BSc, MSc & PhD theses in

Neurobiopsychology

Congratulations, you have made a **smart choice**. In the following we would like to give some general information on the local customs, do's and don'ts. Some issues are rather concrete, some are more to think about. You might think, this is all right and well, but not for you because you are not that advanced yet or special in some other aspect. Think again.

1. Plan your **time**

• The scope of bachelor theses is usually 3-4 months, masters about half a year. Start with the thesis when you have no other major obligations and are ready to give it priority. It is a good idea to do it in one block and have it done.

• When you start you might not have an exact idea what's up, nor do we know you that well. After about 2 weeks into the thesis, when you have a better idea about the experimental work, programming etc. **prepare a rough schedule** and discuss it with Peter or a doctoral student, who is in charge of your project. As a rule of thumb, everything needs twice the amount of time, even when this rule is taken into account. Put in milestones, so that you can check whether you are on track.

• Please schedule enough time not just for planning and executing your experiments, but also for data analysis and writing everything. In my experience the latter two need more than half of the total time. Please avoid going past the deadline. Specifically, please take care to **submit your thesis** before you move on or need a statement that you have finished it. Sounds trivial, believe me I know what I'm talking about.

• It sometimes happens that you made tight plans for moving on after your thesis. In case you need a recommendation letter it is highly useful to submit your thesis in time. What you **must not do** under any circumstances, not even think about, dreaming of finishing your thesis at the new place. It just does not work out.

2. Get **organized**

• Right at the beginning of your "NBP-membership" you should **see Marion**. She is the one to contact for all kinds of administrative questions like getting keys, office material and assistance with "Dienstreiseanträge" etc. She will hand you a personal data sheet that we would ask you to fill in for us for multiple organizational and statistical purposes.

- Furthermore, on **Stud.IP** you find help, guidelines and instruction manuals for most lab equipment. For example within "Neurobiopsychology – internal" ⇒ "Eye-tracking" the eye-tracking manual is posted. Please read this stuff before you start working with these instruments.

- Within the group you can receive a lot of **help** e.g. with basic computer support, hands-on instruction with eye-tracking, literature search, writing English with style. Use it.

- In the NBP workgroup we **provide** all necessary equipment, computers and software. Workspace in the rooms available is left to self-organization. In case you have trouble finding a suitable desk or something is missing, please tell Peter.

- **Computers** are important for all of us. Please have a look at the document "**nbp_beginners.pdf**". Please mind that they are plugged into the red electric sockets on the walls. In case you need to turn off a computer, please take care that no one is connected and running a process before you turn it off or disconnect it from the network. The admins and the NBP proxy (Niklas Wilming) take care of the general well being of the computers. When a computer has to be moved from one room to the next, general applications or system software has to be updated or something general is buggy (with this I do not mean your self written MatLab programs), tell them.

- You are responsible keeping the lab, computers, workspace in good shape. E.g. if you notice that something in the lab is broken, even if you do not need it, make a notice. … Just use a lot of **common sense**.

- Make sure to use the opportunities you have: **Be around** on Westerberg a lot; several days per week, talk to your fellow students; try to understand what, why and how they are pursuing their projects; talk to Alper, Torsten, Madhu, Kai, Tim, Sebastian, Robert, Andrei, Saskia, Sabine, Nora, Selim, Jose, Michael, Niklas or Peter often, at the very least weekly. For some projects we organize project-oriented meetings (POMs) on Tuesdays. This point is dear to me. Off all the bachelor and master student, those who spent a lot of time on Westerberg we have a near 100% success rate. When you work at some other place like home, you run into the risk to go completely astray. It has happened that students find themselves spending a lot of time on a minor issue, that turns out to be completely irrelevant. By spending enough time in the AVZ you make sure to receive help or sanity checks by the others early enough.

3. A systematic start into **your thesis**

- Writing your thesis you will document what you have done. Start **documentation early on**.

- It is recommended that each time you have a relevant **figure** or something, put it into production quality and store it in a separate folder. With production quality I mean the opposite of a quick screen shot. Think about

what you want to tell with the figure. Make that point salient and discard any unrelated issue. Any reader should get intuitively the same idea. Use a font size that is easily readable, few but large tick marks, clear annotation of the axis. Write one paragraph on the technical issue, how you obtained that figure. This paragraph will turn into the figure legend later. Write one paragraph what you want to tell with the figure. This paragraph will turn into the written text later. With production quality I mean that the figure is finished in every aspect and you do not have to touch it again at all. Seriously, do these steps while everything is fresh on your mind. Later you will have forgotten how to do it, the figure will look slightly different, be inconsistent with other figures and a great mess emerge.

