cryoEDU

An online curriculum and software platform for hands-on learning in single-particle cryo-EM and cryo-ET

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CryoEM
TRANSFORMATIVE HIGH RESOLUTION CRYO-ELECTRON MICROSCOPY

A step-by-step guide to accessing & using RELION simulator

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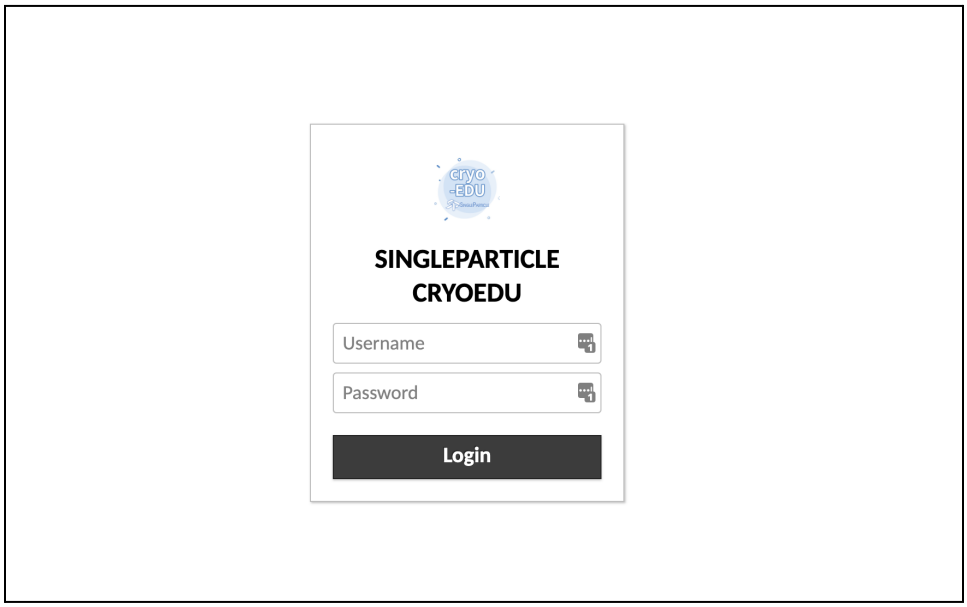
1. Access the cloud desktop from web browser

Recommended browser: Google Chrome
URL to access desktop: http://132.249.229.224:8080/cryoedu/#/

