

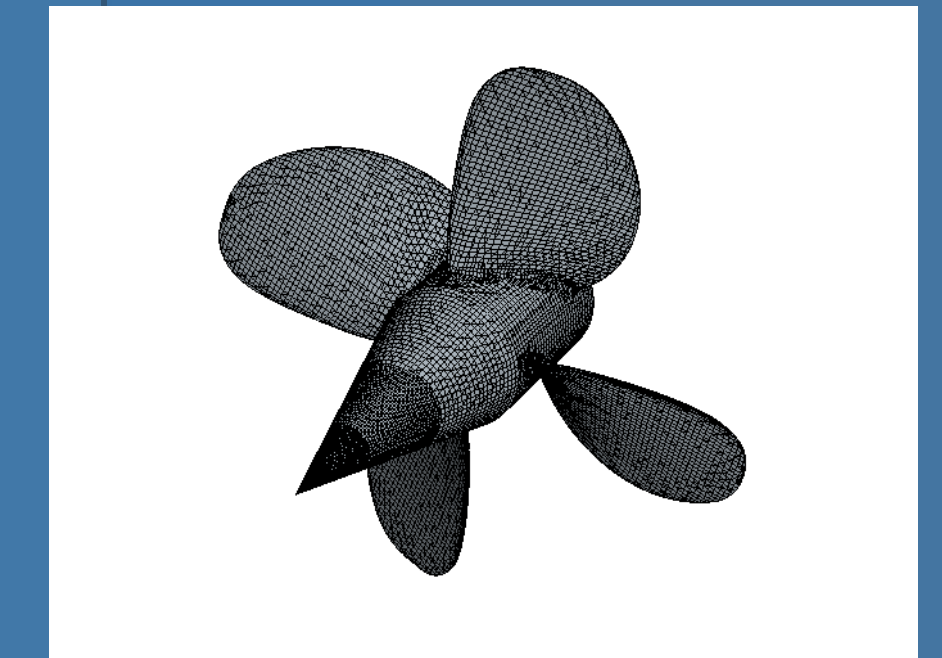
# Floating On Air: Drag Reduction For Ships Using Air Lubrication

## Research Focus:

### Developing a Computational Fluid Dynamics approach to Simulate air lubrication on the hull of a ship and its interaction with appendages