• In a thesis you **document what you have done**. This includes potentially dead-ends, failures and misleading ideas. – This is quite opposite to a paper. In a paper you discard anything that is not in the center of the story line or an important control. – Here, in your theses, sections that do not fit the general story line might be shifted to an appendix. Specific code and pilot projects are suitable for an appendix as well. You should mention everything you put in work. In a PhD thesis this may include collaborative work on loosely or unrelated projects, supervision of other theses, developing setups, … You have to put your work in writing to make it easy for me to give you a good mark.

• Find out the mysteries of **Context-Contents-Conclusion (CCC)**. At the beginning of each paragraph you write what the paragraph is about. This is the context. It gives the scope and may be formulated as a question and should not contain results or statements as such. At the end you write the conclusion. This is the literal bottom-line. It gives an answer within the scope of the context. Read the sequence of conclusions, it gives the summary. Read the context and conclusion of a paragraph, it must make sense, otherwise you have changed topic in between. In between is the contents. It's only purpose is to lead up and support the conclusion. Once the conclusion is accepted, the content as such is forgotten. Read the sequence of contexts (first sentences), it gives you the outline of your theses.

• In case you stumble upon a strange observation. The general procedure is **Document-and-Discuss (DD)**. Document what has happened, then discuss possible reasons, then which type of investigations could resolve the issue.

• For your thesis and the abstract thereof the **20-20-40-20 rule** applies. It gives a rough estimate of intro, method, result and discussion.

   o The introduction should contain a focused line of argument leading up to your project. There is no need to write extensive reviews of the field you just entered into. In general this can be done within 20% of the whole thesis.

   o The methods cover all your methods. A good part of the work is invested into the preparation of stimuli, programming a simulator, constructing or checking hardware. Document it, this may be 20% or how much it takes.

o The result section is the core of your thesis. I like a slow start with a careful documentation of raw data and basic properties. First give examples, then the statistics. Identify you example in the statistics. Then proceed to more advanced analysis. These will start homing in on the big questions and hypothesis. Also document the controls. Here you document what you have done (see above). The result part may be 40% of the thesis. More is not a problem.

o In the discussion section, when you demonstrate that you understood what it is all about, this makes me happy. Start with a super short summary (assemble all conclusion sentences of the result section, massage and shorten, and a summary on one more abstract level emerges). Next discuss potential problems of your study. Then relate it to other current research. At the end there is some mind stretching, where it could all leads to.

o A summary of not more than 1 page is the most important part of your thesis. It will be read by many more people than the main text. The division into intro, method, result and discussion is the same 20-20-40-20 rule.

• Be kind and have a look at the **Check out list**. Do the mini-CV for the Alumni page, this helps future students.

4. Be **active**

• We have **tea-time** twice a week (Monday 13:00 and Thursday13:00) with a 1-slide presentation and cookies. It is a wonderful forum to tell the others what you are up to, when you have a cool piece of software, a great result, discovered a problem, whatever. Don't be shy, the schedule is on Stud.IP Neurobiology Internal Wiki.

• **Journal Club** Monday morning at 10:15 is a good opportunity to keep in touch with current literature. While you work on your master, it does you good to participate, during your PhD I expect that you participate.

• There are major differences between writing a paper and writing a thesis. A paper is about answering a question; **a thesis documents your work**. As a consequence, a thesis may contain dead ends, technical annex, specific programs, detailed methods considerations, documentation of not significant results, anything you did, not just anything you succeeded in!

• The **final thesis** should be accompanied by a CD/DVD with PDF of thesis and poster (see below) and relevant raw data.

• Preparing a **poster** describing your thesis work is also a part of the project package. On Stud.IP you also find pdfs of previous thesis and posters. As a Bachlor or Master student you should do a poster once, as a PhD student you should do it twice a year. You should go to conferences with roughly the same rate. There are the local conferences (HIT, graduation day, Elterntag,

Gestalt), the national conferences (Göttingen, Regensburg 09, Berlin 09), and the international conferences (FENS, SFN). A poster is your ticket. – If it is July and you find yourself not having prepared a poster yet, it is still a good idea. You put your thoughts on paper, a large one. You think about the structure, where you are and what is important next. There is a special wiki page on nbp trac explaining why you should do that on a regular basis.

- During your thesis you will enjoy a considerable amount of **freedom**. This is good, use it. See the list above, it is the key to success.

Most importantly: science is **fun**, great **fun**. **Enjoy** your thesis!