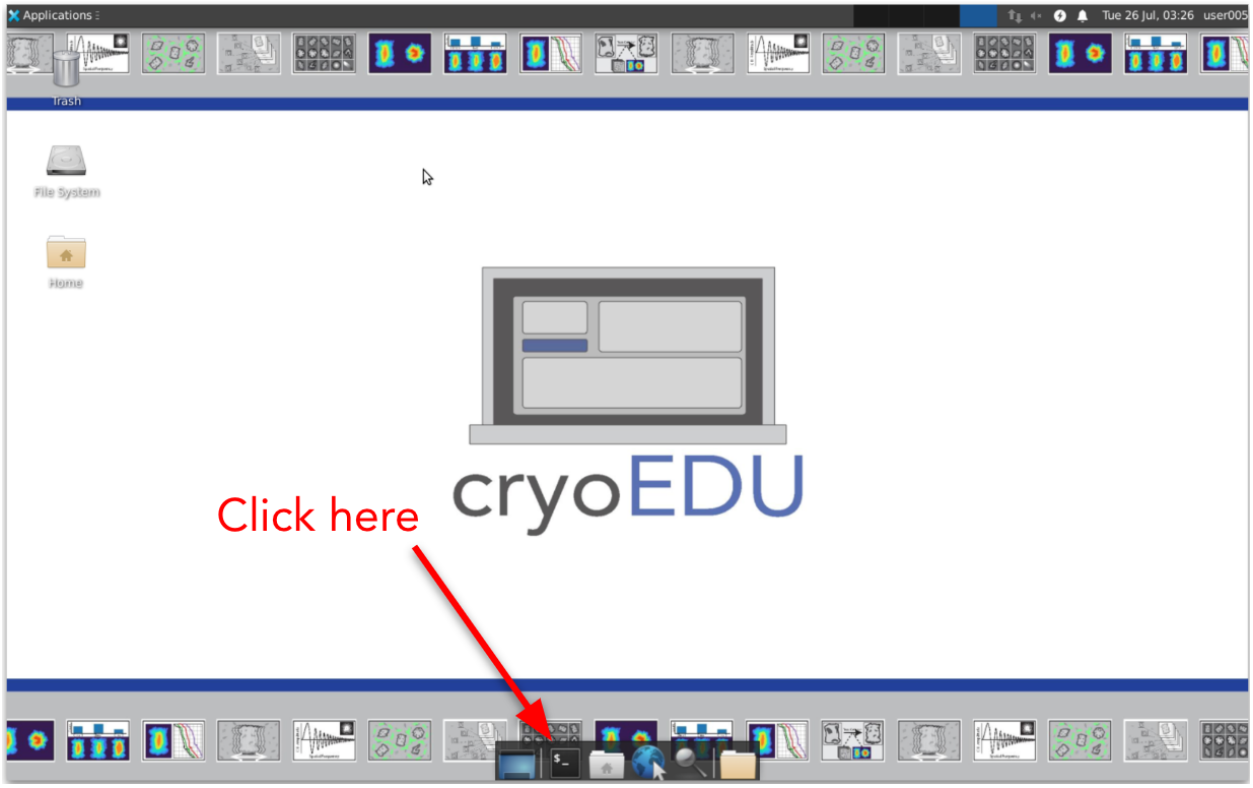
-> When successful, you should see the landing page



Input username & password provided

2. Open terminal on cloud desktop

On the desktop, open the terminal by clicking on the Terminal icon.

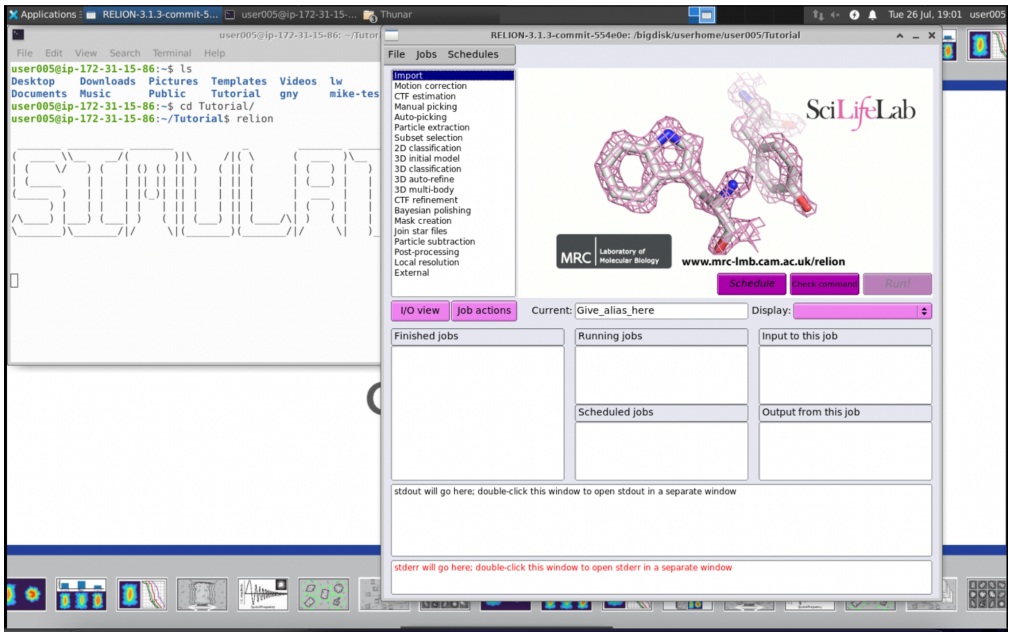


Useful Linux commands:

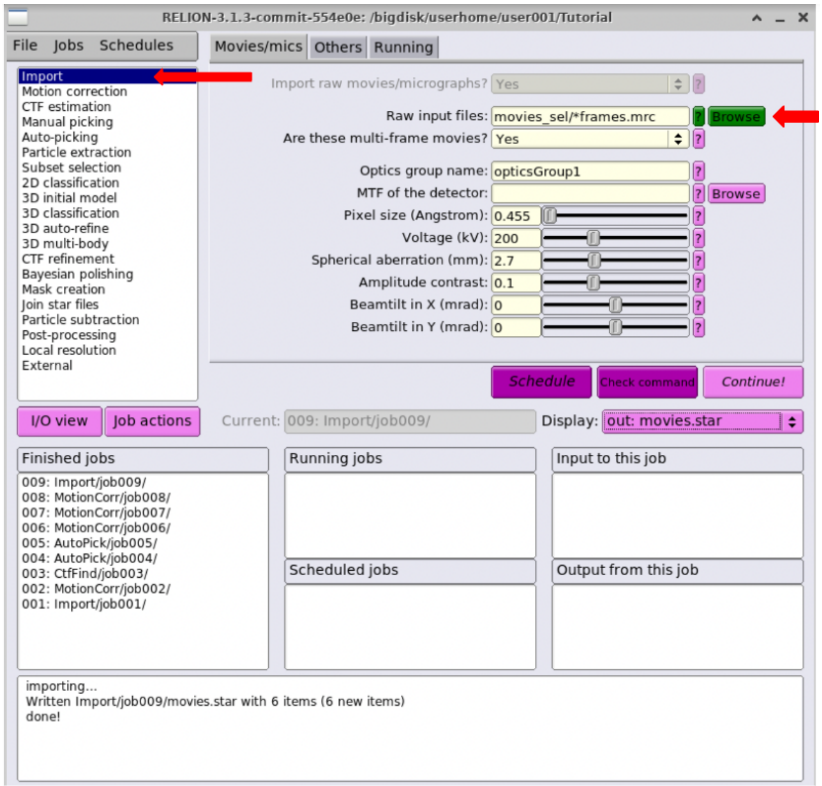
- `cd` - change directory. *Example*: move into the directory named 'Tutorial':
  - `$ cd Tutorial`
- `ls` - lists contents of current directory. *Example*: lists contents of directory ''Tutorial':
  - `$ ls Tutorial`
- `mkdir` - makes a new directory. *Example*: creates a directory names 'test':
  - `$ mkdir test`

3. Open RELION & import movies

In project directory (e.g., 'Tutorial'), open RELION by typing: `relion`.

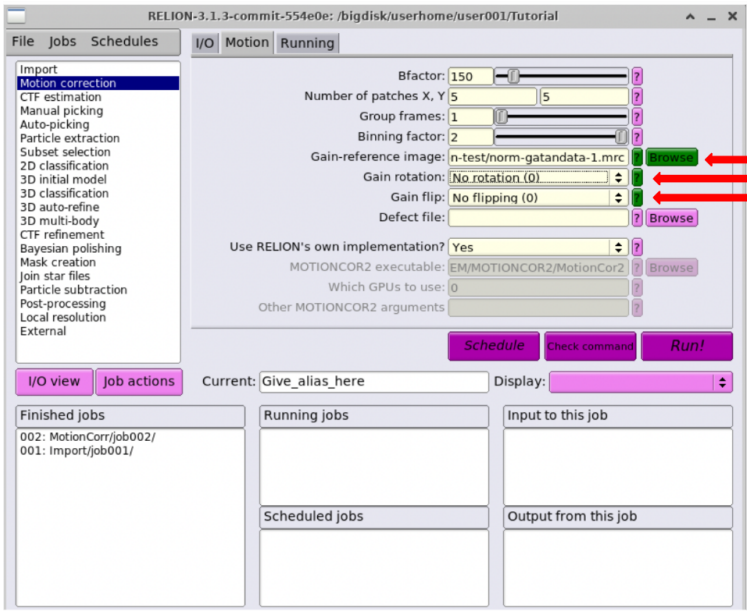


Click 'Import' and then input movie path into box with green browse button.