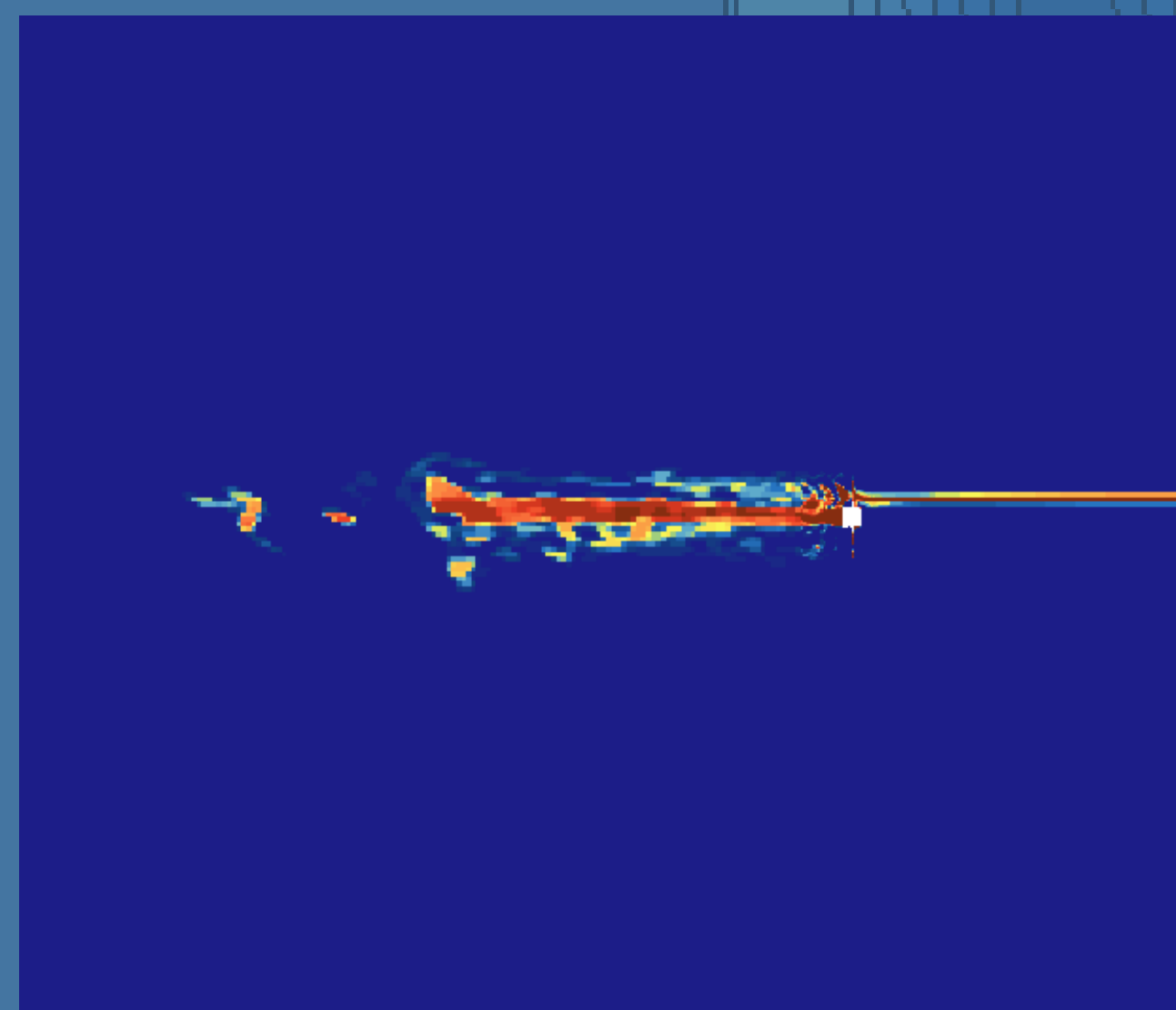
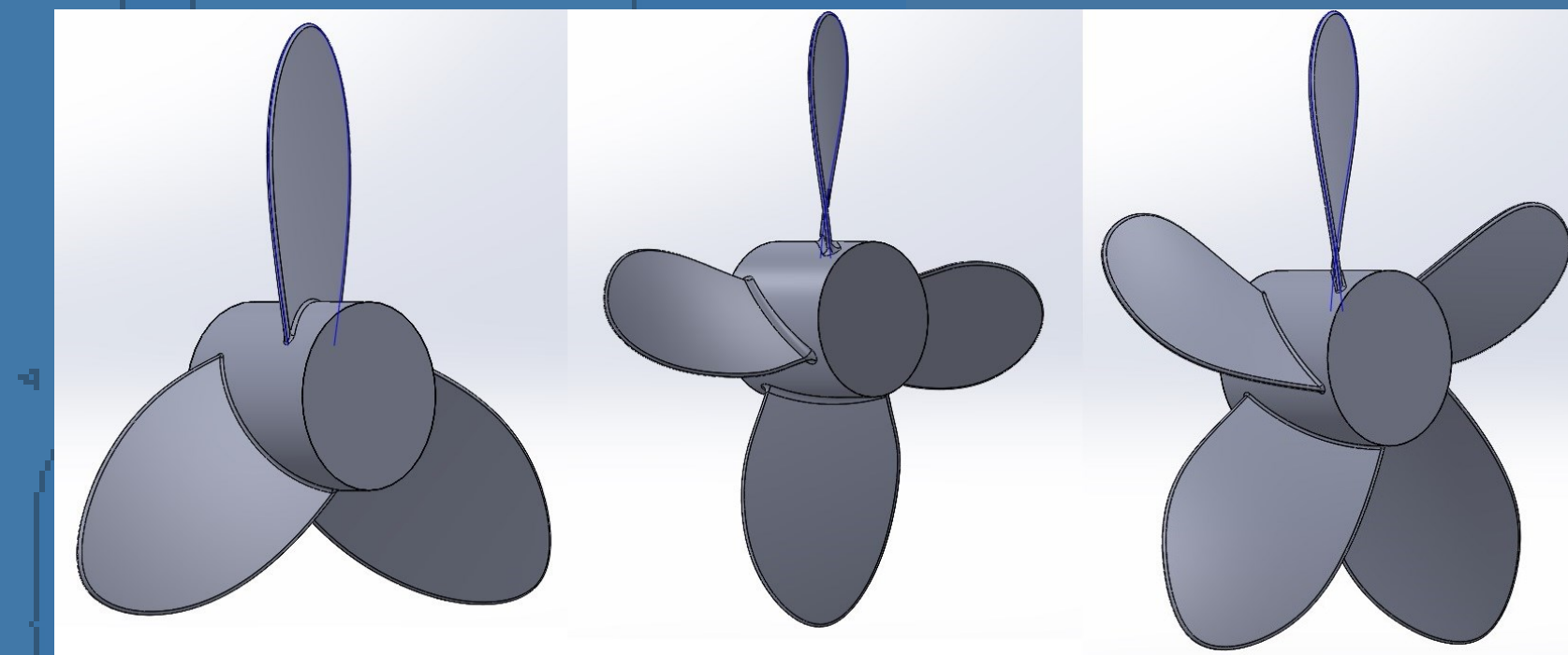
#### Motivation:

Increasing pressure on the shipping industry to reduce emissions means that operators and designers of ships must explore novel methods in order to reach emissions targets. Air lubrication is one such technology which shows promise in the pursuit of reducing emissions but currently there is a lack of robust methods available to simulate the phenomena and investigate its potential effect of seakeeping parameters and overall benefit.



