

Educational Workshop: Advances in Neuroimaging Workflow

Acquisition of higher resolution data and the use of iterative and computationally intensive algorithms puts a strain on the computational resources and data storage available in a lab. Demands for reproducibility motivate figuring out how to keep workflows and their underlying software stacks identical to replicate, share, and reproduce results. This workshop will describe tools for advanced neuroimaging workflow that exploit capabilities of AWS.

Neuroimaging pre-processing involves multiple computationally intensive steps that must be checked, possibly re-run, and probably executed in parallel to complete in a reasonable amount of time. Further, reproducibility is critical. We will describe the use of containers, native AWS infrastructure, and the open source project Nextflow (a workflow management system that can orchestrate the execution of neuroimaging workflows on a variety of platforms) as a portable solution for this problem.

Finally, one of the directions enabled by cloud computing is the ability to scale out to reduce execution time, to perform computationally intense operations without waiting. We will describe how to use the Python CloudKnot library to perform parallel operations (such as processing individual voxels or perform tractography) quickly and interactively, e.g. from a Jupyter notebook.

Speakers:

Guillaume Thead

Mengxue Kang

Ariel Rokem