Personal Statement

To whom it may concern,

This is Yaolin GE, a final year master student from the major of Maritime Engineering at KTH Royal Institute of Technology, currently applying for the doctoral program with the topic of *Hydrodynamic performance of ship propulsion and resistance in a seaway* at NTNU. I would like to explain as follows my motivation for my application, and my advantages among the potential candidates for your consideration.

Thanks to the swift progress of my bachelor's degree, it is glaring that studying and doing research are endeavors I would like to engage in even more. During my undergraduate study at Jiangsu University of Science and Technology in China, I was provoked to participate in several undergraduate research projects. One of the most interesting projects that I still remember is the investigation of the resistance and propulsion of a ship hull. I studied the performance in terms of its maneuverability and hydrodynamic behavior of the ship under calm water conditions. After this, I presented the results from my investigation including the past research and current developed experimental technologies. It is a rewarding and fruitful experience that reshaped my view as a student and also cultivated me a research perspective. I pushed myself hard to explore as much as I can, that dedication brought me a national scholarship and an opportunity to take an exchange study in the UK. That exchange study program at University of Strathclyde, which I consider did bring great advantages to me from the perspectives of both academic and personal improvements. The courses I have undertaken there covers diverse aspects of naval architecture and marine engineering, of which my favourite one is NM402 Theory and Practice of CFD. Particularly the practical part which mainly investigates the behaviour of marine structures using advanced numerical methods provoked me about the power of mankind's wisdom and inspired me to step further. In addition, the study atmosphere there which greatly encouraged independent research and innovative ideas had brought me more confidence in my success in a higher level of study and research abroad.

Stimulated to discover more in the marine field, I then accomplished my bachelor's degree project within the topic of Vortex-induced Vibration (VIV) response of marine risers. Throughout the project, I gained a comprehensive overview of the principles and concepts regarding VIV as well as other relevant structure-fluid interactions. To investigate the riser behaviour considering added mass effect, I studied and applied the semi-empirical model to analyse the behaviour of the low mass-ratio systems such as rigid cylinder as well as slender catenary riser in the crossflow direction, all hydrodynamic coefficients were derived from the forced oscillation experiment of the rigid cylinder conducted by Gøpalkrishnan in 1993. Eventually, I performed the sensitivity analysis for 40 different cases in terms of different current, tension forces and mass-ratio systems to verify the numeric model. The project was interesting and rewarding, which surely paved the way for future research.

As a result of the strong interest in exploring at a higher level, I urged myself to learn more under an advanced study environment, for which I then pursued my master's study within Marine Technology at NTNU. The interdisciplinary study and research environment rewarded me a lot in terms of research skills and personal growth. I did follow my passion to polish my understanding in the field of marine hydrodynamics. I have taken Hydrodynamics for High-Speed Marine Vehicles and Naval Hydrodynamic and from which I gained valuable skills. For

example, I learned how to analyse the hydrodynamic performance of the propeller using numerical methods and also more advanced topics were also discovered as well such as the rake, skew and hub effects on the propeller blades. Worth mentioning, the experimental validation was also conducted so as to verify the results derived from the simulation. I also wielded the hydrodynamic tool to investigate some other lifting surfaces such as foils and rudders. Those experiences enhanced my ability to a deeper level to utilize numerical methods to solve practical problems in the marine hydrodynamic field. I feel much more confident about my research and analytical skills thanks to the experience gained at NTNU.

At present, I am doing my master's degree project within the marine autonomous system at KTH, particularly marine robotics. It might have been outside the proposed field of research. However, it partially involves the analysis of the hydrodynamic load for the underwater vehicles as well as its resistance and maneuverability, it also demonstrates my intellectual curiosity, and I do believe that it will also brush up my understanding of hydrodynamic analysis from a different perspective. Worth mentioning, the transferrable skills such as numerical simulation and analysis as well as advanced programming might be beneficial to the applied position.

With this wide range of experiences, I have gradually developed a liking taste in the maritime industry. Over the last year, I have had some interactions with some Ph.D. students within the maritime field at NTNU, and it has given me a tantalizing glimpse into the life of a graduate student – and it is a life I want to lead. It is also a life I believe I am ready and able to manage, as evidenced by my success in my previous graduate coursework and commitment to research. I develop motivation from the level of responsibility and independence required of a graduate student and relish the opportunity to prove myself at this level. My research and coursework so far have been quite interdisciplinary, spanning the border of naval architecture to marine engineering, and the potential to continue this sort of study is what first attracted me to pursue a Ph.D., pursuing a Ph.D. degree in this project, with the project's diversity of research in marine hydrodynamics and its strong reputation, will allow me to learn from professors at the top of this new and exciting field. A Ph.D. program will enable me to pursue my research interests to a much greater depth while also expanding my future career opportunities. It is also worth mentioning that joining a community of other like-minded individuals will be a valuable chance for collaboration and personal development. I believe that I am a highly motivated student and also a well-qualified applicant.

As mentioned at the beginning, I have been aiming to devote myself into the studies and research on marine hydrodynamics. To sum up, I expect to contribute to the practical researches with my professional knowledge and practical skills obtained from the Ph.D. career at NTNU. With full confidence in me as well as the professional training you provide in the program, I believe that my plan will be realized any time soon. Thank you very much for your time and consideration.

Applicant: Yaolin Ge

Application Ref. No. IV-35/20