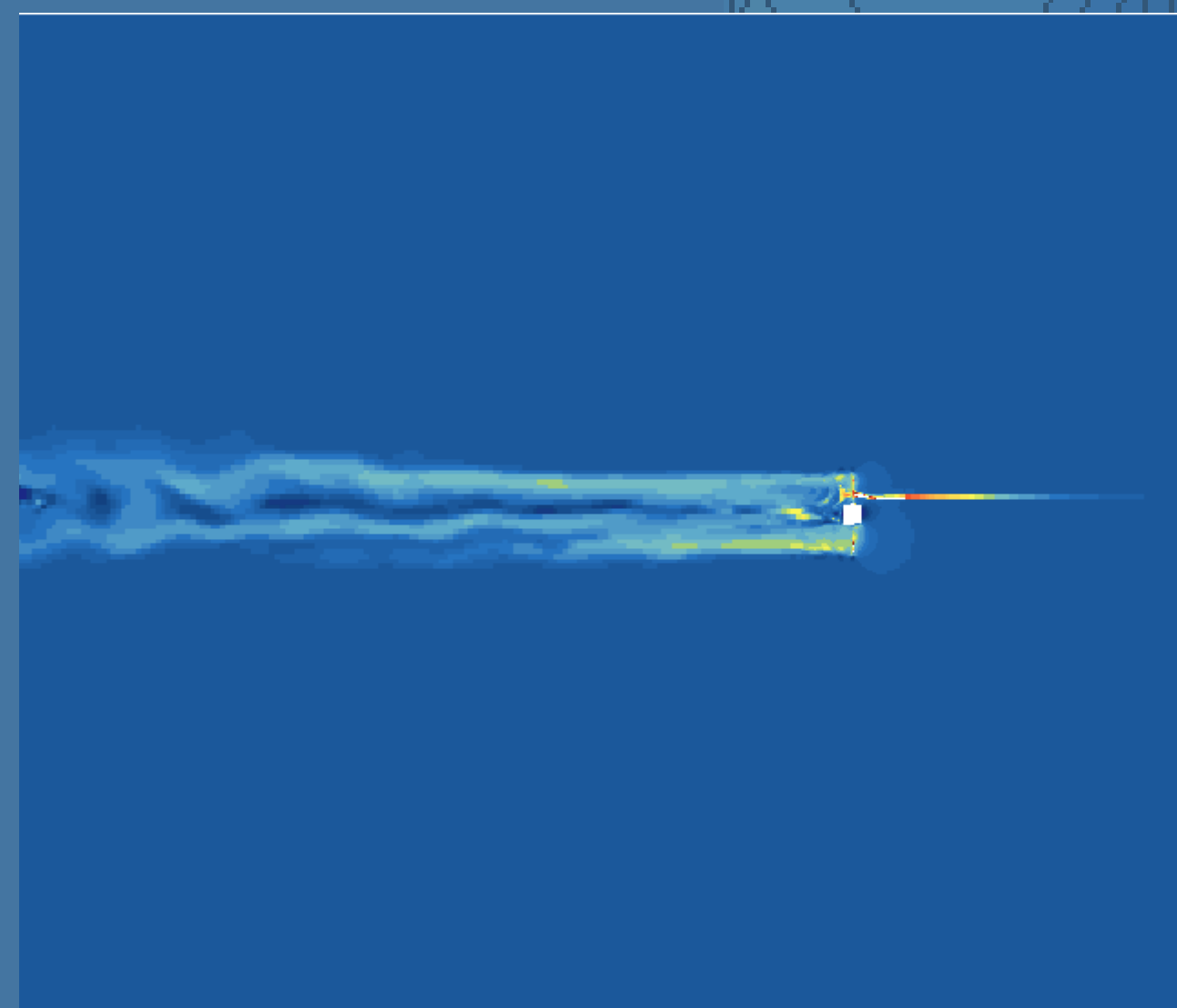
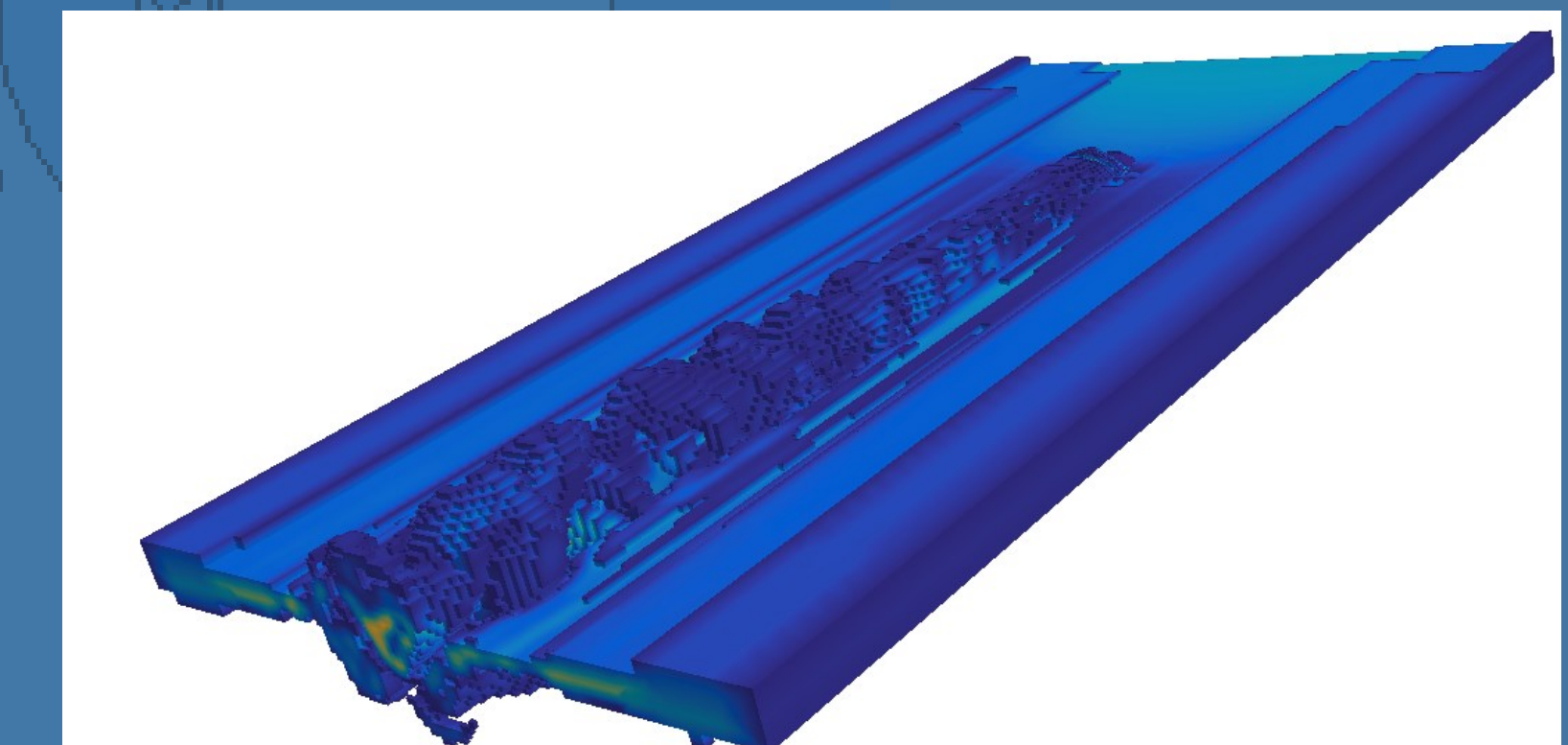
#### Literature Review:

An understanding of the existing work was crucial when undertaking this PhD to consider what has been done previously using CFD, what the current approaches are lacking, and what has been replicated successfully. It is also important to assess the particular phenomenon that I am attempting to capture with my approach.



#### Method and software:

I am currently using the commercial CFD package STAR CCM+, this is a robust software which has seen widespread use in simulation of similar phenomena particularly in marine scenarios. Future development of my work may lead to me utilising open source software to enable a greater level of freedom in making changes and implementing models. I am using computational fluid dynamics software to replicate existing results and implement changes in order to improve the approach's accuracy in reproducing the effect of air lubrication.



#### Potential Impact:

*The industry is reliant on towing tank and water tunnel tests at the moment, if we can develop a robust and consistent CFD approach for simulating air lubrication on the hull of a ship this will allow for further research and improved understanding of the phenomena. This will lead to further development of the technology and for business and environmental decisions to be made regarding the use of air lubrication as well as deciding if it is viable for the technology to be implemented alongside the possible impact of it, whether that be negative or positive for the environment and fuel costs.*



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