Participation Letter for Summer School 2020

To whom it may concern,

I am writing to express my interest in the Summer School 2020. I am a second year PhD student in Engineering at University of Georgia (UGA), Athens, GA, US. Being the first class in Oceanography back in my university in Brazil, I had the chance to build and develop the simulation for the Amazon river plume using ROMS. I had my first contact with python in 2012 while doing my exchange program in Canada. At the time, I was coding in python to calculate potential energy from internal waves in a laboratory experiment. After returning to Brazil, I started applying python to pre and pos-process the ROMS data, which I was very successful.

During my masters, I was capable to use my skills acquired with python and ROMS and apply that to demonstrate the exposure to low Dissolved Oxygen, low pH, and high temperatures expected by the end of 21st century in CMIP5 outputs can be less harmful to benthic organisms than we expected due to short term variabilities (i.e: internal waves) that are normally not taken into account when doing lab experiments (Fagundes *et al.,* under revision at Nature *Scientific Reports*). During my masters, I was able to explore more scipy with its statisical library as well as gained a deeper knowledge of how powerful numpy and matplotlib are for oceanographic dataset.

In the year of 2019, I was granted with the chance to participate in The OceanHackWeek (OHW) 2019. This summer school happens every year in Seattle, WA. The OHW is mainly focused on learning new tools for data analysis, image processing, cloud computing and machine learning in python for advanced python users. There I had the chance to work with researchers and PhD students from different backgrounds. As my final project, I worked along with a researcher to predict tuna larvae using CMIP6 dataset using ML (see my github address in my CV for more details). That was my first contact with applied ML, courses in the Computer Science department at UGA. Part of my project is to understand El Nino impact on oxygen dynamics for the end of 21st century in the Southern California Current System using high-resolution coupled WRF + ROMS + bioFennel. My tentative idea for this summer school would be to create a tool where we could get the dataset from CMIP6 and be able to estimate fisheries stocks (i.e: tuna, salmon) using phytoplankton, ocean currents, and water masses. This idea would be useful at first to give us an idea how the fisheries stocks will be around the global oceans.

I truly believe we can learn more by teaching others, and therefore, I intend to give a seminar that gives the opportunity for other students from engineering and environmental sciences to learn it. Also, high school students could benefit to learn more about the interaction between programming in python and climate. Moreover, this summer school will also help me to understand and explore new concepts in my research as well as getting to know future collaborators in python for climate analysis field.

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