

## **LESSON PLAN: Introduction to High Performance Computing (HPC)**

Instructor: Jens Mueller

Requested TAs: Jason Bracken

### **Logistics:**

Software needed: NX Nomachine from nomachine.com, WinSCP from winscp.net (Windows), filezilla from filezilla-project.org (MAC) MobaXTerm from <https://mobaxterm.mobatek.net/> (Windows)

What needs to be done in advance?

- Install packages on the students personal (laptop) computers
- Have Redhawk cluster student accounts created 2 weeks prior to workshop
- Have premade scripts and datasets on cluster ready for Exercises
- Have problem sets for students to deal with for Day 2
- Make cluster reservations for class 2 weeks prior to workshop

### **Lesson plan, Day 1 (10am-12:30pm)**

#### **Intro – Overview of HPC: 50 min**

- Historical background of high performance computing (HPC)
- Application areas of HPC
- Overview of current HPC systems in the world and in the US
- Overview of the Redhawk cluster

#### **Break 10 min**

#### **Accessing HPC systems 25 min**

- Shell access
- Desktop access via NX Nomachine and MobaXterm
- File system overview and file transfer

#### **Break 5 min**

#### **Interactive: Configuring access for users and connecting to Redhawk 60 min**

- Configuring NX, WinSCP, MobaXTerm, filezilla
- Configuring ssh keypairs (optional)
- Launching shell and accessing compute nodes

### **Lesson plan, Day 2 (10am-12:30pm)**

#### **Intro to compute jobs: 40 min**

- Designing, configuring and submitting compute jobs (interactive, batch)
- Monitoring processes, resource usage and compute jobs

- Managing Input/Output (I/O)
- Overview of parallel compute jobs

**Break 10 min**

**Exercises I 35min**

- Design of a basic compute job (R, Matlab, Python ...)
- Submission and monitoring of compute job
- Postprocessing

**Break 5 min**

**Exercises II 45 min**

- Design of parallel compute job (Matlab)
- Submission and monitoring of compute job
- Postprocessing

**Q&A: 15 min**

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