

FACULTY OF SCIENCE  
UNIVERSITY OF COPENHAGEN

DEPARTMENT OF COMPUTER SCIENCE

## Project outside course scope

### Accelerating Ocean Modelling

Adressing performance bottlenecks of the ocean modelling  
framework Veros

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## **1 Introduction**

Currently, many scientists use purely sequential software for ocean modelling, leading to long simulation times and inefficient use of modern hardware. The aim of this project is to tackle this problem by introducing highly parallel code that uses the potential of modern GPU to accelerate the modelling process.

## **2 Tridiagonal Solver**

One of the bottlenecks within veros is solving many tridiagonal matrices....

### **Trivial Algorithm**

### **Trivial Algorithm - Coalesced**

### **Flat version**

The flat version of the tridiagonal solver is based on.. [ABB<sup>+</sup>16]

### **Flat version in a single kernel**

### **Precision**

### **Benchmarks**

### **Integration into Veros**

# Bibliography

- [ABB<sup>+</sup>16] ANDREETTA, Christian ; BÉGOT, Vivien ; BERTHOLD, Jost ; ELSMAN, Martin ; HENGLEIN, Fritz ; HENRIKSEN, Troels ; NORDFANG, Maj-Britt ; OANCEA, Cosmin E.: Finpar: A parallel financial benchmark. In: *ACM Transactions on Architecture and Code Optimization (TACO)* 13 (2016), Nr. 2, S. 1–27