Doing research & skills to acrue

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This document contains some instructions for students/postdocs that I work with and covers some of the skills that I expect students to have.

- Research is not one-size-fits-all, and there are always special circumstances and cases. Nevertheless, you should read the points here has **very strong recommendations**.

1 Keep a log

Have a document which contains some notes on what you did each week. It is good to be able to go back in time and trace your thoughts, this allows you to detect it you are chasing a moving target, or reinventing the wheel...

- **Use math.** Formalize your thoughts.
- If you do, you might want to directly use latex (or lyx). This will make it easier to reuse stuff later when writing a paper.
- If you have preliminary results: include them! Also make sure that you make sure you can reproduce! (handle to git commit?)
- If you don't have any preliminary results: why not? This is probably a bad sign...
- The log is for yourself, but you can use it to effectively structure our meetings.

2 Make notes about the papers that you read

- If you read something, **make some notes about it!** You will read many many papers and will inevitably forgot some of the papers that you read. Therefore it is very important to make notes.
- Construct a bibtex entry in your own master <yourname.bib> bibfile. Cite the paper in your paper-list.
- Notes do not have to be extensive: it can be just 3 sentences explaining the main idea.
- But notes can extensive if that is helpful for your own understanding! Try writing down the core of a technical idea of a paper... you will notice that it is not easy. This means you're learning.)
- Can be a separate document, or part of your log.
- If you think the paper could be of interest to others in the group, share it on the mattermost channel. Perhaps include a 3 sentence description.
- Where to store your notes...? In a place that is safe and backed up of course.

3 Learn Git

- You will need to be able to use version control for your coding, and paper writing. So please learn git. There are plenty of tutorials.
- Please: **do not put PDFs-in-progress** in the repo...
  - If I check out, I will want recompile (to make sure it is the latest PDF), this immediately puts me in a place that I end up with a conflict when doing another pull...
- And **NEVER EVER** commit a whole bunch of binary blobs that should not be there to a repo...!
  - (You will spend 1-2 days learning to deflate a repo... it is *not* going to be fun!)

4 Automate everything

- The entire chain of processing experimental results should be automated.
- **Avoid *any* manual steps** (such as copying result filed before plotting)