

Scientific Computing Bootcamp List of Topics

Introducing the Shell

<http://geocarpentry.github.io/2015-01-07-instaar/lessons/jk-shell/tutorial.html>

- An introduction to UNIX and shell commands
- Automating your actions with the shell
- Running command line programs
- Searching for text within files
- Compiling software: the “make” and “build” commands

Introducing Python

<http://geocarpentry.github.io/2015-01-07-instaar/lessons/jk-python/intro.html>

- Using Python to write scripts that can be run from the command line
- Using iPython notebook to write and execute scripts in the browser
- Writing unit tests to confirm the accuracy of your Python code
- Making and saving publication-quality plots using matplotlib
- Practicing programming “best practices” such as commenting, creating chunks (functions, objects/classes, and modules) and combining chunks (function composition)

Introduction to Version Control with Git and Github

<http://geocarpentry.github.io/2015-01-07-instaar/intermediate/git/index.html>

“Version control is the lab notebook of the digital world: it's what professionals use to keep track of what they've done and to collaborate with other people.”

- Creating a Github repository to share software with group members and collectively edit code, documents and websites.
- Github retains records of all modifications made by any team member.

Application-oriented tutorials

These tutorials will be developed based on student interests and may include:

- Working with large imagery (e.g., radar or satellite data)
- Using pandas (the Python Data Analysis Library) to process SQL or other database data (e.g., river discharge data)
- Advanced visualization or special formats like netcdf
- Using Python as a wrapper to call lab code written in other languages (e.g., MATLAB, IDL, or FORTRAN)
- Processing large numbers of small files (e.g., sensor data saved every hour by an instrument)

Project sessions

On Day 3, the instructors will be available to assist students who wish to work with their own datasets from their PhD research. For those who would prefer, instructors will also provide a coding project based on a recently developed hydrological model. This project will bring together all of the lessons from the workshop in a final module.