Office IU07, Department of Meteorology

University of Reading, Reading, UK, RG66BB

5th March 2020

Dear Julian Kunkel and Luciana Pedro,

I am writing to apply for the HPC summer school in August 2020. I believe my strong background in analysing and running high-resolution climate/ ocean models, as part of my PhD, fits within your target audience for this summer school. My background is in Physical Oceanography, however I have always been interested in and am really eager to gain more knowledge of model development, through high performance computing and data science.

In collaboration with David Ferreira, Malcolm Roberts and Helene Hewitt, my current PhD research project explores how oceanic mesoscale eddies impact the large-scale ocean globally, through air-sea heat and momentum exchanges. This project is based at the University of Reading, in collaboration with the Met Office. Within my PhD, output from global high-resolution coupled configurations of HadGEM3-GC3.1 is used for an eddy tracking algorithm. This algorithm was split to run in parallel using ROSE/ cylc on JASMIN by myself and Malcolm, to dramatically reduce its processing time. In addition, I am currently running the MITgcm (an idealized non-hydrostatic ocean model setup) using MPI.

Therefore, I am familiar with some of the challenges in running, storing and analysing large volumes of data. I am really interested in how data science, for example machine learning, could improve some of these issues , such as speeding up data transfer in model computations, using GPU instead of CPU or parallelizing in time .

Regarding an Academic Group Project, and considering my PhD, my suggestion would be to explore and understand how global high-resolution air-sea coupling is performed in parallel using either the 'Extreme-scale computing' or 'Code development' topics. I would also be interested in the 'Post-processing and Visualisation' and 'Big Data Analytics' topics. My key words would therefore be: 'Air-sea coupling', 'High-resolution', 'Model development', 'MPI' and 'Big Data'.

To conclude, I would really appreciate the opportunity to deepen my knowledge and learn new technical skills within the HPC summer school this year. Both the Group Project and the knowledge gained from this school will be directly useful for both my PhD project and my future career.

Kind Regards,

Sophia Moreton