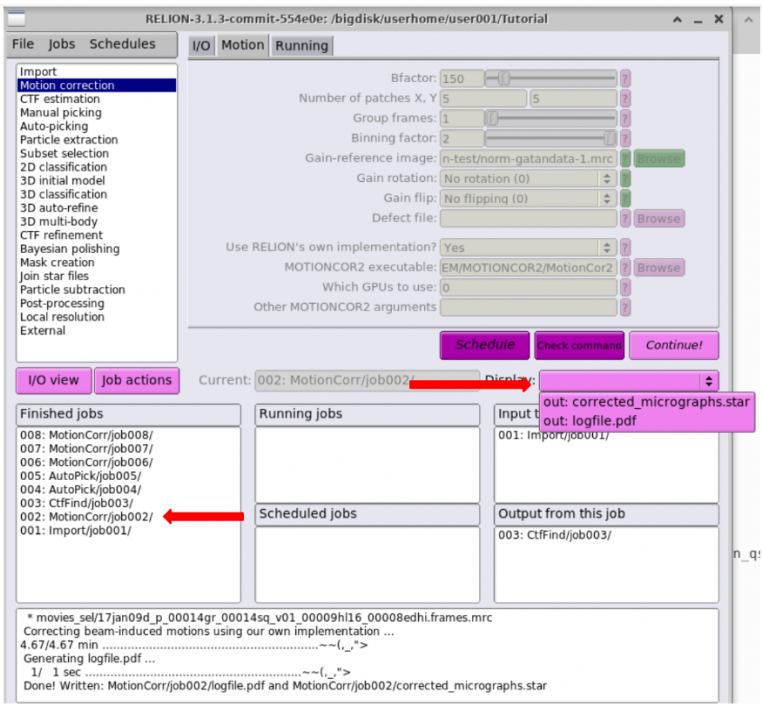


4. Run motion correction & visualize results

a. Specify your Import job (e.g., `Import/job001`) as the Input in the `I/O` tab.
b. Change parameters related to gain reference application. Selecting the gain reference file from the `movies_sel/` directory: `norm-gatandata-1.mrc`
c. Click `Run` when ready to get results from precalculation database



After job finishes, it will move to the '`Finished jobs`' list and you can click on `Display` outputs. Clicking on



`corrected-micrographs.star` will allow you to look at the micrographs whereas `logfile.pdf` will display log outputs.

5. Displaying micrographs

Choice #1: After motion correction: Select `corrected_micrographs.star` as the output

- Make sure to change the scaling factor to 0.1 or 0.2 otherwise because the full micrograph size is very large

Choice #2: Using `relion_display` lets you lowpass filter the the micrographs for easier viewing

From the command line, list the output micrographs directory from Motion Correction:

```
$ ls MotionCorr/job002/movies_sel/
```

This will show you all files in the output motion correction folder. Using one of the filenames in this directory, type the following command:

```
$ relion_display --i
MotionCorr/job002/movies_sel/17jan09d_p_00014gr_00014sq_v01_00009hl16
_00002edhi_frames.mrc --gui
```

Then specify a lowpass filter value (e.g., 20) and a scaling factor (0.1).

6. Useful RELION commands

`relion_image_handler` - A general tool for manipulating and interrogating images

- Adding the option `--stats` will show the image/stack pixel dimensions

`relion_display` - Displays particle stacks, micrographs, slices through 3D volumes

- Adding the option `--gui` will allow interactive choice of filtering and scaling