Motivation For Participation - Tiro Nkemelang

Africa, though inarguably the most vulnerable to global shocks, the continent generally lags behind in several aspects of research, including in the field of climate change research. The common reasoning usually put forward is the lack of infrastructure and skilled manpower. This has evolved to be a handicap for progress in several aspects of development on the continent. I'm currently employed as an associate researcher in the climate change division of the Botswana Institute of Technology Research and Innovation, leading a research project on using downscaling techniques to assess the impact of climate change on various sectors of Botswana's economy.

In Botswana, the University of Botswana and the SADC Climate Service Center currently host high performance computing facilities which are largely underutilised. The lack of human capital remains the main reason why the systems are not fully utilised, the few available scientists prefer working in silos and are not taking advantage of the available resources. According to Narasimhan and Motshegwa (no-date), there is a massive HPC skill-gap in Botswana that includes some basic HPC techniques such as parallel programming and programming models as well as task scheduling and load balancing among others. Having these basic skills will not only allow me to take advantage of the available resources in my research space, but will also open doors for collaboration on projects that others in Botswana may have and cannot implement because of lacking manpower.

As a PhD candidate at the University of Cape Town's African Climate and Development Initiative (ACDI), my current research focuses on extreme event attribution (EEA), a subject area that requires dealing with big datasets and heavy computing resources. My lack of training in HPC currently limits me to the use of personal computers/desktops leading to very slow progress on the project even though there are high performance computing facilities at my disposal both at UCT and the Centre for High Performance Computing (CHPC) in South Africa. This training will therefore come in handy. An introduction to agile software development will particularly be useful, it will provide the necessary foundation to drive for a move away from the silo mentality and learn how to work in teams to facilitate for better code development in the context of climate change research in Africa. An introduction to various techniques used in post processing and visualizing big data will also be particularly useful for both my current PhD research project and future projects that I will participate in.

I am of the view that, even though HPC capacity and utilization is still very low in Sub-Saharan Africa, Botswana in particular, learning best practices when it comes to optimizing the use of the limited available resources is critical. This will not only advance research on the African continent, it will also provide a base for future advancements of HPC utilization in Africa, allowing the continent to tap on this largely unexplored venture.

References

Lakshmi Narasimhan V. and Motshegwa T., (no-date), **'Parallel & High Performance Computing Education – A Botswana Perspective'**, Available online at https://tcpp.cs.gsu.edu/curriculum/?q=system/files/paper%201_0.pdf, [Accessed 05-03-2020]