Tutorial introduction to reconstruction of synchrotron-based X-ray computed tomography data with *ufo-kit* software

Canadian Light Source, 29-30 October, 2018

Day one

Registration in User Office; Breakfast. (Room 2068 8.00-9.00)

Morning introduction session: synchrotron-based X-ray tomography and ufo-kit (9.00-12.00, Room 2068)

1) Synchrotron-based computed tomography (sCT) data acquisition
2) Typical tasks encountered in reconstruction of sCT data

Coffee break (10-10.30)

3) *Ufo-kit*: an introduction to the software kit
4) Applying *ufo-kit* to sCT data: typical data flow

Lunch (12.00-13.00)

Afternoon practical sessions: *ufo-kit* in action (13.00-17.00, Room 1117, 4-5 terminals)

1) Getting familiar with the environment (30 min)
2) Ordinary CT reconstruction with *tofu gui*, including search for the center of rotation (30 min)
3) Single step CT reconstruction in command-line (30 min)
4) Automating an *ufo-kit* task: search for axis of rotation with an *sh* script (30 min)

Coffee break (15.00-15.30)

5) Step-by-step reconstruction with ring removal applied to sinograms (30 min)
6) Vertical stitching and preparation of volume for visualization (30 min)
7) Putting it all together in a single *sh* script for batch processing (1 hour)

Pizza and beer (Ogle Hall, ~18.00)

Day two **(Room 1117)**

Breakfast 8.00-9.00

Morning practical session: concluding previous day exercises and advanced topics

8) Phase-retrieval
9) *Ufo-filters* for general image processing (remove outliers, median, non local means, bin, etc)
10) Creating pre-processing pipelines with *ufo-launch*
11) Half-acquisition mode
12) More *sh* scripting for automation of image processing and CT reconstruction tasks
13) Scripting in *python* for batch processing with *ufo-kit*

End of workshop tutorials (~12 pm)