HPC Activity Group Meeting 11/14/24

Attendance: Michael Kirby, Anne Mook, Sunetra Das, Brandon Shanks, Bill Carpenter, Jesse Burkhardt, Chris Snow, Simon Tavener, David King, Nanadini Nim,

Discussion on HPC education objectives:

- Vet students coming in with no experience to bioinformatics and HPC. Looking for easy entry with fast path to computing
- For the business school, not integrated with high-level data science / HPC.
- DS510,511,512 with final course being on bioinformatics
- Simon has had discussions with business school in terms of both undergraduate and graduate. Introducing synergy with graduate certificates
    - Data science general concentration with minor in another thing such as business
- HPC 4-week workshops are helpful and encouraged
- When it comes to ML and AI working on entry level and avoiding duplication of resources at small university
- When talking about HPC, are ML and AI synonymous?
    - Discussion of there being lots of resources across different departments for subjects in ML and AI and not HPC
- One option to solve this problem would be a foundational course that would apply to all further topics for ML
    - Risk of repetition and waste of resources for single foundational class taught by one department.
    - Trouble comes when you need resources to teach foundational material for specialized departments and topics
    - Important to also feature foundational teaching on HPC (how to use these skills on systems)
- RNAC 4-week class that does 2 weeks of HPC (zero command line experience needed)
    - After that class, is when the question of “what comes next” arises. Specialization is needed
    - Coding Club meets twice weekly (David King contact)
- Idea of DSRI working with other programs to create core class on HPC and linux (offering for credit or not for credit still in discussion)
    - Teaching first a user guide and then follow up with programmer
- Bill noted that from his perspective teaching virtual environments and containerization to be the next step for instruction needed
    - This will lead into GPU education

    - Michael noted that GPU usage on Riviera is still under-utilized and that no courses are currently being offered that teach GPU computing on HPC
- How are graduate students using the GPUs of Riviera?
    - Either poorly or self-taught
- Follow-up question, what is the minimal amount material would you offer in a course to be effective?
    - Practical aspects of using GPU code higher need than writing the code for GPU
- How can we engage students to feel comfortable on using HPC?
    - Giving them opportunities to dive in and use an HPC to inspire interest in learning more
    - Students want to see results in their own particular area. Very difficult for a single course. Again the idea of basic and then specialization training
    - 3 modules: first two on basics, final one on specific topic (single instructor would not be able to do all this)
    - Jesse mentioned being able to take the first two modules would be great to then go and teach grad students in his own department (third module)
    - First modules could also emphasize the jargon related to HPC and coding
    - ChatGPT has been very helpful in certain circumstances to fill in gaps / increase comfort with coding
        - Next question is inference. How do you know if the code is garbage or not? DS335 (taught by statistics teaching inference with data)
- HPC for other disciplines (outside traditional HPC users) it will need to become necessary in order to get students engaged with it

HPC won't be the end goal, but a tool to achieve their specific research questions