  - ✓ Provided insights on advanced CFD modeling to support the proposal's technical aspects
  - ✓ Contributed to the writing and finalization of the proposal

- **Dr. Saeed Salehi:**
  - ✓ Identified PINN as viable collaborative research topic between the two divisions
  - ✓ Contributed with new ideas such as on combination of CFD, multi-fidelity methods, and PINN
  - ✓ Made major contributions to developing and detailing the proposed concepts and methodologies

Prof. Håkan Nilsson   Prof. Wengang Mao   Assoc. Prof. Arash   Dr. Saeed Salehi
                                                         Eslamdoost

CHALMERS